A Symposium Sponsored By
The Federal Reserve Bank of Kansas City

CHANGING CAPITAL MARKETS: IMPLICATIONS FOR MONETARY POLICY

CHANGING CAPITAL MARKETS:
Implications for Monetary Policy

A Symposium Sponsored by
The Federal Reserve Bank of Kansas City

Jackson Hole, Wyoming
August 19 - 21,1993

Contents

Foreword *vii*

The Contributors *ix*

Symposium Summary *xvii*

The Moderators
JOHN W. CROW, *Governor,*
Bank of Canada
MAURICE *F.* DOYLE, *Governor,*
Central Bank of Ireland

OPENING REMARKS **1**
ALAN GREENSPAN, *Chairman,*
Board of Governors of the Federal Reserve System

FINANCIAL MARKETS IN TRANSITION—OR THE DECLINE OF COMMERCIAL BANKING **5**
FRANKLIN R. EDWARDS, *Professor,*
Columbia University

Commentary: KUMIHARU SHIGEHARA, **63**
Head of the Department of Economics and Statistics, OECD

CREDIT CHANNEL OR CREDIT ACTIONS? AN INTERPRETATION OF THE POSTWAR TRANSMISSION MECHANISM **71**
CHRISTINA D. ROMER, *Professor,*
University of California at Berkeley

DAVID H. ROMER, *Professor,*
University of California at Berkeley

Commentary: CHARLES FREEDMAN, 117
Deputy Governor, Bank of Canada

Commentary: MARK GERTLER, *Professor,* **131**
Columbia University

THE ROLE OF JUDGMENT AND DISCRETION IN THE CONDUCT OF MONETARY POLICY: CONSEQUENCES OF CHANGING FINANCIAL MARKETS **151**
BENJAMIN M. FRIEDMAN, *Professor,*
Harvard University

Commentary: DONALD L. KOHN, *Director,* 197
Division of Monetary Affairs, Board of Governors of the Federal Reserve System

Commentary: REINER KÖNIG, *Director,* 205
Department of Economics, Deutsche Bundesbank

Commentary: ALLAN H. MELTZER, *Professor,* 213
Carnegie-Mellon University

FINANCIAL MARKETS IN 2020 227
CHARLES S. SANFORD, JR., *Chairman,*
Bankers Trust

THE INTEGRATION OF WORLD CAPITAL MARKETS **245**
MICHAEL MUSSA, *Director of Research,*
International Monetary Fund
MORRIS GOLDSTEIN, *Deputy Director of Research,*
International Monetary Fund

Commentary: MARTIN FELDSTEIN, *President,* **315**
National Bureau of Economic Research

Commentary: ROBERT A. JOHNSON 323
Managing Director, Soros Fund Management

MONETARY POLICY IMPLICATIONS OF INCREASED CAPITAL FLOWS 331
ANDREW D. CROCKETT, *Executive Director, Bank of England*

Commentary: ANTONIO M. BORGES, *Professor and Dean, INSEAD* 365

Commentary: ALBERTO GIOVANNINI, *Professor, Columbia University, Consultant to Ministry of Treasury, Italy* 371

OVERVIEW PANELISTS

STANLEY FISCHER, *Professor, Massachusetts Institute of Technology* 379

JACOB A. FRENKEL, *Governor, Bank of Israel* 389

TOYOO GYOHTEN, *Chairman, Board of Directors, Bank of Tokyo, Ltd.* 399

HANS TIETMEYER, *Vice President, Deutsche Bundesbank* 405

The Participants 417

The Symposium Series 422

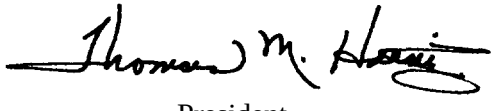
Foreword

Changes in the structure of financial markets and institutions can have profound implications for the operation and effectiveness of monetary policy. One of the most significant developments in financial markets in recent years is the growing prominence of capital markets. In many countries, financial intermediation is increasingly carried out directly in capital or securities markets rather than through banks and other traditional intermediaries. In addition, reduced barriers to capital mobility have increased the linkages among financial markets worldwide.

To explore the implications of these financial market developments, the Federal Reserve Bank of Kansas City sponsored a symposium on "Changing Capital Markets: Implications for Monetary Policy" at Jackson Hole, Wyoming, on August 19-21, 1993.

We hope these proceedings of the symposium will promote public understanding of the issues discussed and inspire further study of the implications of financial market changes. We also appreciate the contribution of all those who participated in the symposium and made it a notable success. In that regard, special thanks go to Bryon Higgins, Craig Hakkio, and Gordon Sellon in the Bank's Research Division who helped develop this symposium program.

THOMAS M. HOENIG



President
Federal Reserve Bank of Kansas City

The Contributors

Antonio M. **Borges,** ***Professor and Dean, INSEAD***

Mr. Borges has been associated with INSEAD at Fontainebleau since 1980. He has also been a visiting professor of economics at Portuguese Catholic University, at Stanford University, and at the New University of Lisbon. In other professional activities, he has been a consultant to the Prime Minister and to the Ministers of Finance, Industry, Labor and Social Security, and several Portuguese cabinets, as well as to the U.S. Treasury Department, OECD, and the Electric Power Research Institute among many other Portuguese and foreign companies. From May 1990 until March 1993, he was deputy governor of the Bank of Portugal.

Andrew D. Crockett, ***Executive Director, Bank of England***

Mr. Crockett first joined the Bank of England in 1966, serving in the Economic Intelligence and Cashiers' Departments. He was named personal assistant to the managing director of the International Monetary Fund in 1972 and later became chief of the Fund's Special Studies Division, assistant director of the Middle Eastern Department, and deputy director of the Reserch Department with primary responsibility for the World Economic Outlook project. Mr. Crockett rejoined the Bank of England in March 1989 as executive director for overseas affairs.

John W. Crow, ***Governor, Bank of Canada***

Mr. Crow was appointed to a seven-year term as governor of the Bank of Canada in 1987. He joined the Research Department of the bank in 1973 and subsequently served as chief of that department, adviser to the governor, deputy governor, and senior deputy governor. Earlier in his career, he spent 12 years with the International Monetary Fund where he worked as an economist with both the North and South

American Divisions. Mr. Crow is a member of the board of directors of the Canada Deposit Insurance Corporation.

Maurice F. Doyle, ***Governor, Central Bank of Ireland***

Mr. Doyle became governor of the Central Bank of Ireland in 1987, following a 32-year career with Ireland's Department of Finance. He had been in charge of economic planning and budgetary affairs and served as the Irish representative to the OECD and Economic Community (EC) Economy Policy Committees. From 1976 to 1981, he was second secretary in charge of the Public Expenditures Division, and then was named secretary of the Department of Finance, a post he held until his appointment to the central bank. A former member of the EC Monetary Committee, he currently serves on the EC Committee of Central Bank Governors.

Franklin R. Edwards, ***Professor, Columbia University***

Mr. Edwards has been a member of the faculty at the Columbia University Business School, where he holds the Arthur F. Bums Chair in Free and Competitive Enterprise, since 1966. A former vice dean of the school, he has been director of the Center for the Study of Futures Markets since 1980. He is a member of the advisory board of the Center for Law and Economics, the Shadow Financial Regulatory Committee, and the nominating committee of the American Stock Exchange. He was a director of the Futures Industry Association from 1982 to 1987, and has served on advisory panels for several government agencies.

Martin Feldstein, ***President, National Bureau of Economic Research***

Mr. Feldstein is the George F. Baker Professor of Economics at Harvard University and president of the National Bureau of Economic Research, a private nonprofit research organization specializing in nonpartisan studies of the American economy. From 1982 through 1984, Mr. Feldstein chaired President Reagan's Council of Economic Advisers. He is a fellow of the Econometric Society and the National Association of Business Economists and a member of the Trilateral Commission, the Council on Foreign Relations, and the American Academy of Arts and Sciences.

Stanley Fischer, *Professor,*
Massachusetts Institute of Technology

Mr. Fischer, the Elizabeth and James Killian Professor and Director of the World Economy Laboratory at MIT, joined the MIT faculty in 1973. From 1988 to 1990, he was vice president for development economics and chief economist at the World Bank. He has also consulted for the U.S. State Department, the International Monetary Fund, and the Bank of Israel. Mr. Fischer is a fellow of the Econometric Society and the American Academy of Arts and Sciences, a Guggenheim Fellow, and a research associate of the National Bureau of Economic Research. A native of Zambia, he holds several other appointments with international institutions.

Charles Freedman, *Deputy Governor, Bank of Canada*

Mr. Freedman was appointed to his present post in 1988. His principal responsibilities relate to the area of monetary policy design and issues regarding financial institutions. He joined the Bank of Canada in 1974, serving as research adviser in the Research Department, chief of the Department of Monetary and Financial Analysis, and adviser to the governor. During 1989-90, he was the Clifford Clark visiting economist at the Department of Finance of the Government of Canada. Before joining the Bank of Canada, he spent five years on the faculty of the University of Minnesota.

Jacob A. Frenkel, *Governor, Bank of Israel*

Mr. Frenkel was named governor of the Bank of Israel in 1991. He was economic counselor and director of research at the International Monetary Fund from 1987 to 1991, and the David Rockefeller Professor of International Economics at the University of Chicago from 1973 to 1990. He is a member of the G-7 Council, the advisory committee of the Institute for International Economics, and the executive committee of Britain's Center for Economic Policy Research. He is also a research associate of the National Bureau of Economic Research and a fellow of the Econometric Society.

Benjamin M. Friedman, *Professor, Harvard University*

Mr. Friedman is the William Joseph Maier Professor of Political Economy at Harvard University where he is also chairman of the Department of Economics. He directs research on financial markets and

monetary economics at the National Bureau of Economic Research, is a director of the Private Export Funding Corporation, a trustee of the Standish Investment Trust, an associate editor of the ***Journal of Monetary Economics,*** and a member of the Brookings Institution's Panel on Economic Activity and the Council on Foreign Relations. He joined the Harvard faculty in 1972 after working with Morgan Stanley & Co.

Mark Gertler, ***Professor,*** New ***York University***

Mr. Gertler joined the NYU faculty in 1990 after previous appointments at Cornell University and the University of Wisconsin and visiting professorships in the Graduate Schools of Business at Stanford and Columbia Universities. He has also been a visiting scholar at the Federal Reserve Bank of Minneapolis and has continued a similar relationship with the Board of Governors of the Federal Reserve System since 1987. A research associate of the National Bureau of Economic Research, Mr. Gertler focuses on macroeconomic theory, monetary economics, and finance.

Alberto Giovannini, ***Professor, Columbia University***

Mr. Giovannini joined the faculty of Columbia University's Graduate School of Business in 1983. He was a Robert McNamara Fellow at the World Bank in 1986-87, an Olin Fellow at the National Bureau of Economic Research in 1987-88, and a Faculty Research Fellow at the NBER from 1986 to 1990. He is presently an adviser to the Italian Ministry of the Treasury, a consultant to the International Monetary Fund and the World Bank, a member of the Italian Monetary Policy Group, a research fellow at the Centre for Economic Policy Research in London, and an NBER research associate.

Morris Goldstein, ***Deputy Director, Research Department, International Monetary Fund***

Mr. Goldstein was named deputy director of the IMF's Research Department in 1987. He first joined the Fund in 1970 and filled several senior staff positions before accepting his present assignment. He heads the Fund's annual international capital markets missions to Europe, Asia, and North America. He has been a research fellow at the Brookings Institution, a senior technical adviser at the U.S. Treasury Department, and a visiting research associate at the London School of Economics.

Alan Greenspan, ***Chairman,***
Board of Governors of the Federal Reserve System

Mr. Greenspan was appointed in 1991 to a second four-year term as chairman of the Federal Reserve Board. He began his first term in August 1987. Previously, he was chairman and president of the New York economics consulting firm of Townsend-Greenspan & Co., Inc., chairman of President Ford's Council of Economic Advisers, chairman of the National Commission on Social Security Reform, and a member of President Reagan's Economic Policy Advisory Board. He was also senior adviser to the Brookings Institution's Panel on Economic Activity, consultant to the Congressional Budget Office, and president of the National Association of Business Economists.

Toyoo Gyohten, ***Chairman, Board of Directors,***
Bank of Tokyo, Ltd.

Mr. Gyohten was named to his present post in 1992 after having served as adviser to the Bank of Tokyo's board the previous year. His long career with Japan's Ministry of Finance culminated in 1986 with his appointment as vice minister for international affairs. He retired in 1989 and became a visiting professor at Harvard and Princeton Universities and the University of St. Gallen in Switzerland. He presently serves on advisory panels for the New York Stock Exchange, the East Aftrican Development Bank, All-Nippon Airways, and BMW of Munich. He is co-author (with Paul Volcker) of the book, ***Changing Fortunes,*** published in 1992.

Robert ***A.*** Johnson, ***Managing Director,***
Soros Fund Management

In his current position, Mr. Johnson manages a leveraged global investment fund that takes positions in currencies, bonds, stocks, and commodities based on fundamental political and economic trends. Before joining Soros Fund Management, he was a member of the proprietary trading team at Bankers Trust Company and managed an exotic currency fund in the Funds Management Division. Earlier he was chief economist for the Senate Banking Committee, senior economist for the Senate Budget Committee, and a research economist in the Division of International Finance at the Board of Governors of the Federal Reserve System.

Donald L. Kohn, *Director, Division of Monetary Affairs, Board of Governors of the Federal Reserve System*

Mr. Kohn was named to his present position in October 1987, after having served 12 years at the Board as an economist in the Government Finance Section, chief of the Capital Markets Section, associate director in the Division of Research and Statistics, and deputy director in the Office of the Staff Director for Monetary and Financial Policy. He was a financial economist at the Federal Reserve Bank of Kansas City from 1970 to 1975.

Reiner Konig, *Director, Department of Economics, Deutsche Bundesbank*

Mr. Konig became head of the department of economics at the Deutsche Bundesbank in 1991. He had been a staff member of the department at the bank's headquarters since 1972, holding various positions in the monetary policy and balance of payments division. He gained his initial practical experience at a savings bank and at regional branches of the Deutsche Bundesbank.

Allan H. Meltzer, *Professor of Political Economy and Public Policy, Carnegie-Mellon University*

Mr. Meltzer has been at Carnegie-Mellon University since 1964. His work in the field of money and capital markets has brought frequent consulting assignments with Congressional committees, the U.S. Treasury Department, the President's Council of Economic Advisers, the Board of Governors of the Federal Reserve System, foreign governments, and central banks. He is an honorary adviser to the Institute for Monetary and Economic Studies at the Bank of Japan and a member of the President's Economic Policy Advisory Board. Mr. Meltzer is a founder and co-chairman of the Shadow Open Market Committee and a fellow of the National Association of Business Economists.

Michael Mussa, *Economic Counselor and Director of Research, International Monetary Fund*

Mr. Mussa assumed his present position in 1991. He is on leave from the University of Chicago where he is the William H. Abbott Professor of International Business. He joined the faculty there in 1977 after having taught at the University of Rochester, the Graduate

Center of the City University of New York, the London School of Economics, and the Graduate Institute of International Studies in Geneva. From 1986 to 1988, he was a member of the President's Council of Economic Advisers. He is a previous consultant for the IMF and the World Bank and is a research fellow of the National Bureau of Economic Research and a fellow of the Econometric Society.

Christina D. Romer, ***Professor, University of California at Berkeley***

Ms. Romer joined the faculty of the University of California at Berkeley in 1988. A research associate of the National Bureau of Economic Research and co-organizer of the NBER's Annual Workshop on Macroeconomic History, she is also a frequent visiting scholar at the Board of Governors of the Federal Reserve System. Her research interests include the effects of monetary policy changes on the depth and duration of recessions in the twentieth century, and the causes and consequences of the Great Depression.

David H. Romer, ***Professor, University of California at Berkeley***

Mr. Romer became a member of the Berkeley faculty in 1988. He is a research associate at the National Bureau of Economic Research and serves on the editorial boards of four economics journals. He has published extensively on monetary policy. stock market volatility. economic growth, and "New Keynesian" theories of economic fluctuations.

Charles S. Sanford, Jr., ***Chairman, Bankers Trust***

Mr. Sanford is chairman of Bankers Trust New York Corporation and its principal subsidiary, Bankers Trust Company. He joined Bankers Trust in 1961 and held various senior management positions beginning in 1969 when he was named vice president. He was elected president of the bank and the corporation in 1983, deputy chairman in 1986, and chairman in July 1987. He is a member of the Business Roundtable and the Council on Foreign Relations and a director of Mobil Corporation and J.C. Penney Company, Inc.

Kumiharu Shigehara, ***Head of the Department of Economics and Statistics, Organization for Economic Cooperation and Development***

Mr. Shigehara was appointed head of the economics department and chief economist at the OECD in Paris in May 1992. He undertook a number of previous assignments for the OECD during 1970-74, 1980-82, and 1987-89, serving last as director of the General Economics Branch. Between his OECD assignments, he returned to the Bank of Japan where he began his professional career in 1962. He has been manager of international finance and domestic policy planning and representative to the Committee of Bank Supervisors at the Bank of International Settlements. Between 1989 and 1992, he was director-general of the Institute for Monetary and Economic Studies and chief economist at the Bank of Japan.

Hans Tietmeyer, ***Vice President, Deutsche Bundesbank***

Mr. Tietmeyer assumed his present post in August 1991. He had been a member of the board of the Deutsche Bundesbank since January 1990, except for a brief leave as personal adviser to the Federal Chancellor for negotiations on the State Treaty Establishing the Economic, Monetary and Social Union. Most recently, he was responsible for the Foreign Department and the Department of International Monetary Issues, Organizations, and Agreements. Earlier, he filled various supervisory positions in the Federal Ministry of Economics between 1962 and 1982 and was State Secretary in the Federal Ministry of Finance from 1982 to 1989.

Symposium Summary

Gordon H. Sellon, Jr.

Financial markets throughout the world have changed substantially in recent years as capital markets have become deeper and broader. In many countries, financial intermediation is increasingly carried out directly in capital markets rather than through such traditional intermediaries as commercial banks. Moreover, complex linkages among global financial markets have increased capital mobility to the point where considerable amounts of funds cross national borders each day. These developments have potentially important implications for monetary policy in the United States and other countries.

To explore the implications of these financial market trends, the Federal Reserve Bank of Kansas City invited central bankers, academics, and financial market participants to a symposium entitled "Changing Capital Markets: Implications for Monetary Policy." The symposium was held August 19-21, 1993, at Jackson Hole, Wyoming.

This article highlights the issues raised at the symposium and summarizes the papers and commentary. The first section of the article provides an overview of the main issues and identifies areas of agreement and disagreement among program participants. The remaining sections summarize the viewpoints of the program participants and their policy recommendations.

Symposium highlights

Over the past decade, two significant trends have emerged in

financial markets around the world. First, there has been tremendous growth in domestic capital markets in terms of the volume and value of transactions and in the development of new types of securities. Associated with this growth in capital markets has been an apparent decline in the traditional role of commercial banks, as both depositors and borrowers have sought alternative sources for investment and financing. Second, in response to financial market liberalization around the world, international capital mobility has risen dramatically. Evidence of the significance of this trend can be found most strikingly in the recent turmoil in the European Exchange Rate Mechanism (ERM) but is also apparent in the increased inflow of investment into Latin America and the volatility of Japan's overseas investment.

As Federal Reserve Chairman Alan Greenspan noted in his introductory remarks at the symposium, both of these trends have important implications for monetary policy. If banks play a smaller role or a different role in the financial system, the monetary transmission mechanism may be altered. If so, monetary policy could become less effective or the impact of policy on economic activity may be different than in the past. In addition, it may become more difficult to implement monetary policy. These financial market changes may distort the information provided by traditional policy indicators such as the monetary aggregates. And, the greater capital mobility resulting from increased linkages among financial markets may make it more difficult for central banks to balance domestic policy considerations against international obligations. Finally, both trends have implications for financial stability. Regardless of whether they tend to enhance or diminish the inherent stability of the financial system, these changes in financial markets may complicate the task of central banks in assessing and controlling systemic risk and in responding to financial crises.

Symposium participants debated the significance of these trends and, in the course of their discussion, reached broad agreement on a range of issues. Most participants felt financial market changes have altered the channels through which monetary policy affects the economy but have not impaired the overall ability of central banks to affect economic activity. At the same time, however, there was general

agreement these changes have caused operational difficulties for monetary policy by reducing the usefulness of monetary aggregates and by making it more difficult to operate a fixed exchange rate system. Participants also concurred that while new methods of hedging risks could promote financial stability, problems of assessing and limiting systemic risk have become more complex.

In contrast to broad consensus on the major issues, significant differences of opinion emerged about the appropriate response of central banks to these challenges. Some participants stressed institutional differences among countries that might require policy responses to be tailored to individual circumstances. Disagreement also surfaced over how the monetary transmission mechanism has changed and how much emphasis should be attributed to bank credit, interest rates, and exchange rates as policy channels. How central banks should respond to the diminished usefulness of the monetary aggregates was a particularly controversial issue. Some participants recommended using a broad set of information variables. Others advocated the use of policy rules. Still others proposed direct targeting of ultimate policy objectives. Views also diverged on how the ERM should be restructured in light of the recent crisis. While there was little support for proposals to restrict international capital mobility to reduce realignment pressures, there was less consensus on whether a broad or narrow set of exchange rate bands is more consistent with further progress toward European monetary union.

The transformation of domestic capital markets

The first day's sessions focused on significant structural changes in domestic financial markets and their implications for monetary policy. Topics examined included the changing role of banks in the intermediation process, the impact of financial market changes on the channels of monetary policy, the implementation of monetary policy without intermediate targets, and longer run prospects for financial change.

The changing role of banks

According to Franklin Edwards, dramatic changes in financial

markets have occurred worldwide since the 1980s. Two developments are particularly noteworthy. First, in the United States and many other countries there has been an apparent decline in the share of commercial banks and other depository intermediaries in the intermediation process. Bank deposits have declined as a share of household assets, and businesses have turned from banks to capital markets to finance their investment spending. Second, nonbank intermediaries, such as pension and mutual funds, insurance companies, and finance companies, have played an increasingly important role in the financial system.

In Edwards' view, this growing institutionalization of savings has been associated with a number of important trends, such as increased trading activity in financial markets, rapid growth in the use of financial derivatives, and increased cross-border equity holdings. Behind these developments are a variety of causes, including greater inflation and interest rate volatility, improvements in information and communications technologies, and the end of capital controls and the advent of flexible exchange rate systems.

Edwards stressed the potential importance of these changes for monetary policy. He noted banks have historically played a key role in the intermediation process. Banks are heavily regulated to promote financial stability and serve as the fulcrum for monetary policy. Thus, it is important to understand whether the changing importance of the banking system undercuts the effectiveness of monetary policy or results in a less stable financial system. In designing possible policy responses, Edwards emphasized the importance of knowing whether these changes were due to the natural evolution of financial markets or to inappropriate financial regulation.

In his discussion of Edwards' paper, Kumiharu Shigehara indicated he was in general agreement with the analysis and data presented by Edwards, but certain qualifications should be made. In particular, he noted important differences in the form and speed with which financial market changes are occumng. Thus, Shigehara thought Edwards' analysis tended to reflect U.S. events more accurately than changes occurring in other countries. He also thought focusing too heavily on traditional balance sheet measures tended to overstate the decline in

banking to the extent that banks were heavily engaged in off-balance-sheet activities. Finally, Shigehara emphasized a second trend of potential concern to policymakers, a trend in a number of OECD countries toward financial conglomeration due to mergers of banks with securities firms and banks with insurance companies.

Implications for the monetary transmission mechanism

Christina and David Romer examined whether these financial market changes have altered the effectiveness of monetary policy or the way that monetary policy affects the economy. They identified three possible channels for monetary policy: an interest rate channel, a bank lending or credit channel, and a "credit actions" channel. That is, central banks can affect the economy by influencing market interest rates, by controlling bank lending through control over bank reserves, or by imposing credit controls or other types of direct restrictions on bank lending.

Based on a historical examination of several episodes of tight monetary policy in the postwar United States, the Romers suggested direct credit actions have played a very important role in the monetary transmission mechanism. They argued, however, the Federal Reserve has become less willing to directly control bank lending in recent years. Apart from direct controls, they found no evidence in their empirical work of a bank credit channel for monetary policy. As a result, they felt monetary policy would work exclusively through an interest rate channel in the future. In their view, this channel will continue to operate as long as there is a demand for high-powered money. Thus, they concluded structural changes in financial markets are unlikely to affect central banks' ability to conduct monetary policy.

Charles Freedman found the Romers' historical discussion to be enlightening but was critical of their empirical work. He noted that in Canada, as in the United States, direct credit actions formerly played an important role in speeding up the response of bank lending to restrictive monetary policy. He thought both countries placed less reliance on supplemental credit restraints for various reasons: partly because of a belief the market's allocation of credit was superior to

administrative allocation, partly because of the increased emphasis on monetary aggregates as policy indicators, and partly because of the rapid growth of nonbank sources of credit.

Citing concerns about the specification of their model, Freedman was not convinced the Romers had accurately measured the impact of credit actions on the economy. In addition, he noted the continued existence of an interest rate channel did not depend on the existence of reserve requirements. Even in the absence of reserve requirements, as long as payment settlement occurs on the books of the central bank, monetary policy will still have leverage over interest rates.

In his discussion of the Romers' paper, Mark Gertler emphasized the importance of a bank credit channel for monetary policy. Indeed, Gertler noted there are actually two bank credit channels: the channel working through reserve requirements which was emphasized by the Romers, and a channel involving a balance sheet mechanism in which borrowers with imperfect access to capital markets (small business) may be differentially affected by tight money. According to Gertler, this second channel does not rely on regulatory restraints and so should be operative even in the absence of direct credit actions.

Gertler argued the Romers' empirical work did not rule out this latter channel and that, more generally, it was difficult to separate the effects of credit actions from restrictive monetary policy. He also suggested that while central banks may not have lost control over short-term interest rates, financial market changes may have affected their ability to influence long-term rates. At the same time, he complimented the Romers for their attempt to measure the effects of credit actions and suggested that, by ignoring these effects, the existing literature may have overstated the effects of monetary policy on real activity.

Conducting monetary policy amid financial change

In his presentation, Benjamin Friedman suggested financial market changes have profound implications for the operation of monetary policy. Citing considerable empirical evidence of structural changes in the relationship between the monetary aggregates and income and

prices, Friedman argued it was no longer possible to implement U.S. monetary policy by following a rule based on a predetermined intermediate target.

In response to this problem, Friedman advocated increased reliance on information variables reflecting changes in real and financial activity. Because any one variable can give false signals, he suggested policymakers should look at a wide range of variables and should exploit the information from these indicators intensively through frequent re-examination of the data.

Friedman also expressed concern over the long-term implications of a changing role for banks. He thought a declining reserve base and increasing importance of nonbank intermediaries could undercut the Federal Reserve's ability to affect asset prices and nonfinancial activity in the future.

In his comments on Friedman's paper, Donald Kohn indicated the declining reliability of the monetary aggregates has led the Federal Reserve to adjust its policy procedures along the lines suggested by Friedman, that is, to a more frequent use of a broader range of indicator variables. At the same time, Kohn was not as pessimistic about the future use of the aggregates by the Federal Reserve, citing a number of unusual factors affecting their behavior in recent years that might not be present in the future.

Kohn also warned about excessive reliance on either nominal or real interest rates in the policy process, pointing out while interest rates may function as information variables they are not good targets since they do not provide a nominal anchor for policy. Indeed, Kohn felt explicit emphasis on an ultimate goal of price stability was necessary to provide discipline to a discretionary approach to monetary policy. He was less concerned than Friedman that changes in the role of banks will reduce the Federal Reserve's leverage in conducting monetary policy.

Reiner Konig commented on Friedman's paper from the perspective of Germany, a country that has not experienced significant structural changes in financial markets. He noted Germany's mone-

tary targeting strategy has recently been complicated by such special factors as German reunification and foreign capital flows. Still, the long-run demand for M3 continues to be stable, suggesting it will remain a reliable intermediate target. He pointed out, however, that it would be incorrect to say the German system of monetary targeting is based on a strict rule. Considerable discretion is possible in deriving the target and in permitting short-run deviations from the target in response to changing economic conditions.

As to the usefulness of interest rates as information variables, Konig stressed that neither the level of nor change in rates is particularly informative. In Germany, as in the United States, there is some evidence that interest rate spreads have predictive content. He emphasized, however, that because of institutional differences in financial structures, different countries will necessarily come to different conclusions about the choice of specific monetary policy targets and indicators.

In response to Friedman, Allan Meltzer argued that change and uncertainty do not make the case for discretionary monetary policy. He observed that errors in the use of information variables or in economic forecasts could lead to costly, destabilizing policy actions. Instead of discretion, Meltzer advocated the use of an adaptive policy rule. According to Meltzer, an adaptive rule, unlike a discretionary approach, reacts to new information but does not base policy actions on forecasts. It also differs from a fixed rule that ignores new information. In Meltzer's view, use of an adaptive rule would guard against major policy errors, would provide a more stable planning environment by making central bank behavior more predictable, and would assure both reasonable price stability and enhanced exchange rate stability.

The longer term outlook for financial markets

In his luncheon address, Charles Sanford focused on the future evolution of financial markets. Describing his vision of financial markets in the year 2020, Sanford saw the continuation of technological change in communications and information management combined with new developments in financial theory as radically altering

the way that financial services are delivered.

According to Sanford, the basic financial functions—financing, risk management, trading and positioning, advising, and transactions processing—will still be present. Traditional financial products, however, such as loans, borrowings, and securities, will be replaced with "claims on wealth or "financial claims" that will be actively traded around the clock and worldwide. Banks, as currently structured, will no longer exist, and there will be no need for separate financial branches as individuals become more directly linked to markets and financial service providers. To make this future possible, Sanford indicated further advances in financial theory will be necessary to identify underlying risks and their component attributes, to price these attributes, and to re-bundle the attributes into new investment products.

Sanford also traced out some of the implications of these changes for financial markets and policymakers. While the future financial system would tend to be more efficient in terms of lower transactions costs and better risk management, Sanford thought the task of managing financial institutions will be more complex. In addition, he stressed that to monitor and control systemic risk, central banks will have to understand and adapt to this new financial world.

Causes and consequences of greater international capital mobility

The second set of symposium sessions focused on the growing integration of world capital markets. Topics covered in the presentations and discussion included the causes of increased capital mobility, the extent of capital market integration, and the consequences of greater capital mobility for monetary policy.

The integration of world capital markets

In their presentation, Michael Mussa and Morris Goldstein provided evidence of greatly increased capital mobility. They attributed increases in the volume and range of international financial transactions to a variety of factors including liberalization of capital controls, technological change, and financial innovation. According to Mussa

and Goldstein, integration has proceeded farthest for liquid instruments traded in major financial centers.

At the same time, the authors cautioned it was premature to speak of a world capital market. They noted many countries still maintain capital controls or restrictions on international investments by banks and institutional investors. In addition, they noted evidence portfolios are generally not internationally diversified and investors still exhibit substantial home-country bias. Furthermore, as compared with earlier historical periods, there is less interest rate convergence and relatively small net capital flows.

Still, Mussa and Goldstein suggested integration has proceeded far enough and capital flows are large enough to have significant effects on exchange rate agreements and on domestic policy and reform programs in industrialized and developing countries. In the case of the recent ERM crisis, they argued the lesson to be learned was that greater capital mobility places more demands on participants to coordinate policies or make orderly adjustments in exchange rate parities. They opposed proposals to restrict capital mobility by re-imposing capital controls, suggesting ti better approach is to improve market discipline, the understanding and pricing of risks, and supervisory coordination.

In discussing the Mussa and Goldstein paper, Martin Feldstein stressed the imperfect integration of world capital markets. He noted most of the recent increase in capital mobility is short term. In most countries, long-term investment continues to be largely financed by domestic savings. He agreed the increased availability of short-term capital plus the end of capital controls in Europe have made it more difficult to sustain artificial exchange rate levels. He also thought the recent widening of bands in the ERM has made the path to full monetary union more difficult.

Feldstein also emphasized the impact of greater capital mobility on the monetary transmission mechanism. He argued the effectiveness of monetary policy has been strengthened with the addition of a trade and exchange rate channel to supplement the traditional interest rate channel.

In his discussion, Robert Johnson suggested the responsibility for the recent ERM crisis should not be assigned to speculative capital flows, but rather to flaws in the system. According to Johnson, German reunification required an adjustment in real exchange rates. Over time, financial markets concluded that realignment of nominal exchange rates was the only credible policy option and reacted accordingly. He thought an important part of ERM reform would be to develop a mechanism to preemptively adjust exchange rate parities when faced with similar shocks in the future. He also advocated wider bands than before to increase the cost of speculation and a better means of sharing the burden of maintaining parities among ERM members.

Johnson also identified two other challenges facing Europe and other OECD countries: increasing competition from newly developing countries, and fiscal imbalances resulting in continued growth in government debt. According to Johnson, the first development will cause downward pressures on real wages in industrial economies and indusmal restructuring that will require changes in real exchange rates. He noted the continued growth of government debt could lead to concerns about credit risk. Johnson suggested that easier monetary policy may be necessary in many countries to bring about the necessary adjustments in real exchange rates and to support deficit reduction.

Monetary policy implications of increased capital flows

In his presentation, Andrew Crockett examined the implications of greater capital mobility for three policy issues: the choice of an exchange rate regime, the implementation of monetary policy, and international policy coordination. He argued increased capital mobility has particularly important consequences for the choice of an exchange rate system. According to Crockett, capital mobility tends to exert a stabilizing influence on either a fully flexible or a fully fixed system but may destabilize a fixed but adjustable system, such as the ERM. As a result, Crockett suggested that an important lesson to be learned from the ERM crisis is that a gradual approach to monetary union may not be feasible. Rather, it may be necessary to achieve sufficient convergence of economic performance so that the need for

exchange rate adjustments is eliminated before rates are fixed.

Crockett also noted capital market changes have complicated monetary policy by obscuring the meaning of traditional monetary aggregates. He thought adopting purely discretionary procedures put the central bank's credibility at risk. According to Crockett, a better approach is the new U.K. system of directly targeting the ultimate objective of policy, price stability.

In the presence of the continuing integration of world capital markets, Crockett suggested there may be benefits to increased policy cooperation. He noted, particularly in flexible exchange rate systems, cooperation may be superior to such alternatives as capital controls in response to extreme exchange rate volatility.

Antonio Borges agreed with Crockett's thesis that strong capital mobility and financial market integration make it difficult to maintain a hybrid exchange rate system that attempts to pursue conflicting policy objectives. He emphasized that while capital mobility does not prevent a fixed-exchange-rate system, it does impose serious constraints on policy and requires other objectives to be sacrificed to exchange rate stability. Moreover, he suggested that in the case of Europe, free capital mobility requires quasi-perfect economic convergence and lower levels of public and private debt as preconditions for monetary union.

Borges also argued the apparent autonomy of monetary policy under floating exchange rates is largely illusory. He suggested, with strong capital market integration, most of the impact of monetary policy in an open economy is transmitted through exchange rates rather than interest rates. Indeed, changes in monetary policy that lead to small interest rate changes can cause large exchange rate changes. Thus, many countries may find it difficult to accept sizable exchange rate changes to get a small amount of policy autonomy.

In his discussion of Crockett's presentation, Alberto Giovannini focused on two issues: the underlying causes of the recent ERM crisis and future options for the ERM. He noted conflicting objectives inherent in the historical development of the ERM in its dual role as

an exchange-rate-based stabilization program and as part of a convergence plan to monetary union. Under the former role, exchange rate changes were necessary, while in the latter role parity changes were not permitted because they might undermine convergence and anti-inflation credibility. Giovannini was also critical of the gradual approach to monetary union, suggesting it was not credible and provided the wrong incentives to participants.

As to the future options for the ERM, Giovannini outlined three approaches: returning to narrow bands with new parities, adopting a modified narrow band with a provision to accelerate the pace of monetary union in the face of speculative pressures, and widening the ERM band as proposed by Crockett. Noting that each approach has advantages and disadvantages, he concluded there is no obvious choice. In the absence of a return to narrow bands, however, he pointed out the difficulties for European central banks in conducting monetary policy without explicit exchange rate objectives.

Overview panel

The final sessions provided speakers the opportunity to give their perspective on the broad range of policy issues covered at the symposium.

In his remarks, Hans Tietmeyer examined financial market changes from the perspective of Germany and discussed some of the implications for European monetary integration. He noted two important general implications of recent trends in financial markets. First, while financial markets have become more efficient, they have also become more fragile. Second, monetary policy has become more difficult. Thus, in a number of countries the monetary transmission mechanism has been affected and intermediate targets distorted. In addition, Tietmeyer thought the effectiveness of policy has been affected by such factors as the expansion of variable rate debt, the ability of banks to avoid the restrictions of reserve requirements, and inflation impulses induced by exchange rate intervention.

Tietrneyer noted Germany has been less affected by changes in the intermediation process than by increased capital mobility. Because of

less regulation and a slower pace of financial innovation, German banks have not experienced significant erosion in their position, and the long-run M3 relationship has remained stable. In Tietmeyer's view, however, greater capital mobility has made it more difficult to maintain a fixed exchange rate system in the face of differing domestic policy requirements and has undercut the effectiveness of sterilized intervention.

On issues related to European monetary integration, Tietmeyer favored a European strategy of money supply targeting, which he thought was necessary for policy credibility. He indicated the recent decision to widen the ERM bands gave European central banks more flexibility but made the task of maintaining long-run anti-inflation policies more difficult.

Toyoo Gyohten provided insight into recent financial market changes by highlighting Japan's role in world capital markets. He noted the flow of investment funds from Japan has expanded greatly in recent years and the composition of the investment flows has changed considerably. According to Gyohten, from 1986 to 1990, Japan's trade surplus was financed by an enormous increase in private overseas investment by Japanese investors, partially offset by heavy Euromarket borrowing by Japanese banks. The capital outflow was stimulated by a number of factors, including interest rate differentials, a strong yen, and the boom in the Japanese stock and property markets.

More recently, Gyohten noted, speculative excesses in Japanese financial markets have been unwound and banks have become more conservative, in part, because of higher capital standards. As a result, the private capital outflow has ceased and Japan's trade surplus is being financed primarily by short-term lending by Japanese banks in the Euromarkets. For private capital outflows to increase again, Gyohten stressed the need for a more stable macroeconomic framework in Japan and abroad.

In his overview of issues raised at the symposium, Stanley Fischer offered a longer term perspective on recent capital market changes. He noted the recent liberalization of capital controls and deregulation of financial markets have largely offset restrictions put in place during

the 1930s. Thus, while capital market integration has increased in recent years, the degree of integration is similar to that of a century ago.

Fischer suggested the implications of financial market changes for financial stability were unclear. While the development of new markets and financial instruments may be beneficial, he stressed it was important for central banks to have procedures in place to deal with financial crises.

Fischer also thought the financial market changes have more implications for the implementation of monetary policy than for the transmission mechanism. Thus, he argued that in the presence of financial innovations central banks could not follow simple rules. He also disagreed with the view that rules are necessary for credibility. According to Fischer, credibility depends more on the predictability of outcomes than on the predictability of actions.

On the choice of an appropriate exchange rate regime, Fischer suggested the experience of the United States and Canada indicated floating rates are not inconsistent with a move to greater economic integration. He also thought Crockett's approach to the ERM, while logical, was not realistic and further moves toward monetary union in Europe are likely to be accompanied by a progressive tightening of the exchange rate bands.

In his concluding comments, Jacob Frenkel identified a number of consensus policy lessons flowing from the financial market changes in recent years. On regulatory and supervisory issues, he noted there was little support expressed at the symposium for re-regulation or "sand-in-the-wheels" attempts to restrain financial market developments. At the same time, he saw general agreement on the need for strengthened supervision. On monetary policy, he noted the importance of central bank credibility and the need for a nominal anchor to guide policy. Thus, according to Frenkel, while policy discretion is necessary in a rapidly changing world, discretion must be systematic, not erratic.

Finally, while there was no agreement on the choice of an exchange

rate regime, Frenkel observed consensus on two exchange rate issues. First, in the presence of capital mobility, foreign exchange market intervention is not a good substitute for fundamental changes in economic policy. Second, countries must reach convergence before pegging exchange rates or must adopt a mechanism for allowing timely adjustment in exchange rate parities as convergence occurs.

Gordon H. Sellon, Jr., is an assistant vice president and economist at the Federal Reserve Bank of Kansas City.

Opening Remarks

Alan Greenspan

Successful implementation of monetary policy requires an understanding of how financial markets operate and how they are linked, both to each other and to the economy. Such an understanding is a dynamic process of learning about, and adjusting to, capital market innovations. Over the last generation, deregulation, vastly improved information and communications technology, and advances in our understanding of finance have combined to accelerate the pace of financial innovation. In some cases, such as the market for swaps, new instruments have emerged. In other cases, markets have grown and changed in a dramatic fashion. The rapid expansion of the medium-term note market over the past decade is one example. One of the most important features of financial innovation has been the reduction in constraints on international capital flows and the internationalization of finance. Not too long ago, exchange rates were mostly fixed, and many countries had capital controls in place; private cross-border investment flows were relatively small. Over the last twenty years, however, the easing of restrictions on capital flows has boosted cross-border investment, and floating exchange rates have led to flourishing markets in currency derivatives.

The declines in financial market frictions prompted by deregulation, technology, and ingenuity are having far-reaching consequences. New instruments and markets reduce the costs of bringing borrowers and savers together and increase their opportunities to manage risk. At the same time, these new markets have presented central bankers with many challenges. Capital market innovations have altered both the

relationships among financial variables and their links to the economy. In addition, changes in financial markets expose national economies to shocks from new and unexpected sources, and with little if any lag. For example, disruptions in foreign capital markets—from which the United States was once fairly well insulated--can now have important effects on U.S. financial markets. As we saw in October 1987, these effects can also run from the United States to foreign markets.

As must be evident by now, I believe that this conference is both timely and important. I would like to highlight three questions that will be interesting to discuss over the next two days. First, how have the changes in financial markets affected the way in which monetary policy feeds through to the economy? Thirty years ago banks provided three-fourths of short- and medium-term business credit, and banks and thrifts originated—and held—more than two-thirds of residential mortgages. Moreover, legal ceilings on the interest rates offered by depositories interacted with Federal Reserve policy in ways that resulted in sharp movements in the supply of funds to these sectors at key rate levels, thereby affecting the economy.

In contrast, banks and thrifts are now far less "special" than they once were. Deposit rates are unregulated, and banks and thrifts compete for funds with money market funds and, more recently, stock and bond mutual funds. On the asset side, rapid growth in the commercial paper and medium-term note markets and increased competition from finance companies have cut banks' share of short- and intermediate-term credit to businesses to little more than one-half. The advent of securitization means that banks and thrifts can continue to make consumer loans and home mortgages without increasing the size of their balance sheets because other investors are willing to hold the resulting securities. Of course, commercial banks continue to have a dominant role in the provision of "information intensive" credit, especially to small businesses, and we have experienced the consequences for businesses of problems in the bank lending process in recent years. Even this special role for banks may decline in importance, however, if current efforts to securitize small and medium-sized business loans are successful. I suspect that commercial banks will continue to play a major role in the channeling of credit to these

businesses, but the precise nature of that role, and its relationship to policy actions, could change.

As a result of these developments, the fairly direct effect that open market operations once had on the credit flows provided for businesses and home construction is largely dissipated. Nonetheless, the Federal Reserve can still affect short-term interest rates, and thus have an impact on the cost of borrowing from banks, from other intermediaries, and directly in the capital markets. While this effect may be more indirect, take longer, and require larger movements in rates for a given effect on output, the Federal Reserve and other central banks still have the tools required to implement monetary policy.

The first question raises a second: how have the changes in financial markets affected the process of formulating and implementing monetary policy? The basic answer is that this process has become more complex. The relationships between interest rates and spending are evolving in response to financial innovations. Moreover, as banks and other intermediaries have become less special, many of the targets and indicators traditionally used by policymakers have become less useful. **A** dramatic example is the recent anomalous behavior of M2. This behavior has, at least for the time being, greatly undermined the use of M2 either as a guide to policy or as a way to communicate the stance of Federal Reserve policy to others. M2 may well become more useful again over time as the economy completes adjustments to the availability of new assets and the demand for credit recovers from current efforts to bolster balance sheets. Meanwhile, the Federal Reserve must rely relatively more on the wide variety of macroeconomic and financial variables it has always used to assess the current condition of financial markets and the trend of the economy.

My final question is not explicitly addressed in the conference program, but it is important, and I'm sure it will be addressed in our discussion. That is, have capital market innovations increased or decreased the inherent stability of the financial system? The answer to this question is by no means clear. The increased number of financial markets, the rapid changes in them, and the increased pace of market responses to shocks made possible by improved computer and communications technologies, challenge the ability of central

bankers to monitor closely developments in the financial system and react in a timely manner when necessary. These challenges arise particularly in markets for complex new instruments such as derivatives. Some have expressed the fear that these markets have not been fully tested under stress, and argue that all of their risks are not evident. That may be true, and is the nature of the challenge we face. In the past couple of years, however, market participants themselves, and the regulatory community around the world, have made considerable progress in increasing our understanding of derivatives markets and the risks that they involve.

Moreover, there are reasons to believe that capital market innovations have, in some important respects, increased structural stability. Derivatives should, after all, allow banks to better manage risk and so should help to insulate the payments system from financial and real shocks. Similarly, the increased substitutability among instruments and intermediaries should buffer the economy from disruptions affecting specific markets or classes of intermediaries. We have seen this effect already in the United States. Over the past five years the size of the thrift industry has declined by more than one-third. **A** generation ago such a collapse arguably could have had catastrophic effects, but with the securitization of home mortgages, the supply of home mortgages—as gauged by their relative cost—appears to have been little affected.

Clearly, finding ways to assess and limit systemic risk without losing the benefits of these new markets is an important issue currently facing central banks. Capital market changes are likely to continue because the changes in technology and knowledge driving the recent innovations will continue. This conference should help us to understand the changes that have occurred and to anticipate the challenges that new innovations will provide.

Financial Markets in Transition—or the Decline of Commercial Banking

Franklin R. Edwards

The 1980s was the most revolutionary decade in U.S. financial markets since the Great Depression. The thrift industry collapsed, necessitating a massive government bailout; commercial banks suffered an unprecedented loss of market share; households sharply reduced their direct participation in securities markets; pension funds and other institutional investors became financial powerhouses, and for the first time took an active role in the governance of corporations; trading in foreign securities soared to new heights; and there was an explosive growth in derivative markets, both on and off regulated exchanges. These changes, moreover, are just the beginning of a process that will eventually result in an entirely new landscape for the financial service industry. However, precisely what kind of financial structure we will have in the future is still not clear.

The primary objective of this paper is to identify and describe the key trends that underlie the changes in financial markets that have occurred, and to provide an explanation for these trends. In addition, I discuss possible policy implications and alternative policy responses to the changes that have occurred. The rapidly changing financial structure in all countries raises the obvious question of whether we need to respond to what has occurred by adapting our economic and regulatory policies in some way.

The changing financial structure: the 1980s in historical perspective

In the United States, as in most other countries, banks have historically been the dominant financial intermediary. In 1929, prior to the sweeping legislative financial reforms of the early 1930s, commercial banks held assets of $66 billion, more than twice as much as the second largest financial intermediary (personal trusts), and almost four times as much as those held by life insurance companies. (See Table 1.) Including the personal trust assets held and managed by banks, commercial banks accounted for over 50 percent of all intermediary assets in 1929. (See Table 2.) Banks have held this dominant intermediary role partly for historical reasons and partly because of their favored role as providers of "money" and "liquidity."

During the 1930s and the Great Depression, when banking suffered widespread failures, the market share of banks slipped to about 40 percent of total intermediary assets, where it stayed for the next thirty years. In the 1970s the market share of banks again began to slip, but it was during the 1980s that banking suffered its most serious erosion of market share. From 1980 to 1990, banks' market share fell a full 10 percentage points, from 37 percent to 27 percent of total intermediary assets. By 1990 banks had lost more than one-fourth of the market share with which they began the decade. (See Table 2.)

During the 1980s the market share of nonbank depository institutions (or thrifts)—mutual savings banks, savings and loans associations, and credit unions—also experienced a pronounced decline. These institutions lost more than a quarter of their market share—a drop of 7.3 percentage points. Taken together, the market share of banks and thrifts fell by 17.7 percentage points during the 1980s. (See Table 2.)

Non-depository institutions, in contrast, increased their market shares: investment companies (or mutual funds) by 7.2 percent, insurance companies by 1.7 percent, finance companies by 2.6 percent, and pension funds by 6.3 percent. (See Table 2.) Some of this increase was clearly gained at the expense of banks and thrifts, which grew much more slowly during the 1980s than in previous years. (See

Table 3.) From 1980 to 1990 banks captured only 20.5 percent of the growth of total financial intermediary assets, less than any other period with the exception of the 1930s. In comparison, investment companies accounted for 15.3 percent, life insurance companies for 20.1 percent, and finance companies for 9.5 percent of this growth. (See Table 4.)

The relative decline of banks and depository intermediaries can also be seen in the changing composition of household assets. From 1980 to 1991, as a proportion of their total assets, households reduced their holdings of all forms of bank deposits from 23.8 percent to 18.8 percent, while increasing their holdings of mutual fund shares and pension fund assets from 16.3 percent to 32.2 percent. (See Table 5.) In terms of the total net flows of household assets during the 1980s, pension funds captured a larger share than all depository institutions taken together. (See Table 6.)

The only other period during which commercial banks experienced as severe an erosion in market share was during the 1920s and the early 1930s. From 1922 to 1939 their share of financial intermediation fell by almost 15 percentage points. (See Table 2.) This period can be divided into two distinct sub-periods: one of great economic prosperity, from 1922 to 1929; and one of great economic depression, from 1929 to 1939. Even omitting the economically depressed period after 1929, banks' market share fell from 54.9 percent in 1922 to 45.9 percent in 1929.

There are striking similarities between the 1980s and the 1920s. First, both the 1920s and the 1980s were times of great international expansion in financial markets. New York became a world financial center. Money freely flowed between countries in search of more attractive yields, and financial institutions built international networks by establishing overseas branches. Second, both periods were marked by considerable macroeconomic instability and policy experimentation. Third, tremendous product innovation occurred in financial markets. Fourth, increased competition greatly weakened traditional customer relationships. Fifth, there was a sharp growth in the reliance of banks on time deposits. In 1920, time deposits in national banks (generally the large banks) were about one-third the level of demand deposits;

Table 1
Assets Held by Financial Intermediaries, 1900-1990 (in billions of dollars)

	1900	1912	1922	1929	1939	1949	1960	1970	1980	1990
Commercial Banks	10	21.8	47.5	66.2	66.3	157.7	228.3	504.9	1386.3	2643.8
Thrifts	2.9	5	9.4	17.3	17.5	36.8	118.8	273.5	870.5	1577.3
Savings & Loans	0.5	1	2.8	7.4	5.4	14.5	71.5	176.2	629.8	1096.8
Mutual Savings	2.4	4	6.6	9.9	11.9	21.5	41	79.3	171.5	263.5
Credit Unions			0	0	0.2	0.8	6.3	18	69.2	217
Insurance Companies	2.2	5.6	11.2	23	35.2	73.6	142	250.8	649.9	1883.8
Life Insurance	1.7	4.4	8.7	17.5	29.2	59.6	115.8	200.9	469.8	1366.8
Other Insurance	0.5	1.2	2.5	5.5	6	14	26.2	49.9	180.1	517
Pension and Trust	3	7	18.3	32	42.2	95.2	57.8	170.7	484.9	1904.9
Personal	3	7	18	≡0	35	50				
Private			0	0.5	1	6	38.1	110.4	286.8	1161.5
Public	0	0	0.3	1.5	6.2	39.2	19.7	60.3	198.1	743.4
Investment Companies			0.1	3	1.6	3.3	17	49.2	138.1	1078.3
Mutual Fund							17	46.8	63.7	579.9
Money Market								2.4	74.4	498.4
Finance Companies				2.6	3	6.4	27.6	64	198.6	780.7
Total	8.1	17.6	39	77.9	99.5	215.3	363.2	808.2	2342	7225

*Money Market Mutual Fund data starts in 1974

Sources: 1900-1949, *Financial Intermediaries in the American Economy Since 1900*; 1960-1990, *Flow of Funds Accounts, Federal Reserve Bulletin.*

Table 2
Relative Shares of Total Financial Intermediary Assets, 1900-1990

	1900	1912	1922	1929	1939	1949	1960	1970	1980	1990
Commercial Banks	55.2%	55.3%	54.9%	45.9%	40.0%	42.3%	38.6%	38.5%	37.2%	26.8%
Thrifts -	16.0%	12.7%	10.9%	12.0%	10.6%	9.9%	20.1%	20.8%	23.3%	16.0%
Savings & Loans	2.8%	2.5%	3.2%	5.1%	3.3%	3.9%	12.1%	13.4%	16.9%	11.1%
Mutual Savings	13.3%	10.2%	7.6%	6.9%	7.2%	5.8%	6.9%	6.0%	4.6%	2.7%
Credit Unions	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	1.1%	1.4%	1.9%	2.2%
Insurance Companies	12.2%	14.2%	12.9%	16.0%	21.2%	19.7%	24.0%	19.1%	17.4%	19.1%
Life Insurance	9.4%	11.2%	10.1%	12.1%	17.6%	16.0%	19.6%	15.3%	12.6%	13.8%
Other Insurance	2.8%	3.0%	2.9%	3.8%	3.6%	3.8%	4.4%	3.8%	4.8%	5.2%
Pension and Trust	16.6%	17.8%	21.2%	22.2%	25.5%	25.5%	9.8%	13.0%	13.0%	19.3%
Personal	16.6%	17.8%	20.8%	20.8%	21.1%	13.4%	0.0%	0.0%	0.0%	0.0%
Private	0.0%	0.0%	0.0%	0.3%	0.6%	1.6%	6.4%	8.4%	7.7%	11.8%
Public	0.0%	0.0%	0.3%	1.0%	3.7%	10.5%	3.3%	4.6%	5.3%	7.5%
Investment Companies	0.0%	0.0%	0.1%	2.1%	1.0%	0.9%	2.9%	3.7%	3.7%	10.9%
Mutual Fund	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	3.6%	1.7%	5.9%
Money Market	0 0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	2.0%	5.1%
Finance Companies	0.0%	0.0%	0.0%	1.8%	1.8%	1.7%	4.7%	4.9%	5.3%	7.9%

*Money Market data starts in 1974

Sources: 1900-1949: ***Financial Intermediaries in the American Economy Since*** 1900,1960-***1990, Flow of Funds Accounts, Federal Resewe Bulletin***

Table 3
Growth of Financial Intermediaries, 1900-1990, (Percentage Change in Assets Held)

	1900-1912	1912-1922	1922-1929	1929-1939	1939-1949	1949-1960	1960-1970	1970-1980	1980-1990
Commercial Banks	118%	118%	39%	0%	138%	45%	121%	175%	91%
Thrifts	72%	88%	84%	1%	110%	223%	130%	218%	81%
Savings & Loans	100%	180%	164%	-27%	169%	393%	146%	257%	74%
Mutual Savings	67%	65%	50%	20%	81%	91%	93%	116%	54%
Credit Unions					300%	688%	186%	284%	214%
Insurance Companies	155%	100%	105%	53%	109%	93%	77%	159%	190%
Life Insurance	159%	98%	101%	67%	104%	94%	73%	134%	191%
Other Insurance	140%	108%	120%	9%	133%	87%	90%	261%	187%
Pensions and Trust	133%	161%	75%	32%	126%	-39%	195%	184%	293%
Personal	133%	157%	67%	17%	43%	-100%			
Private				100%	500%	535%	190%	160%	305%
Public			400%	313%	532%	-50%	206%	229%	275%
Investment Companies			2900%	-47%	106%	415%	189%	181%	681%
Mutual Fund							175%	36%	810%
Money Market								3000%	570%
Finance Companies				15%	113%	331%	132%	210%	293%
Total	118%	120%	67%	15%	125%	59%	122%	184%	165%

*Money Market Mutual Fund data starts in 1974.

Source: 1900-49, ***Financial Intermediaries in the American Economy Since 1900;*** 1960-1990, ***Flow of Funds Accounts, Federal Reserve Bulletin***

Table 4
Relative Share of Growth of Total Financial Intermediary Assets, 1900-1990

	1900-1912	1912-1922	1922-1929	1929-1939	1939-1949	1949-1960	1960-1970	1970-1980	1980-1990
Commercial Banks	55.4%	54.6%	32.5%	0.5%	44.1%	32.3%	38.3%	36.5%	20.5%
Thrifts	9.9%	9.3%	13.7%	0.9%	9.3%	37.5%	21.4%	24.7%	11.5%
Savings & Loans									2.3%
Mutual Savings	7.5%	5.5%	5.7%	9.2%	4.6%	8.9%	5.3%	3.8%	1.5%
Credit Unions	0.0%	0.0%	0.0%	0.9%	0.3%	2.5%	1.6%	2.1%	2.4%
Insurance Companies	16.0%	11.9%	20.5%	56.2%	18.5%	31.3%	15.1%	16.5%	20.1%
Life Insurance	12.7%	9.1%	15.3%	53.9%	14.7%	25.7%	11.8%	11.1%	14.6%
Other Insurance									3.3%
Pension and Trust	18.8%	24.0%	23.8%	47.0%	25.6%	-17.1%	15.6%	13.0%	23.1%
Personal	18.8%	23.4%	20.8%	23.0%	7.2%	-22.9%	0.0%	0.0%	0.0%
Private	0.0%	0.0%	0.9%	2.3%	2.4%	14.7%	10.0%	7.3%	14.2%
Public									0.0%
Investment Companies	0.0%	0.2%	5.0%	-6,5%	0.8%	6.3%	4.5%	3.7%	15.3%
Mutual Fund	0.0%	0.0%	0.0%	0.0%	0.0%	7.8%	4.1%	0.7%	8.4%
Money Market	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	3.0%	6.9%
Finance Companies	0.0%	0.0%	4.5%	1.8%	1.6%	9.7%	5.0%	5.6%	9.5%
Growth of Total Assets for all Financial Intermediaries (in billions)	$21.3	$47.1	$57.6	$21.7	$207.2	$218.5	$721.6	$2,415.2	$6,140.5

Money Market Mutual Fund data starts in 1974.

Sources: 1900-49, ***Financial Intermediaries in the American Economy Since 1900,*** 1960-1990, ***Flow of Funds Accounts, Federal Reserve Bulletin***

Table 5
Distribution of Household Financial Assets (in billions)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Deposits												
Checkable Deposits & Currency	260.4	294.3	316.8	342	357.6	379.6	471.7	479	476.9	495.4	514	568.9
Small Time & Savings Deposits	1140.7	1188.2	1322.5	1532.6	1685.7	1829.6	1945.7	2005.3	2137.2	2225.9	2277.8	2289.1
Large T i e Deposits	111.9	126	91.3	70.9	123	97.5	64.2	117.3	145.3	149.5	103.3	5.6
Total Deposits	1513	1608.5	1730.6	1945.5	2166.3	2306.7	2481.6	2601.6	2759.4	2870.8	2895.1	2863.6
Credit Market Instruments												
U.S. Government Securities												
Savings Bonds	72.5	68.2	68.3	71.5	74.5	79.8	93.3	101.1	109.6	117.7	126.2	138.1
Other Treasury Issues	121.6	144.7	184.7	234.9	282.1	277	251.1	254.3	300	313.8	357.4	302.7
Agency Issues	46.6	48.3	38.7	46.2	68.6	90.7	80.1	136.3	212.4	307.6	357.5	360.8
Total U.S. Government Securities	240.7	261.2	291.7	352.6	425.2	447.5	424.5	491.7	622	739.1	841.1	801.6
Tax-exempt Securities	102.4	122.8	153.2	192.5	224	305	304.7	397.8	465	526.6	549.2	554.1
Corporate & Foreign Bonds	30.8	25	37.6	32.2	26.9	18.9	68.2	90.4	50.9	62.5	185	144.8
Open-market Paper	42.6	32.3	39	61.2	69.3	128.7	142.6	151.3	196	194.9	214.2	174.5
Total Credit Market Instruments	416.5	441.3	521.5	638.5	745.4	900.1	940	1131.2	1333.9	1523.1	1789.5	1675
Corporate Equities	1111.3	1051.2	1184	1334.5	1343.6	1700	1877.1	1750.9	1876.6	2205.1	2007.8	2238.4
Security Credit	16.2	14.7	17.8	20.6	21.6	35.1	44	39.1	40.9	53.2	62.4	87
Miscellaneous Assets	73.5	80.4	87.4	102.9	104.2	132.5	149.4	170.7	187.7	201.9	217.1	226.2
Equity, Bond, & Income Mutual Fund Share	52.1	52.6	66.7	98	117.7	206.9	356.9	406.3	418	480.6	495.9	726.4

Table 5 (Continued)

Money Market Mutual Fund Shares	64.9	155.6	189.4	158.4	2M.4	211.1	250.7	278.8	305.8	391.9	438.6	459.2
Total Mutual Fund Share	117	208.2	256.1	256.4	320.1	418	607.6	685.1	723.8	872.5	934.5	1185.6
Total Household Liquid Financial Assets	$3,2475	$3,404.3	$3,797.4	$4,298.4	$4,701.2	$5,492.4	$6,099.7	$6,378.6	$6,922.3	$7,726.6	$7,906.4	$8,275.8
Mutual Fund Assets as a % of Total Household Liquid Financial Assets	3.60%	6.12%	6.74%	5.97%	6.81%	7.61%	9.96%	10.74%	10.46	11.29%	11.82%	14.33%
Other (Non-liquid) Financial Assets												
Mortgages	107	117.3	126.1	127.1	127.8	127.4	141.2	164.9	182.1	212.9	225.5	244
Life Insurance Reserves	216.4	225.6	232.8	240.8	246	256.7	274.2	300.3	325.5	351.8	377.4	409.3
Pension Fund Reserves	916.1	996.9	1155.9	1349.6	1497.9	1794.5	2062.8	2181.8	2450.7	2847.9	2962.6	3710.3
Equity Fund Reserves	1868.3	2015.2	2014.9	2053.4	2017.8	2040.6	2094.2	2213.2	2346.6	2469.6	2506.8	2582.1
Total Non-liquid Financial Assets	3107.8	3355.0	3529.7	3770.9	3889.5	4219.2	4572.4	4860.2	5304.9	5882.2	6072.3	6945.7
Total Household Financial Assets	$6,355.3	$6,759.3	$7,327.1	$8,069.3	$8,590.7	$9,711.6	$10,672.1	$11,238.8	$12,227.2	$13,608.8	$13,978.7	$15,221.5
Mutual Fund Assets as a % of Total Household Financial Assets	1.84%	3.08%	3.50%	3.18%	3.73%	4.30%	5.69%	6.10%	5.92%	6.41%	6.69%	7.79%
Pension and Mutual Fund Assets as a % of Total Household Financial Assets	16.26%	17.83%	19.27%	19.90%	21.16%	22.78%	25.02%	25.51%	25.96%	27.34%	27.88%	32.16%

Source: Federal Reserve Board

Table 6
Net Flows of Household Financial Assets (in billions)

Net Flows	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Total
Deposits													
Checkable Deposits & Currency	6.3	33.9	20.8	25.1	15.8	21.9	92.1	5.5	(0.9)	19.2	18.6	56.4	314.7
Small Time & Savings Deposits	82.5	47.5	134.3	210.1	153.2	143.9	120.4	66.8	115.3	88.3	52.4	4.3	1,219.0
Large Time Deposits	39.4	14.1	(15.1)	(20.4)	52.0	(25.5)	(33.3)	53.1	28.0	4.2	(46.6)	(70.4)	(20.5)
Total Deposits	128.2	95.5	140.0	214.8	221.0	140.3	179.2	125.4	142.4	111.7	24.4	(9.7)	1,513.2
Credit Market Instruments													
U.S. Government Securities	31.6	20.4	33.4	58.1	81.3	31.8	(17.5)	61.5	123.7	124.5	103.0	4.5	656.3
Tax-exempt Securities	0.7	19.8	31.8	39.3	31.5	81.0	(1.2)	93.1	54.1	61.7	22.6	5.0	439.4
Corporate & Foreign Bonds	(13.8)	(1.9)	(9.0)	(3.9)	(6.5)	(16.8)	43.7	6.7	(32.9)	(27.1)	(11.8)	2.6	(70.7)
Open-market Paper	3.8	(10.2)	(15.9)	19.2	8.1	59.4	13.9	7.6	41.6	(1.1)	15.4	(32.0)	109.8
Total Credit Market Instruments	22.3	28.1	40.3	112.7	114.4	155.4	38.9	168.9	186.5	158.0	129.2	(19.9)	1,134.8
Corporate Equities	(12.3)	(43.5)	(23.2)	(28.5)	(78.1)	(119.4)	(135.0)	(99.8)	(122.4)	(131.6)	(49.5)	(25.0)	(868.3)
Security Credit	5.9	(1.5)	3.1	2.7	1.0	13.5	9.0	(5.8)	1.8	12.3	9.2	24.6	(75.8)
Miscellaneous Assets	6.8	6.8	7.1	15.5	1.3	28.3	16.9	21.3	17.0	14.2	15.3	9.1	159.6
Equity, Bond & Inwme Mutual Fund Share	1.7	6.4	7.6	26.1	21.9	73.5	141.5	71.8	2.3	41.9	52.7	126.7	574.1
Money Market Mutual Fund Shares	24.5	90.7	32.8	(31.1)	44.0	8.7	39.6	28.1	27.0	86.1	46.7	20.6	417.7
Total Mutual Fund Shares	26.2	97.1	40.4	(5.0)	65.9	82.2	181.1	99.9	29.3	128.0	99.4	147.3	991.8
Total Household Liquid Financial Assets	$177.1	$182.5	$207.7	$312.2	$325.5	$300.3	$290.1	$309.9	$254.6	$292.6	$228.0	$126.4	$3,006.9

Table 6 (Continued)

Net Acquisition of Mutual Fund Asset. as a % of Household Net Acquisition of Liquid Financial Asset.	14.79%	53.21%	19.45%	(1.6%)	20.25%	27.37%	62.43%	32.24%	11.51%	43.75%	43.60%	116.53%	32.98%
Other (Non-liquid) Financial Assets													
Mortgages	17.9	10.9	9.7	0.7	1.5	3.4	18.6	21.0	25.4	19.1	20.5	18.1	166.8
Life Insurance Reserves	9.7	9.2	7.2	8.0	5.2	10.7	17.5	26.0	25.3	26.2	25.7	29	199.7
Pension Fund Reserves	108.8	108.7	146.3	134.5	167.7	212.6	213.8	87 6	186.5	206.1	182.2	256.8	2,011.6
Equity Fund Reserves	(72.1)	(42.6)	(81.5)	(79.8)	(74.9)	(54.7)	(25.4)	(61.9)	(42.2)	(74.1)	(43.9)	(18.4)	(671.5)
Total Non-liquid Financial Assets	64.3	86.2	81.7	63.4	99.5	172.0	224.5	72.7	195.0	177.3	184.5	285.5	1,706.6
Total Household Net Acquisition of Financial Assets	241.4	268.7	289.4	375.6	425.0	472.3	514.6	382.6	449.6	469.9	412.5	411.9	4,713.5
Net Acquisition of Mutual Fund Assets as a % of Household Net Acquisition of Total Financial Assets	10.85%	36.14%	13.96%	(1.33%)	15.51%	17.40%	35.19%	26.11%	6.52%	27.24%	24.10%	35.76%	21.04%
Net Acquisition of Pension and Mutual Fund Assets as a % of Household Net Acquisition of Total Financial Assets	55.92%	76.59%	64.51%	34.48%	54.96%	62.42%	76.74%	49.01%	48.00%	71.10%	68.27%	98.11%	63.72%

Source: Federal Reserve Board

by 1929 time deposits had become three-fourths as large as demand deposits. Banks turned to the more expensive time deposits in order to retain funds, just as they did in the 1970s and 1980s. Sixth, in both periods commercial loans became a less important part of banks' portfolios. In 1920, loans to business and agriculture, most of which were short-term, accounted for almost half of the total earning assets of large urban banks. By 1929, these loans comprised only one-third of their total earning assets. Large corporations then, as now, were able to obtain financing directly, although in the 1920s the issuance of new equity was the main financing vehicle rather than commercial paper.

During both periods commercial banks also replaced loan income with fee income. In the 1920s they increased their fiduciary services and expanded their investment banking activities. As corporations increasingly went to the equity markets for their financing, large banks captured a piece of this business and retained corporate relationships by enlarging their underwriting functions. By 1929, nearly all large commercial banks had at least one securities affiliate, which performed a complete range of investment banking functions: they originated new security issues, formed and took part in underwriting syndicates, sold new issues to retail banks and to institutional investors, and participated at the retail level in the distribution of securities to individual investors through a network of branch offices. By the late 1920s, it has been estimated that commercial banks and their securities affiliates handled almost half of the total distribution of securities. The growth of personal fortunes in the United States in the 1920s also fueled the growth of banks as active money managers, through trust departments and subsidiaries. A few large banks even began their own mutual funds (or investment trusts as they were then called).

In the 1920s similar changes in the banking structure occurred as well. The number of banks fell substantially. There was a high rate of bank failure, especially among smaller banks whose profitability diminished. There was a sharp increase in bank mergers, especially among city banks. As a result, concentration in urban banking markets grew appreciably. Lastly, there was an upsurge in branch and "chain" or "group" banking. All of these changes occurred then as now in response to the increasingly competitive environment faced by banks.

Finally, in the 1920s both pension funds and investment companies grew rapidly, just as in the 1980s. Although these institutions did not become major players until after World War II, their growth in the 1920s was a harbinger of what was to come in the 1980s when open competition replaced protective regulation.

The financial structure in the United States: origin and rationale

The financial structure in the United States is a product of our unique political, cultural, and economic history, all of which came together in the 1930s to create by legislative decree a highly segmented financial system. Reforms enacted in the 1930s were motivated largely by the collapse in the stock market in 1929 and by the depression which followed. While interpretations differ as to what were the causes and effects of these cataclysmic events, they unquestionably occupied center stage in the thinking of financial reformers at the time.

Four significant themes emerge from the legislative reforms adopted during the 1930s. First, commercial banks, as the main providers of money and liquidity to the economy, were seen as key, or unique, financial intermediaries, requiring special protections. The widespread failure of banks and the concurrent economic depression during the 1930s undoubtedly encouraged this view. Second, large size among financial institutions, especially banks, was discouraged. Branch and affiliate operations were restricted and severe restrictions were imposed on banks' activities. Third, banking and securities activities were viewed as particularly incompatible and, if intermingled, a threat to economic stability. Finally, to reduce speculative activity and make security markets more efficient, issuers of public securities were required to disclose more information, and curbs on the provision of credit for speculative purposes were imposed.

The main result of these reforms was to create a rigid and segmented financial structure. Banks were supposed to do certain things, savings institutions other things, and life insurance, pension funds, and investment companies still other things. This segmented structure, it was believed, would assure both the stability of the financial system and its continued contribution to the growth of the nation.

Banks and the regulatory system

Banks have been the centerpiece of the financial systems in all countries. The creation of "liquidity" via demand deposits (or transactions balances) has historically been the province of banks. Consequently, banks have had an integral relationship to the money supply. Further, the stability and integrity of both banks and the banking system has always been considered essential for economic stability. To guarantee this stability, bank deposits in the United States have been government-insured (by the Federal Deposit Insurance Corporation) since the 1930s, and banks have been subjected to extensive regulation to maintain their solvency.

Regulation sought to achieve this objective in two ways. First, it insulated banks from competition. Only banks were permitted to provide demand deposits, and they were not permitted to compete with one another by paying interest on these deposits. This assured banks a steady flow of cheap funds-demand deposits. Interest rate ceilings on savings and time deposits (Regulation Q) similarly prevented banks from competing with one another by paying higher interest rates. In addition, geographical restrictions on where banks could have offices prevented competition from banks outside a bank's immediate area. The result of these restrictive regulations was to create a banking system of many thousands of small banks operating in competitively-insulated markets. This system was reinforced by "entry restrictions" that carefully controlled the formation of new banks, even in locales that were "underbanker — where additional competition would not be "destabilizing." By limiting competition, banks in general were made more profitable, and the number of bank failures was kept to a minimum.

Second, regulation limited the freedom of banks to take risks. Banks were required to maintain specified levels of capital, were prohibited either from making certain kinds of loans and from extending more than a certain amount of credit to specified borrowers, were prevented from engaging in securities activities (such as the underwriting of stocks and bonds) or from holding corporate stocks and bonds in their own portfolios, and were prohibited from engaging in other risky activities, like the underwriting of insurance. Thus, by limiting the

ability of banks to take risks and by insulating them from competition, regulation sought to guarantee the soundness of banks and the stability of the financial system, as well as to guarantee the uninterrupted flow of credit to business enterprises.

Causes of the changing financial structure

Three factors underlie the recent changes in financial structure. First, the long period of price and interest rate stability that followed the Great Depression and later World War II ended in the 1960s. Greater inflation brought higher interest rates and greater interest rate volatility, which sensitized savers to yield differences and made it worthwhile for them to search out higher yields. As a result financial intermediaries had to pay higher yields either to retain funds or to attract new funds.

Second, improvements in both information and communications technologies began to break down what were heretofore natural barriers to competition. The ability to retrieve, store, process, manipulate, and transmit large masses of data at low cost increased both economies of scale and scope, enabling financial institutions to offer new products and compete in new markets. The increased speed and lower cost of communicating and transmitting data over large geographical areas also eliminated geographical distance as an obstacle to competition. Institutions were able to collect and to service deposits (and other funds) from distant savers as easily as they could from local savers, and could make loans to distant borrowers as easily as to local borrowers.

Third, the growing internationalization or globalization of markets (both financial and nonfinancial) that accompanied the end of capital controls and the institution of flexible exchange rates further increased competition. U.S. financial institutions were forced to compete with foreign financial institutions, often for corporate borrowers who had been their clients for decades. This competition was particularly wrenching because many foreign institutions were governed by different rules and regulations that gave them a competitive advantage. Thus, with globalization came not only head-to-head competition between U.S. and foreign financial institutions but direct competition

between U.S. and foreign regulatory systems.

Internationalization also created a regulatory loophole that prevented the enforcement, or undercut the effectiveness, of key U.S. regulations. With capital free to flow to the highest yields, wherever they may be, the imposition of deposit rate ceilings in the United States became unenforceable and counterproductive. The gigantic Eurodollar market, for example, was largely the creation of unwise and misdirected U.S. regulations during the 1960s—many of which no longer exist.

The chief effect of these changes was to increase competition among financial intermediaries and between financial intermediaries and primary security instruments. Further, as these competitive pressures mounted, it became increasingly clear that regulations designed to segment financial markets and institutions could no longer be maintained. In some cases these regulations had become ineffective; in other cases they threatened to destabilize the financial system. As a result, there has been a steady erosion of the regulatory restrictions that historically separated financial intermediaries from one another.

The growth of non-depository intermediaries

Competition for savings and the growth of pension funds and investment companies

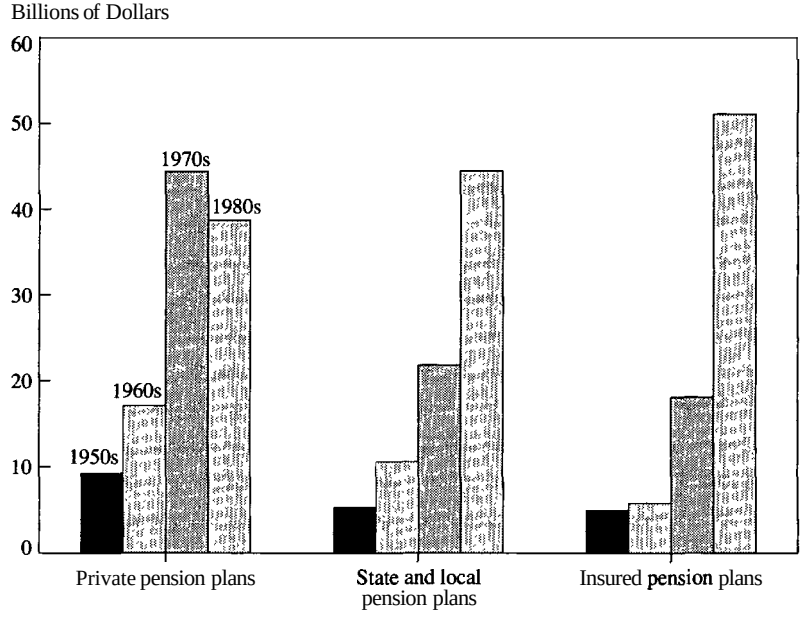
In the competitive struggle to capture the savings and financial assets of households, pension funds and investment companies were the biggest winners during the 1980s.[1] As shown in Table 2, the latter's share of intermediary assets grew from 16.7 percent in 1980 to 30.2 percent in 1990, and this growth shows no sign of abating. By pooling funds from a large number of investors and purchasing a diversified portfolio of assets, pension and mutual funds provide individual investors with a low-cost way of holding highly diversified portfolios of stocks, bonds, and mortgage-backed securities. They also make available to investors, particularly small investors, professional portfolio management.

Pension fund growth during the postwar period has been due to

increased pension coverage—both in the private and public sectors—and to the increasing value of the assets held by pension funds. In the 1980s all types of pension funds grew rapidly. (See **Chart** 1.) During this period rising stock values contributed significantly to this growth. In addition, federal tax policy, which permits the deduction of employer contributions and the deferral of taxes on both employee contributions and earnings on pension fund assets, has been a major stimulant to pension fund growth. Pension funds are now the dominant institutional player in the stock market, holding over 25 percent of all corporate stock outstanding.

The early growth of mutual funds, in the 1950s and 1960s, was due almost entirely to savings flowing into equity funds. Mutual funds offered investors diversified, professionally-managed, stock portfolios, and a booming stock market did the rest. In the 1970s, however, disappointing stock market performance caused investors to seek other investments. The mutual fund industry responded by creating

Chart 1
Growth of Pension Plans



Note: Mean net acquistion of real financial assets by decade.
Source: Flow of Funds Accounts. Federal Reserve System.

money market funds and various kinds of bond or fixed-income funds. Consequently, during the 1970s and 1980s the growth of mutual funds came primarily from the expansion of money market funds, and, to a lesser extent, bond funds. (See Chart 2.) These funds offered investors attractive alternatives both to individually held stock portfolios and to savings deposits in banks and thrifts, which until the early 1980s were constrained by interest rate ceilings.

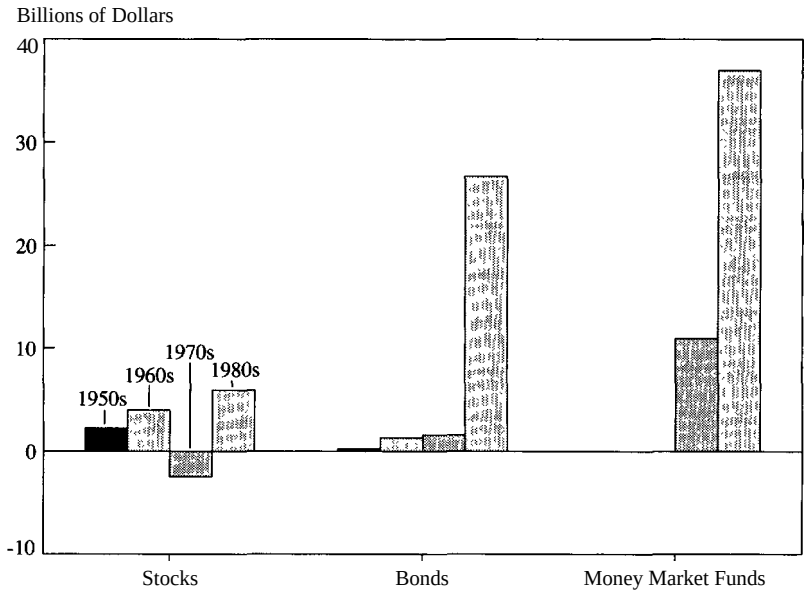
By 1991, money market mutual funds (MMMFs) had grown to $540 billion, up from $76 billion in 1980. (See Table 7.) In 1980, MMMF shares constituted only 7.2 percent of total commercial bank deposits; by 1991 this figure had grown to over 23 percent. Further, from 1980 to 1991 MMMF shares as a percentage of commercial bank *checkable* deposits rose from about 25 percent to almost 90 percent. Chart 3 shows the dramatic growth in these assets beginning in the early 1970s.[2]

In the 1980s the types of assets held by MMMFs also changed significantly. Table 7 shows the aggregate balance sheet for MMMFs during this period. MMMFs sharply reduced their holdings of bank time deposits (or certificates of deposit), replacing these assets with government securities and commercial paper.

The sharp growth of both pension and mutual funds can be seen vividly in Tables 5 and 6 as well. In 1980, pension and mutual fund assets amounted to 16.3 percent of total household financial assets; by 1991 this figure had jumped to over 32 percent. (See Table 5.) In contrast, the holdings of household assets in the traditional intermediaries—banks, thrifts, and life insurance companies—fell from 27.2 percent in 1980 to 21.15 percent in 1991. Mutual fund assets alone soared from only 3.6 percent of household "liquid assets" in 1989 to over 14 percent in 1991.

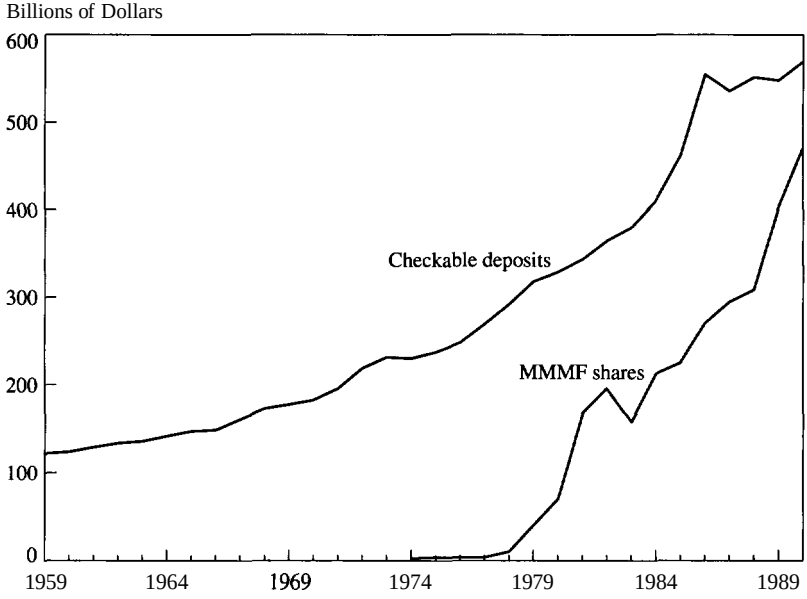
The growth of non-depository intermediaries is even more pronounced when viewed in terms of the annual flows of household assets. During the 1980s pension and mutual fund growth accounted for, on average, more than 63.7 percent of the net growth in the total assets acquired by households. (See Table 6.) In contrast, the traditional intermediaries accounted for only 36.3 percent of this growth.

Chart 2
Mutual Fund Assets



Note: Mean net acquistion of real financial assets by decade.
Sources. Flow of Funds Accounts. Federal Reserve System.

Chart 3
Checkable Deposits and MMMF Shares



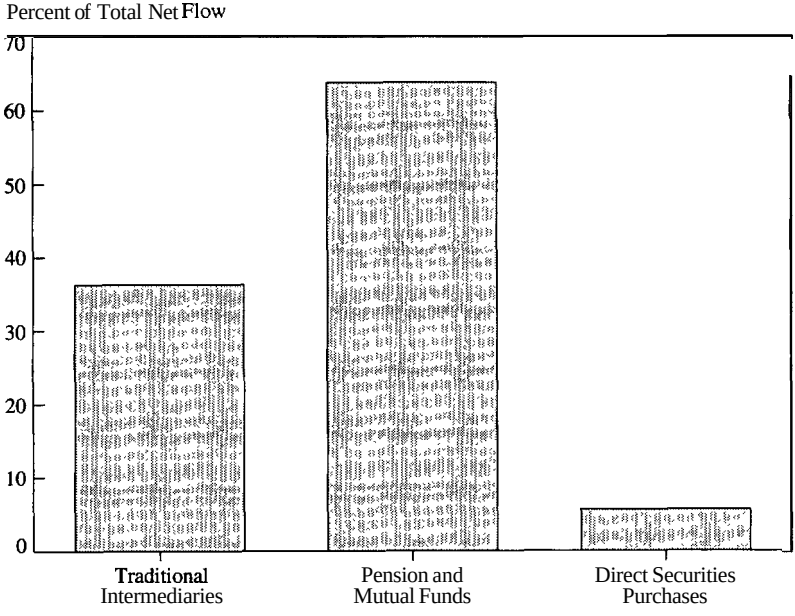
Source: Board of Governors of the Federal Reserve System

Table 7
Money Market Mutual Funds' Balance Sheet

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992:3
Total Financial Assets ($ billions)	76	186	220	179	234	244	292	316	338	428	498	540	553
Time Deposits (%)	27	24	19	13	10	7	7	11	10	10	4	6	
Security RPs (%)	7	8	7	7	10	11	11	12	12	13	12	13	13
Foreign Deposits (%)	9	10	11	12	9	8	8	7	9	6	5	4	4
U.S. Government Securities	11	17	25	20	18	18	15	13	9	8	17	22	24
Tax-exempt Securities	2	2	6	9	10	15	22	19	19	16	17	17	17
Open-market Paper (%)	41	38	31	37	42	41	36	35	38	44	41	36	34
Other (%)	2	1	1	1	1	2	2	2	3	3	4	3	3
Total Shares Outstanding	76	186	220	179	234	244	292	316	338	428	498	540	553

Source: *Flow of Funds Accounts,* Board of Governors of the Federal Reserve System
James R. Barth and R. Dan Brumbaugh, Jr., "The Changing World of Banking: Setting the Regulatory Agenda," 1993, unpublished.

Chart 4
Net Flows of Household Financial Assets as a Percent of Net Acquistion of All Financial Assets, 1980-1991



Source: Flow of Funds Accounts. Federal Reserve System.

(See Chart 4.) Mutual funds alone accounted for about a third of the growth in households' liquid assets during this decade. (See Table 6.)

These structural changes manifest two major developments in financial markets. First, households have become highly sensitive to the relative returns and risks associated with different financial assets, and now act quickly to place their savings in assets offering the best returns. Second, the segmentation of financial markets is rapidly disappearing. The opportunities available to small savers are now very similar to those available to large savers. Through pension and mutual funds, small savers can hold portfolios of all kinds of fixed-income securities as well as diversified stock portfolios, which in the past were available only to the wealthy. Nor are savers and investors any longer constrained by geography. There are few natural barriers to the flow of savings and investment. Funds flow across national borders as readily as between different areas of the same country.

The changes that have occurred also are irreversible because they are economically-motivated and technologically-driven. The 1980s were to financial markets what World War II was to our labor markets. World War II and its aftermath made women a major component of the labor force, setting in motion an irreversible trend that resulted in profound changes in society. While not everyone found this to their liking at the time, it was a fact of life. People who believe that the changes in financial markets that occurred during the 1980s can be undone or rolled back are as naive as those who in the late 1940s believed that they could return to a prewar society.

Competition for borrowers and the growth of finance companies and the commercial paper market

In the 1980s finance companies grew rapidly, becoming strong competitors of banks on the lending side of the balance sheet. (See Tables 1, 2, and 3.) Table 8 shows an aggregate balance sheet for all finance companies for the period 1950 to 1991. Two factors stand out. First, during the 1980s finance companies reduced their consumer lending and greatly increased their mortgage lending as a percentage of their total loan portfolio. Although the proportion of business loans did not change, prior to the 1980s these loans were made largely by "captive" finance companies to affiliates and customers of their parent companies. During the last decade, however, finance companies have been able to raise funds in the commercial paper market and use these funds to make general business loans, in direct competition with banks.[3]

Second, finance companies have significantly changed the way in which they raise funds, relying more on the issuance of commercial paper and much less on bank loans. During the last decade the commercial paper market literally exploded, growing to $528 billion in 1991 from $121.6 billion in 1980.[4] Finance companies alone accounted for almost two-thirds (or $322.8 billion) of the newly issued commercial paper in 1991. (See Table 9.)

Most of the commercial paper issued by finance companies was purchased by MMMFs during the 1980s. Newly issued commercial paper fed the voracious appetite of the rapidly growing MMMFs. In

the eleven-year period, 1981 through 1991, 63 percent of the commercial paper issued by finance companies was acquired by money market mutual funds. By 1991 money market mutual funds held almost $200 billion of commercial paper, constituting 34 percent of their total assets. (See Table 7.)

Taken together, the growth of both finance companies and the commercial paper market came at the expense of bank lending to business. In 1980 banks accounted for 19.1 percent of the total debt owed by nonfinancial businesses; finance companies accounted for only 6 percent. By 1991 the share held by banks had declined to 12.9 percent, while the share held by finance companies had risen to 8.1 percent. (Table 10.) In addition, finance company loans to businesses amounted to only 31 percent of banks' commercial and industrial loans in 1980. By 1991 this figure had jumped to almost 63 percent. (See Table 10.)

During this period large business firms also increasingly bypassed banks (as well as finance companies), borrowing more in primary markets by issuing their own commercial paper. In 1980 commercial paper issued by nonfinancial companies amounted to $28.0 billion—about 10 percent of banks' commercial and industrial loans. By 1990 this figure had jumped to $116.9 billion, over 22 percent of banks' commercial and industrial loans.

Banks have themselves facilitated these developments by providing backup lines of credit and guarantees to commercial paper issuers, including finance companies. One consequence of Penn Central Railroad's 1970 default on $83 billion of its commercial paper is that banks began to provide commercial paper issuers with guarantees and backup lines of credit, on which banks earned a fee. Although it is difficult to know exactly what portion of the commercial paper issued by finance companies is backed by bank guarantees, it has been reported that over 90 percent of the paper issued by the largest fifteen finance companies is backed by banks.[5] These fifteen companies account for about 40 percent of the total commercial paper issued by finance companies. It would also seem reasonable to believe that small finance companies would need a bank guarantee even more than large finance companies. Thus, nearly all commercial paper issued by

Table 8
Finance Companies' Balance Sheet

	1950	1960	1970	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992:3
Total Financial Assets ($ billions)	9	27	63	243	273	292	327	371	440	531	584	646	719	772	794	789
Mortgages (%)	5	6	9	21	22	23	23	24	24	27	24	25	28	29	28	29
Consumer Credit (%)	57	57	52	32	32	32	32	30	30	28	26	24	20	18	16	15
Other Loans (to Businesses) (%)	27	30	34	37	36	34	35	37	36	33	37	38	38	38	37	37
Other (%)	11	6	4	10	10	10	10	9	10	11	13	13	14	15	19	19
Total Liabilities ($ billions)	5	20	57	217	245	262	294	336	405	492	551	602	664	708	729	720
Corporate Bonds (%)	33	50	40	42	41	43	42	43	37	38	31	24	26	24	27	24
Bank Loans, N.E.C. (%)	50	30	22	11	10	10	9	8	7	7	6	5	5	5	5	5
Open-marketpaper(%)	14	19	38	28	30	28	30	30	35	37	39	45	45	47	46	47
Other (%)	3	1	0	19	19	19	19	19	21	18	25	26	24	24	22	24

Source: *Flow* of Funds ***Accounts***, Board of Governors of the Federal Reserve System
James R. Barth and R. Dan Brumbaugh, Jr., "The Changing World of Banking: Setting the Regulatory Agenda," 1993, unpublished.

Table 9
Amount of Outstanding Commercial Paper

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992:2Q
Amounts Outstanding (in $billions at yearend)													
All issues	121.6	161.1.	161.8	183.5	231.7	293.9	326.1	373.6	451.8	521.9	557.8	528.1	544.7
Financial Companies	86.6	107.6	109.2	125.2	145.5	187.8	225.9	258.6	316.1	351.7	365.6	347.9	355.5
Bank Related	25.9	33.0	34.6	38.0	44.1	46.4	43.1	44.6	44.4	48.8	30.1	24.3	22.5
Finance Companies	60.1	74.1	74.2	86.8	100.8	140.7	181.7	212.6	270.5	301.7	335.0	322.8	332.1
Nonfinancial Companies	28.0	42.7	37.6	36.8	58.5	72.2	62.9	73.8	85.7	107.1	116.9	98.5	111.7
Shares of Total Outstanding (in percent)													
All Issues	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Financial Companies	71.2	66.8	67.5	68.2	62.8	63.9	69.3	69.2	70.0	67.4	65.5	65.9	65.3
Bank Related	21.3	20.5	21.4	20.7	19.0	15.8	13.2	11.9	9.8	9.4	5.4	4.6	4.1
Finance Companies	49.4	46.0	45.9	47.3	43.5	47.9	55.7	56.9	59.9	57.8	60.1	61.1	61.0
Nonfinancial Companies	23.0	26.5	23.2	20.1	25.2	24.6	19.3	19.8	19.0	20.5	21.0	18.7	20.5

Source: Flow of Funds Accounts of the Federal Reserve System
Jane W. D'Arista and Tom Schlesinger, "The Parallel Banking System," Economic Policy Institute, 1992, unpublished

Table 10
Outstanding U.S. Credit Market Debt Owed by Households and Nonfinancial Businesses

(in billions of dollars and percent)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992:2Q
Total Credit Market Debt Owed by:													
Households	$1405.8	$1521.7	$1600.3	$1766.0	$1993.3	$2271.0	$2584.0	$2861.3	$3177.3	$3508.2	$3780.6	$3938.6	$4010.8
Nonfinancial Businesses*	1484.3	1650.0	1775.4	1946.2	2249.5	2512.2	2806.3	3034.6	3281.6	3512.0	3618.0	3593.2	3602.3
1) Outstanding Finance Company Credit to Consumers													
a) Amount	$78.9	$87.8	$93.2	$103.7	$111.7	$132.4	$151.0	$154.0	$155.3	$144.6	$138.7	$126.7	$120.8
b) Percent of Total Debt Owed by Households	5.6	5.8	5.8	5.9	5.6	5.8	5.8	5.4	4.9	3.8	3.7	3.2	3.0
2) Outstanding Finance Company Credit to Businesses													
a) Amount	$88.7	$99.4	$100.4	$113.4	$137.8	$158.7	$177.2	$213.8	$245.3	$270.2	$293.5	$292.6	$293.7
b) Percent of Total Debt Owed by Nonfinancial Businesses	6.0	6.0	5.7	5.8	6.1	6.3	6.3	7.0	7.5	7.7	8.1	8.1	8.2
3) Outstanding Bank Loans to Individuals													
a) Amount	$181.2	$186.1	$191.6	$217.4	$258.4	$299.5	$321.5	$334.3	$361.5	$382.3	$384.7	$369.6	$358.8
b) Percent of Total Debt Owed by Households	12.9	12.2	12.6	12.3	13.0	13.2	12.4	11.7	11.4	10.9	10.2	9.4	8.9
4) Outstanding Commercial and Industrial Loans of Banks													
a) Amount	$282.9	$317.9	$355.5	$381.3	$430.0	$446.6	$487.8	$481.9	$501.1	$517.7	$512.7	$464.5	$446.3
b) Percent of Total Debt Owed by Nonfinancial Businesses	19.1	19.3	20.0	19.6	19.1	17.8	17.4	15.9	15.3	14.7	14.2	12.9	12.4

*Includes farm, nonfarm, noncorporate sectors.

Source: *Flow of Funds* Accounts of the Federal Reserve System. D'Arista and Schlesinger, *Ibid.*

finance companies is probably backed by a bank guarantee.

Is the decline of banking a global phenomenon?

Banking, at least in its traditional form, is in decline in all countries. This decline has been more severe in countries where constraining regulations have created a highly segmented financial structure and prevented banks from responding to the competitive initiatives of nonbank competitors. In all countries, however, technologically driven financial innovation, competition, and deregulation, when they have occurred, have had powerful effects.

Although it is difficult to make cross-country comparisons because of differences in national accounting conventions, the decline of banking appears to have been greater in the United States, the United Kingdom, Australia, and the Scandinavian countries than in continental European countries. Table 11, for example, shows a greater decline in bank profitability in the former countries than in most European countries. In the latter countries banks were better able to respond to the changing market environment by developing new products and diversifying into new activities.

In addition, there has been a rapid growth of non-depository financial intermediaries in all countries. Mutual funds, for example, have experienced significant growth in countries with developed financial markets. (See Table 12.) Further, non-depository intermediaries as a group—life insurance companies, pension funds, and investment companies—have sharply increased their share of household financial assets in all major countries: from an average of 18.9 percent in 1980 to an average of 31.9 percent in 1990. (See Table 13.) In some countries, banks have been able to participate in this growth via ownership of, or a relationship with, non-depository intermediaries.

In countries where banks have come under the most competitive pressure there is evidence to suggest that they have responded by significantly increasing their risk-taking. In particular, the comparative loan-loss provisions shown in Table 14 indicate that in the United States, the United Kingdom, Australia, and the Scandinavian countries, banks have increased their lending to less creditworthy borrow-

Table 11
Bank Profit Margins[1]

Countries	1980-82	1984-86	1989-90	1990
United States[2]	0.83	0.83	0.61	0.59
Japan[2,3]	0.40	0.46	0.40	0.33
Germany[2]	0.50	0.97	0.88	0.83
France[2]	0.34	0.21	0.33	0.31
Italy	0.68	0.96	1.19	1.24
United Kingdom[2]	1.04	1.05	0.28	0.59
Canada[3]	0.63	0.74	0.96	1.22
Australia[3]	1.41	1.33	1.20	0.94
Belgium[3]	0.34	0.39	0.26	0.33
Finland	0.49	0.55	0.22	0.21
Netherlands	0.31	0.66	0.59	0.53
Norway	0.63	0.75	-0.43	-1.02
Spain[2]	1.09	0.92	1.75	1.72
Sweden[4]	0.38	0.55	0.34	0.22
Switzerland	0.65	0.71	0.64	0.53

[1] Ratio of pre-tax profit to average total assets of commercial banks; the data are not fully comparable across countries.
[2] Large commercial banks
[3] Fiscal years
[4] A break in series in 1986 considerably raises profit margins in that and subsequent years in comparison with 1980-85.
Sources: For Australia, Reserve Bank of Australia; for the other countries, OECD and BIS estimates.
David Llewellyn, "Secular Pressures on Banking in Developed Financial Systems: Is Traditional Banking and Industry in Secular Decline?" in D. E. Fair and R. Raymond, eds., *The New Europe: Evolving Economic and Financial Systems in East and West.* Netherlands: Kluwer Academic Publishers, 1993.

ers, possibly to maintain profit margins. In contrast, the loan-loss provisions of banks in the continental European countries banks' have increased relatively little if at all.

In all countries banks are changing what they do in response to a more competitive environment. When permitted to do so, they have

Table 12

Mutual Fund Assets in Selected Countries[1] (in billions of U.S. dollars)

	1985	1986	1987	1988	1989	1990	1991
United States	495.5	716.3	769.9	810.3	982.0	1,066.9	1,346.7
Long-term	251.7	424.2	453.8	472.3	553.9	568.5	807.1
Short-term	243.8	292.2	316.1	338.0	428.1	498.4	539.6
Japan	99.0	197.1	318.8	433.9	408.2	353.5	349.4[2]
Germany[3]	42.3	65.7	90.2	109.2	132.2	160.1	174.6[4]
Public	23.4	35.7	48.9	60.2	70.2	84.9	88.5[4]
Special	18.9	30.0	41.3	49.0	62.0	75.2	86.1[4]
France	84.6	153.0	204.0	240.4	268.3	383.2	396.5[5]
Italy	16.3	47.1	50.8	40.2	45.4	41.9	47.5
United Kingdom	29.4	51.3	67.9	76.7	92.8	91.5	100.8
Canada[6]	7.4	12.6	15.6	17.2	20.2	21.5	43.5
Spain	. . .	. . .	. . .	. . .	. . .	24.4	24.8[2]
Australia	3.3	4.1	6.9	12.2	30.9	29.1	34.5'
Netherlands	9.1	12.9	15.5	. . .	. . .	24.4	. . .
Switzerland	. . .	. . .	20.3	24.8	24.6	25.7	23.9
Belgium	2.8	5.3	7.4	4.8	4.3'	4.6	4.7[2]
Denmark	2.5	4.3	. . .	. . .	. . .	3.6	3.6'
Ireland	. . .	. . .	. . .	. . .	5.0[7]	7.9	7.5[2]
Korea	7.1	10.4	13.6	21.0	27.6	33.8	36.8[2]
India	. . .	. . .	. . .	17.0	. . .	12.5	12.7
Luxembourg	. . .	. . .	. . .	. . .	. . .	94.6	114.2[2]
Total	799.3	1,280.1	1,581.0	1,807.6	2,041.5	2,379.0	2,721.7

Source: Investment Company Institute.
[1] Open-end funds only.
[2] As of September.
[3] Includes real estate funds.
[4] As of November.
[5] Includes *sociétiés d'investissement à capital variable* (investment companies with variable share capital) of $297.7 billion as of September and ***fonds commun de placement*** (unit trusts) of $98.8 billion as of December.
[6] Prior to 1991, only 75 percent of the companies reported to the Investment Funds Institute of Canada.
[7] As of June.

Table 13
The Growth of Institutional Investors

Countries	Pension Funds and Life Assurance Companies			Collective Investment Institutions			Total		
	1980	1985	1990[3]	1980	1985	1990[3]	1980	1985	1990[3]
	Financial Assets as a Percentage of Household Financial Assets								
United States	17.8	21.1	23.5	2.2	5.0	7.7	20.0	26.0	31.2
Japan	13.8	16.6	20.8	1.8	3.6	5.6	15.6	20.2	26.4
Germany	19.4	24.2	27.1	3.2	4.8	8.1	22.6	29.0	35.1
France	8.0	11.2	14.7	2.7	12.4	21.7	10.6	23.6	36.3
Italy[1,2]	1.6	0.9	3.2	n.a.	2.1	2.9	n.a.	2.9	6.1
United Kingdom[1]	39.9	49.9	53.7	1.6	3.1	4.9	41.5	53.1	58.6
Canada	19.4	23.3	26.7	1.0	1.6	3.0	20.4	24.9	29.7

[1] Total asset?.
[2] At book value.
[3] For Italy and United Kingdom, 1989 figures.

Source: BIS, Annual Report, 1992.

pursued off-balance sheet activities as a way of increasing fee income to replace lower income from traditional banking activities. They have expanded securities, insurance, and trading activities, "securitized" more of their loan portfolios, provided more loan commitments and standby letters of credit, and increased derivative-market services. Table 15 shows the sharp growth in banks' non-interest income (relative to bank gross income) that has occurred in all major countries. This income, for example, has increased by **36** percent in the United States and by 47 percent in the United Kingdom since 1980.

Two views of the decline of banking

There are two theses about why banking is in decline in the United States as well as in other countries. These can be characterized as the "excess capacity" and the "regulatory burden" views.

The "excess capacity" thesis

The "excess capacity" thesis contends that the banking industry has excess capacity that must be eliminated before a new industry equilibrium can be obtained. Banking has historically been a protected industry. In the past, regulation has consciously been used to restrict competition by erecting high entry barriers and by curbing price competition in the industry. Restrictions on de novo bank formation and on branching geared to prevent "overbanking" made entry into local banking markets difficult, and price-ceiling regulations (such as Regulation Q) prevented "ruinous" price competition. By limiting competition, therefore, an abnormally high rate of return could be earned on capital invested in the banking industry. The inevitable result was that more capital was attracted to the banking industry than would have been the case if only a competitive (or "normal") rate of return could have been earned.

Changes in technology, the internationalization of banking markets, and deregulation have subjected banks to increased competition by reducing the barriers to entry into traditional banking markets. For example, liquidity services in the form of transactions balances can now be provided by money market mutual funds operating from a single location and providing services to individuals widely dispersed

Table 14

Net Loan-Loss Provisions of Banks in Selected Industrial Countries' (in Percent of Gross Income)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
United States: Commercial Banks	6.56	9.57	11.06	12.80	14.30	16.34	26.30	11.14	18.90	18.53
Large Commercial Banks	7.23	10.37	12.16	14.02	14.12	15.78	32.31	11.01	22.51	21.36
Japan: Commercial Banks	0.83	3.33	2.17	2.26	1.24	2.42	2.16	3.34	3.36	2.37
Large Commercial Banks	1.02	4.73	2.37	2.65	1.07	2.33	2.23	10.37	4.61	3.18
Germany: Commercial Banks	15.62	21.89	22.59	15.29	13.44	15.05	13.26	7.77	13.07	16.45
Large Commercial Banks	14.53	20.56	16.26	12.44	8.01	9.53	10.15	3.32	6.13	13.52
France: Commercial Banks and Credit Cooperatives	18.10	20.89	21.58	20.40	19.33	21.30	18.67	18.80	20.87	20.93
Large Commercial Banks	20.64	23.73	24.23	22.81	22.81	25.15	21.02	22.39	23.31	21.78
Italy: Commercial Banks	...	...	...	13.16	12.52	12.18	11.12	12.41	11.49	11.65
Large Commercial Banks			...	11.35	13.60	11.89	10.25	13.89	12.97	13.05
United Kingdom: Commercial Banks	...	...	...	14.49	11.68	10.95	30.99	6.19	32.74	20.07
Large Commercial Banks	4.20	10.23	12.34	14.50	10.24	9.32	30.32	3.94	33.07	21.00
Canada: Commercial Banks	...	14.61	15.24	17.36	17.69	20.57	17.49	13.68	25.56	8.28
Netherlands: Commercial Banks	27.37	27.39	19.69	20.45	12.25	10.68	6.13	13.26	12.19	11.78
Sweden: Commercial Banks	24.74	19.08	29.91	23.90	26.89	20.94	23.45	27.20	28.64	14.10
Switzerland: All Banks	14.75	17.75	18.73	18.72	19.64	19.00	19.06	17.82	18.90	20.70
Large Commercial Banks	13.30	16.70	17.68	18.31	19.44	19.23	18.32	17.78	17.89	17.40
Belgium: Commercial Banks	10.40	14.26	14.32	14.29	14.95	14.18	13.93	20.46	23.61	11.54
Luxembourg: Commercial Banks	39.09	52.28	56.51	49.90	49.38	46.05	39.66	29.54	32.37	44.06

[1]Owing to differences in national accounting practices, the figures in this table should be interpreted with caution. In particular, cross-country comparisons may be less relevant than developments over time within a single country.

Sources: Bank of England; and Organization for Economic Cooperation and Development (1992).

International Monetary Fund, "International Capital Markets: Development, Prospects and Public Issues," World Economic and Financial Survey, Sept., 1992.

Table 15
Non-Interest Income of Banks in Selected Industrial Countries' (in Percent of Gross Income)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
United States: Commercial Banks	23.98	24.61	26.54	24.71	26.57	29.76	30.20	30.08	31.77	32.79
Large Commercial Banks	30.97	30.99	32.96	29.20	30.93	34.13	35.13	34.75	36.80	37.99
Japan: Commercial Banks	17.78	13.94	14.68	17.68	21.06	19.69	25.12	25.83	23.84	24.12
Large Commercial Banks	23.79	19.11	18.95	22.77	26.59	24.53	32.23	40.05	37.20	35.94
Germany: Commercial Banks	29.11	26.85	24.82	25.94	30.05	29.55	29.83	30.39	36.02	35.68
Large Commercial Banks	28.89	30.29	26.68	27.16	31.15	27.54	30.14	31.43	33.62	34.92
France: Commercial Banks and Credit Cooperatives	16.00	16.18	16.77	13.19	14.08	14.45	17.03	17.01	21.18	20.07
Large Commercial Banks	15.21	15.76	17.02	12.96	15.69	17.20	20.74	20.98	23.84	24.92
Italy: Commercial Banks	...	...	..	29.18	31.51	31.88	27.98	27.58	25.74	26.78
Large Commercial Banks	...	...	...	34.56	39.27	38.67	32.79	34.34	29.99	30.13
United Kingdom: Commercial Banks	...	...	...	35.60	34.51	36.33	38.17	37.58	39.10	40.09
Large Commercial Banks	27.07	29.35	31.94	33.38	32.48	33.88	35.86	36.33	38.12	39.86
Canada: Commercial Banks	...	21.61	21.07	22.68	23.71	24.73	28.35	27.39	29.18	30.95
Netherlands: Commercial Banks	25.85	23.25	23.51	24.66	25.65	23.92	25.95	27.25	29.37	28.65
Sweden: Commercial Banks	29.17	31.11	28.68	30.25	34.95	35.27	28.25	28.77	28.58	26.21
Switzerland: All Banks	47.69	44.22	46.49	45.67	47.38	49.35	51.58	47.10	50.87	49.05
Large Commercial Banks	52.57	47.28	47.91	46.65	48.16	49.75	51.34	47.38	50.29	50.93
Belgium: Commercial Banks	17.35	21.17	24.48	20.76	23.65	25.82	26.89	29.96	27.42	23.04
Luxembourg: Commercial Banks	23.73	18.38	17.49	13.24	19.67	21.37	19.99	24.28	28.23	35.00

[1] Owing to differences in national accounting practices, the figures in this table should be interpreted with caution. In particular, cross-country comparisons may be less relevant than developments over time within a single country.

Sources: Bank of England; and Organization for Economic Cooperation and Development (1992).

International Monetary Fund, "International Capital Markets: Development, Prospects and Public Issues," World Economic and Financial Survey, Sept., 1992.

throughout the United States (as well as foreign countries). In addition, banks can attract funds from distant locations by using certificates of deposits. Stock and bond mutual funds also offer small-denomination shares in diversified portfolios as an alternative to traditional time and savings deposits. Similarly, technological changes and accompanying market innovations have facilitated new entry into business lending. The "unbundling" of traditional banking products (such as occurs with the "securitization" of loans) has also lowered entry barriers by decomposing traditional bank products into separate products and services that are more easily duplicated by competitors. Finally, market developments have forced the elimination of regulations that previously insulated banks from "excessive" competition—restrictive price ceilings have been removed and geographical restrictions have been eased, either directly or indirectly. The result has been a sharp increase in competition in banking.

The "excess capacity" thesis argues that with greater competition the rate of return on capital invested in banking must decline, resulting in an excess of capital in the industry. As a consequence, capital must leave the industry until a competitive rate of return is restored.

According to this thesis, therefore, we should expect to see falling profitability in banking, possibly greater risk-taking by banks as they seek to maintain former levels of profitability, and a shrinking market share for banks, as nonbanking financial intermediaries succeed in penetrating traditional banking markets and new capital markets instruments are developed to bypass banks entirely. Further, we should expect to see an increased failure rate in banking and an intensified effort by banks to diversify into nontraditional activities, such as those carried on by investment banks, broker/dealers, and insurance companies. Finally, more competitive markets should intensify pressure to cut costs and to restructure along more efficient lines. Thus, the number of small banks should decline, either because of increased failures or because of widespread industry consolidation, and fewer but larger and more diversified banks Should emerge. *Once* the required industry "shakeout" is completed, however, the banking industry should settle into a new equilibrium, as a smaller and more efficient industry relative to other financial intermediaries.

The regulatory burden thesis

An alternative view is that banks are in decline because of burdensome regulations that disadvantage them vis-8-vis their nonbank competitors. In this view regulation has locked banks into a diminishing role by not permitting them to adapt to the changes in technology and competition that have occurred by diversifying their activities.

Institutions competing with banks for funds, such as MMMFs, are not subject to prudential regulation. Unlike banks, they are not subject to Federal Reserve requirements and deposit insurance premiums, both of which raise the cost of funds for banks relative to nonbank competitors. High capital requirements and burdensome regulatory supervision, banks argue, also increase their costs. In addition, banks are subject to costs as a result of their "community obligations," such as those imposed by the Community Reinvestment Act, which their nonbank competitors do not have to bear.,

On the lending side, finance companies, which make the same kinds of loans as do banks, are virtually unregulated. They do not have reserve or capital requirements, are not subject to loan limits, can operate freely anywhere in the country, and transactions with their parents and affiliates are unrestricted. Finance companies also are not subject either to community demands under the Community Reinvestment Act or to restrictions imposed by the Glass-Steagall Act.

Thus, adherents to the "regulatory burden" thesis argue that the combination of the regulatory advantages enjoyed by both MMMFs and finance companies is causing banks to lose market share. Specifically, MMMFs have a cost advantage over banks in raising funds, and this advantage is passed on to finance companies by MMMFs purchasing the commercial paper issued by finance companies. As a result, finance companies gain a competitive advantage over banks in making loans, which may explain the inroads finance companies have made in both mortgage and business lending during the 1980s.

This thesis is difficult to evaluate. Because of their public charters, banks also are the recipient of regulatory benefits. In particular, deposit insurance, implicit government guarantees, and access to the

discount window have arguably reduced their cost of funds. Indeed, it is partly because of these governmentally bestowed benefits that banks have been burdened with greater regulation. The question is: have banks been subject on net to a tax or a subsidy?

Recent experience suggests that banks and other depository institutions have on net benefited from a subsidy. The widespread failure of thrifts and banks during the 1980s resulted in huge costs being imposed on general taxpayers when government insurance funds backing deposits in these institutions proved to be inadequate.[6] The government bailout, in effect, is a measure of the accumulated subsidy extended to these institutions in the past. Had either deposit insurance premiums been high enough to accumulate the necessary funds to pay for the bailout or regulation been sufficient to prevent or reduce the losses to taxpayers that occurred, there may not have been a subsidy.

Within the last few years new legislation has attempted to eliminate this recognized subsidy. The Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) and the Federal Deposit Insurance Corporation Improvement Act (FIDICIA) raised capital requirements for banks and thrifts, increased insurance premiums, and curtailed the asset and liability powers of thrifts. In addition, these acts required early intervention by regulators to prevent troubled institutions from imposing costs on the deposit insurance fund and therefore, taxpayers.

Whether this legislation successfully eliminates the past subsidy to banks, or, alternatively, by overregulation, imposes a net tax on banks, is a point of current contention. It is clear, however, that the net benefits bestowed on banks have been reduced in the last few years. Whether the remaining balance between government-supplied benefits and regulatory burdens is "right" is not clear. If banks perform a different economic or social role than their nonbank competitors, it may be socially optimal to impose a different regulatory structure on them, even though it results in a different cost structure.

The "regulatory burden" view is that the regulatory balance no longer favors banks; and, that, if nothing is done to correct this imbalance, banking will become an ever-shrinking part of financial

intermediation. Banking as a distinct industry, adherents would argue, may come to play the same role in financial intermediation as U.S. savings bonds do in capital markets— as a repository for the funds of small savers who place an exceptionally heavy weight on a government guarantee.

Both the "excess capacity" and the "regulatory burden" theses imply that banking will shrink relative to other financial intermediaries. Depending on which view is accepted, however, the respective policy response is different. The "excess capacity" thesis implies that the diminishing importance of banking is a natural consequence of efficiency-enhancing technological and organizational innovations, and should be allowed to run its course. The "regulatory burden" thesis implies that the decline of banking has been artificially induced—the consequence of misdirected and suboptimal government interference with markets—and should be reversed, either by easing the regulatory burdens on banks or by increasing those imposed on the nonbank competitors of banks. This is the genesis for calls to extend bank-type regulations, such as reserve requirements, deposit insurance premiums, and Community Reinvestment Act responsibilities, to investment companies and pension funds.[7]

The theory of bank "uniqueness": an obsolete concept?

Banks have long occupied a special niche in the thinking of policymakers and financial scholars because of their unique joint provision of liquid liabilities (or "money") and nonmarketable business loans. Because of their unique product mix they have also been singled out for special treatment under our regulatory system. It is clear from the discussion in prior sections of the paper, however, that changes in technology and accompanying deregulation have resulted in the development of new substitutes for the services commonly provided by banks. For example, MMMFs provide similar liquidity services in the form of demandable (or checkable) equity shares, and nonbank lenders such as finance companies serve many of the same borrowers as do banks, including business borrowers. However, while substitute products have developed for all of the services formerly provided only by banks, no nonbank institution provides the identical combination or package of services that banks do. In particular, although nonbank

competitors have successfully separated the provision of liquid liabilities from the provision of nonmarketable, illiquid, business loans, banks are still unique in that they alone produce these products jointly. Thus, there remains the question of whether this special feature of banks distinguishes them from nonbank competitors.

Theories of the banking firm attribute the competitive edge enjoyed by banks to their ability to overcome informational problems more efficiently than other financial institutions. Informational problems arise when borrowers' projects (particularly those of business enterprises) cannot be easily evaluated and communicated to capital markets, when a borrower's behavior must be monitored during the life of the loan in order to protect the lender's investment, and when for competitive reasons borrowers do not wish to make information publicly available, even though such information could in principle be successfully communicated to the public at large. These problems are often identified as those of "asymmetric information," "moral hazard" (that is, borrowers changing their behavior during the life of the loan), and "inside" information.

The comparative advantage of banks in managing these informational problems, however, seems considerably less today than in the past. First, advances in computer technologies have greatly reduced the costs of retrieving, processing, and disseminating information. Thus, lenders and investors can more easily access information about borrowers. This has undoubtedly facilitated the growth of the commercial paper market and the securitization of loans, and has resulted in more and more borrowers bypassing banks. Information asymmetries, of course, still exist-one reason that financial intermediaries exist at all. But do banks, as opposed to, say, finance companies and insurance companies, possess any special advantage in managing these information asymmetries?

The same question applies to the ability of banks to monitor borrowers (or to manage the moral hazard problem), and to their ability to exploit the "inside" information that borrowers make available. Why should banks be more efficient than other financial intermediaries in managing these informational problems?

It has been argued that banks enjoy a comparative advantage because of their large scale (economies of scale), because of their superior diversification, and because they provide many different products (economies of scope). In today's markets, none of these arguments is persuasive. First, many nonbank financial institutions are as large or larger than banks, so it is doubtful that they do not enjoy the same economies of scale as banks. For example, the average size of the largest twelve finance companies in 1991 was $30 billion. (See Table 16.) By comparison, most banks are small. Second, many nonbank financial institutions are as well or better diversified than banks, providing many different services to many different customers located in many different regions of the country (for example, insurance companies and mutual funds).

If banks have any comparative advantage it may stem from their ability to exploit information produced as a byproduct of the particular services they provide. In specific, as a byproduct of their providing liquidity services (checkable deposits) to both existing and potential borrowers banks may gain a unique informational advantage in lending to these borrowers.[8] If there is such an advantage, however, it would seem to exist primarily for business borrowers, where asymmetric information problems are more severe.

I am doubtful that this advantage still exists to any significant extent. First, as we have seen, banks have substantially reduced their lending to businesses in favor of consumer and mortgage lending, which suggests that they do not have a comparative advantage in making business loans. Until 1980 banks made more business loans than any other kind of loan. But by 1991 their combined mortgage and consumer loans were more than double their commercial and industrial loans.[9] (See Table 17.) Further, in 1980, 49 percent of the funds raised by nonfinancial companies was from bank loans; today that figure is less than 17 percent. (See Table 18.) Banks are shifting toward making loans that require less extensive (and less costly) evaluation and monitoring—loans that can be standardized, packaged, and sold in secondary markets. Second, banks have drastically reduced their reliance on checkable deposits, suggesting that these deposits are not particularly valuable to them. Such deposits, once the major source of funds for banks, currently account for less than 17

Table 16
Top 12 Nonbank Finance Companies Ranked by Assets

	1991		1990		1989	
	Amount (billions of dollars)	Percent of Total for All Finance Cos.	Amount (billions of dollars)	Percent of Total for All Finance Cos.	Amount (billions of dollars)	Percent of Total for All Finance Cos.
General Motors Acceptance Corp.	$102.9	12.8%	$105.2	13.6%	$103.6	14.4%
General Electric Capital Corp.	80.5	10.0	70.4	9.1	58.7	8.2
Ford Motor Credit Co.	56.9	7.1	59.0	7.6	54.9	7.6
Associates Corp. of North America*	21.6	2.7	16.9	2.2	14.8	2.1
Chrysler Finance Corp.	21.3	2.7	24.9	3.2	30.1	4.2
Household Financial Corp.	17.3	2.2	16.9	2.2	15.1	2.1
Sears Roebuck Acceptance Corp.	14.7	1.8	15.4	2.0	14.4	2.0
American Express Credit Corp.	14.1	1.8	14.2	1.8	12.6	1.8
ITT Financial Corp.	12.6	1.6	11.7	1.5	10.6	1.5
IBM Credit Corp.	11.3	1.4	11.1	1.4	9.7	1.3
Westinghouse Credit Corp.	8.6	1.1	10.3	1.3	9.3	1.3
Beneficial Corp.	10.0	1.2	9.3	1.2	7.9	1.1
Total	$371.8	46.3	$365.1	47.3	$341.7	47.5

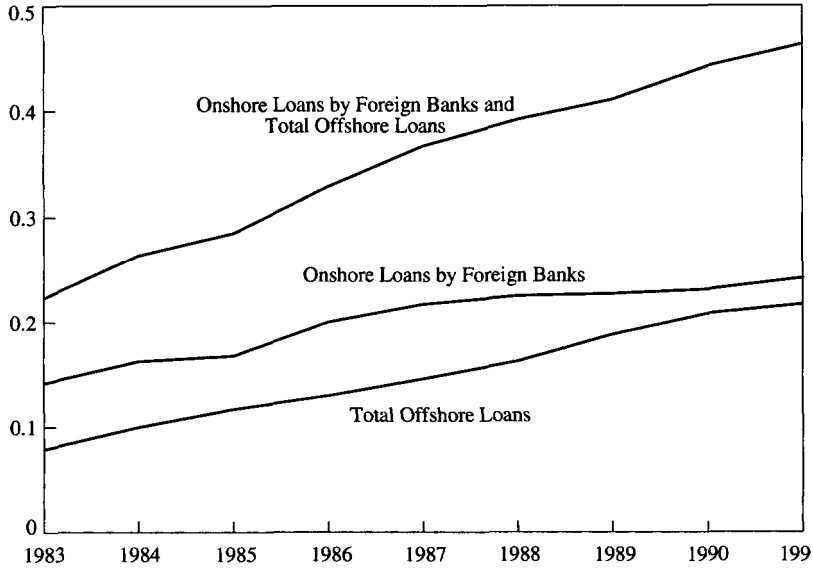
*A subsidiary of Ford Motor Company.
Sources: Annual Reports: American Banker, November 8, 1990, p. 14; December 11, 1991, p. 11. Jane W. D'Arista and Tom Schlesinger, "The Parallel Banking System," Economic Policy Institute, 1992, unpublished.

percent of bank funding. (See Table 19.) Third, finance companies have sharply increased their role as providers of credit to the business sector, despite their not providing any checking facilities to these borrowers. At yearend 1991, finance company loans to businesses totaled more than 50 percent of banks' commercial and industrial loans, and about 35 percent of total commercial and industrial lending. (See Table 10.) If banks have an information advantage over finance companies, therefore, it seems to have eroded in recent years.[10] Lastly, foreign banks have become aggressive lenders to U.S. businesses, even though they often do not provide liquidity services to

these borrowers. Lending by foreign banks, both on-shore and off-shore, as a percentage of total commercial and industrial loans by U.S. banks rose from about 18 percent in 1983 to over 40 percent in 1991. (See Chart 5.)

The results of academic research on the question of bank uniqueness, while mixed, tend to confirm the conclusion that banks have lost much of the advantage they once had.[11] For example, after examining bank loan growth in two periods, 1959 to 1976 and 1977 to 1991, Becketti and Morris conclude that in recent years bank loans have lost much of the "specialness" that distinguished them in the past.[12] Hook and Opler look at the characteristics of firms which borrow from banks, and find that there is little support for the ". . . view that banks provide loans to firms where problems of monitoring and verification . . . are greatest."[13]

Chart 5
Foreign Share of U.S. C&I Loans



Note Fractions of total C&I loans. Total C&I loans include all loans (both onshore and offshore) to U.S. addresses by both foreign and domestic banks. (Flow of funds data on C&I loans excludes foreign offshore loans.)
Source: "U.S. Commercial Banks: Trends, Cycles and Policy," unpublished. 1993.

Table 17

Selected Financial Data for Commercial Banks

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992:3
Number of Institutions	14,435	14,415	14,454	14,467	14,472	14,393	14,188	13,694	13,120	12,705	12,388	11,927	11,590
Total Assets ($ Billions)	1,856	2,029	2,194	2,342	2,508	2,731	2,941	2,999	3,131	3,299	3,389	3,510	3,481
Capital ($ Billions)	108	118	129	140	154	169	182	181	197	205	219	232	257
Net After-Tax Income ($ Millions)	13,974	14,737	14,881	14,932	15,499	17,981	17,412	2,806	24,817	15,647	16,626	18,568	24,205
Net Operating Income ($ Millions)	14,443	15,542	15,475	14,867	15,414	16,182	13,194	1,176	23,722	14,541	15,503	14,823	31,515
Taxes ($ Millions)	4,657	3,873	2,980	4,017	4,721	5,643	5,304	5,424	9,991	9,658	7,885	8,404	10,856
Real Estate Loans to Total Assets (%)	14.5	14.4	14	14.4	15.4	16.1	17.5	20	21.6	23.1	24.5	24.8	24.8
Commercial and Industrial Loans to Total Assets (%)	21.1	22.4	23	22.4	22.5	21.2	20.4	19.7	19.2	18.8	18.2	16.3	15.5
Agricultural Production Loans to Total Assets (%)	1.7	1.7	1.7	1.7	1.6	1.3	1.1	1	1	0.9	1	1	1.1
Loans to Individuals to Total Assets (%)	10.1	9.5	9.1	9.6	10.6	11.3	11.4	11.7	12.1	12.1	11.9	11.4	11
Number of Problem Banks	NA	NA	NA	NA	NA	1,098	1,457	1,559	1,394	1,092	1,012	997	909
Assets of Problem Banks ($ Billions)	NA	NA	NA	NA	NA	NA	NA	329	305	188	342	528	488
Resolutions-Commercial and Savings Banks													
Number	10	10	42	48	79	120	145	203	221	207	169	127	80
Total Assets ($ Millions)	236	4,859	11,632	7,037	3,274	8,337	6,830	9,198	52,623	29,538	16,265	63,300	22,373
Estimated Present-Value Cost ($ Millions)	NA	NA	NA	NA	NA	850	1,732	2,017	5,530	5,998	3,767	7,400	3,499

Source: Congressional Budget Office

James R. Barth and R. Dan Brumbaugh, Jr., "The Changing World of Banking: Setting the Regulatory Agenda," 1993, unpublished.

Table 18
Nonfinancial Company Borrowing (Percentage of Funds Borrowed)

Type of Instrument	1965	1970	1980	1983	1984	1985	1986	1987	1988	1989
Bank Loans										
U.S. Banks	57.3	16.8	48.7	32.1	28.9	22.6	24.4	3.2	16.5	16.5
Foreign Banks	0.0	0.0	2.2	4.9	7.7	1.1	5.4	1.3	5.6	5.7
Commercial Paper	1.7	6.2	6.9	1.5	12.8	11.0	4.6	1.6	5.9	10.6
Finance Company Loans	5.2	0.6	3.7	14.1	9.7	9.6	5.5	11.6	8.0	5.7
Bonds and Notes*	25.6	69.4	66.6	46.5	39.3	72.8	54.7	68.0	57.8	57.7
Mortgages	11.7	3.1	-36.2	-8.0	-0.8	-13.5	13.9	10.7	7.1	2.3
Bankers Acceptances and U.S. Government Loans	1.9	3.9	8.1	11.9	2.4	3.6	0.6	3.6	0.9	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Memorandum Item:										
Total Funds Raised in Credit Markets (in U.S.$ Billions)	18.9	28.5	57.8	54.8	169.6	132.4	203.7	145.5	197.5	196.0

*Includes bonds and notes issued abroad by U.S. corporations and tax-exempt bonds issued for the benefits of nonfinancial corporations.

Sources: L.E. Crabbe, M.H. Pickering, and S.D. Prowse, "Recent Developments in Corporate Finance," *Federal Reserve Bulletin* (August 1990), and other Federal Reserve data (updated).

David T. Llewellyn, "Secular Pressures on Banking in Developed Financial Systems: Is Traditional Banking an Industry in Severe Decline?" 1992, unpublished paper.

Table 19
Commercial Banks' Balance Sheet

	1950	1960	1970	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992:3
Total Financial Assets (in Billions)	150	230	518	1,483	1,620	1,732	1,889	2,129	2,377	2,617	2,773	2,952	3232	3,336	3,441	3,576
U.S. Gov't. Securities (%)	43	28	15	12	11	12	14	12	11	12	12	12	12	14	17	18
Tax-Exempt Securities (%)	NA	NA	NA	10	10	9	9	8	10	8	6	5	4	4	3	3
Corporate and Foreign Bonds (%)		0	1	1	1	1	1	1	1	2	3	3	2	3	3	3
Mortgage Loans (%)	9	13	14	18	18	17	17	18	18	19	21	23	24	26	26	25
Consumer Credit Loans (%)	5	9	10	12	11	11	11	12	12	12	12	13	12	12	11	10
Bank Loans N.E.C. (%)	19	27	31	31	32	31	30	29	28	28	26	26	25	24	23	22
Open-Market Paper (%)	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Other (%)	22	22	28	16	17	18	17	19	19	19	19	18	20	18	18	20
Total Liabilities ($ Billions)	140	212	487	1,411	1,562	1,673	1,829	2,021	2,252	2,485	2,658	2,860	3,119	3,220	3,330	3,456
Private Domestic Checkable Deposits (%)	69	59	39	22	21	20	20	19	19	21	19	18	16	16	17	17
Small Time & Saving Deposits (%)	26	34	42	34	33	37	41	40	39	39	37	37	37	40	41	40
Large Time Deposits (%)	0	1	5	19	21	20	15	16	15	13	14	15	14	13	12	10
Fed. Funds & Security RPs (%)	NA	NA	NA	8	8	8	8	8	8	8	8	8	9	8	7	8
Other (%)	5	6	13	17	18	15	16	17	19	19	21	22	23	23	23	25

Source: ***Flow of Funds Accounts,*** Board of Governors of the Federal Reserve System. James R. Barth and R. Dan Brumbaugh, Jr., 1993, Unpublished.

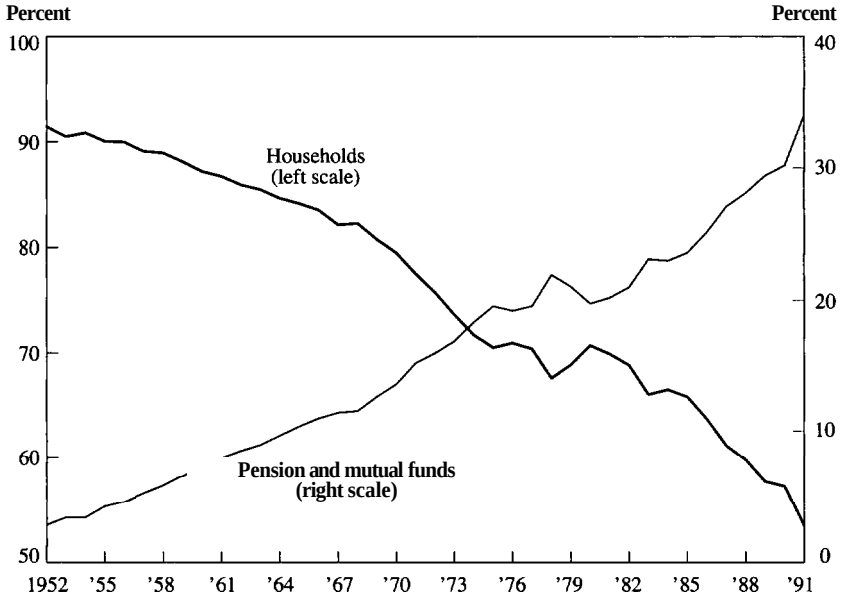
Thus, to the extent that banks have informational advantages resulting from economies of scope, these advantages have shrunk to seeming insignificance. Although banks are still the only joint providers of liquidity services and nonmarketable (or information-intensive) business loans, there are no longer compelling reasons to believe that their unique joint-production technology gives them a competitive advantage. The separable production of liquidity services and nonmarketable business loans by different financial entities (such as MMMFs and finance companies) is obviously feasible, and may even be superior to the joint production of these services. It may, for example, require less government intervention to assure systemic stability because of the built-in matching of liquid liabilities with liquid assets.

An implication of a conclusion that banks have lost much if not all of their specialness is that banks no longer bring to the market a superior production technology—that they no longer have a natural competitive advantage. More simply stated, if our financial markets and institutions were being created for the first time in 1990, banks might not be among the surviving institutions. Thus, the recent decline in the competitive position of banks appears to be a natural consequence of evolving financial technology.

The rise of nonbank intermediaries and related developments in securities and derivative markets

The shift in household assets from depository institutions to nondepository intermediaries also has resulted in a growing "institutionalization" of equity 'markets, which has in turn had important effects on other financial markets. During the last several decades direct purchases of stocks and bonds by households have fallen sharply. Households have been net sellers of stock in every year but one since 1958. (See Table 6.) In 1952, households' direct holdings of stock as a percent of total household financial assets was 32 percent. By 1991 this figure had fallen to 14.7 percent.[14] Even more telling, in 1952 households held 91 percent of all corporate stock outstanding; in 1991 they held only 53 percent. (See Chart 6.) During this period the share of total outstanding stock held by pension and mutual funds rose from 3 percent to 34 percent. Today, institutional investors, taken together, hold 53.3 percent of the total stock outstanding, up from 38 percent

Chart 6
Holdings of Corporate Equity



Source: Flow of Funds Accounts. Federal Reserve System.

since 1981. (See Table 20.)

The institutionalization of equity markets has had significant consequences and has raised a number of important public policy issues. First, trading in securities markets (and probably in other markets as well) has increased substantially, as institutions have sought to outperform one another. In 1975 institutions demanded and obtained a lower institutional commission structure for trades made on equity exchanges. Lower commissions together with a greater emphasis on portfolio performance has in turn resulted in a sharp increase in "annual turnover" in equity markets since 1980. The typical stock is now held for an average of a little over two years, compared to over four years ten years ago, and seven years in 1960. The average holding period for institutional investors is less than two years, compared to almost five years for individuals.[15] This has led to a debate about whether institutional trading is responsible for the increased volatility of securities prices, and about the effect of such trading on corporate

Table 20
Changes in Institutional Equity Ownership: 1981 to 1990
(Percent of Total U. S. Market Capitalization)

Institution	1981	1986	1990	Change from 1981 to 1990
Private Pension Funds	15.5%	16.7%	19.9%	4.4%
Bank Trusts	10.1	10.1	9.2	-0.9
Public Pension Funds	3.0	5.1	8.3	5.3
Mutual Funds	2.5	6.8	7.2	4.7
Insurance Companies	5.7	4.8	6.9	1.2
Foundations and Endowments	1.2	1.3	1.8	0.6
Total	38.0%	44.8%	53.3%	15.3%

See C. Brancato and P. Gaughan, "Institutional Investors Capital Markets: 1991 Update," Table 10, Columbia Law School Institutional Investor Project, September 12, 1991. Brancato and Gaughan define "institution" to include pension funds, mutual funds, insurance companies, bank-managed trusts, and foundation and endowment funds. Id. at 2. This definition excludes shares owned by investment banks, bank holding companies, and nonbank, nonpension trusts.

managers. (Has it made them more myopic or short-term oriented?)[16]

Second, the growth of institutional trading has led to the fragmentation of equity markets. Spurred by advances in automation and communications technology, institutional traders have demanded low-cost, standardized, trading services as well as specialized, tailor-made, services. In response, new trading systems have developed (such as Instinet, Posit, and the Wunsch Auction System) and there has been a substantial increase in "upstairs" or off-exchange trading. Similar to what has happened to commercial banks in financial intermediation, the role of the traditional, regulated, exchanges in securities markets has eroded. In 1980 the New York Stock Exchange accounted for 85.4 percent of the number of consolidated-tape trades. By 1990 this figure had fallen to 62.2 percent.[17]

Third, institutional investors have been a major factor in the surge in the trading of foreign securities since 1980, as well as in the increase

in cross-border stock holdings. U.S. purchases and sales of securities abroad grew from $17.9 billion in 1980 to $230.3 billion in 1989, a cumulative annual growth rate of 32.8 percent.[18] (See Table 21.) At the end of 1991, U.S. investors held $148.8 billion in foreign securities, of which approximately 80 percent was held by ERISA pension funds and 13 percent by mutual funds and closed-end country funds.[19] The globalization of securities trading has in turn created a number of new policy issues, such as the disclosure standards that should be applicable to foreign issuers of stock.[20]

Fourth, institutional ownership of securities has fueled the growth of derivative markets—futures, options, and swaps—both on and off exchanges. The biggest successes in derivative markets in the last decade have come on exchange-traded futures and options contracts on financial instruments—U.S. Treasury bonds, Eurodollar time deposits, and stock indexes (such as the S&P 500 index), and on off-exchange interest rate and foreign currency swaps. (See Table 22.) Institutional investors have been heavy users of these instruments in their effort to manage risk and enhance portfolio performance.[21]

Lastly, the increasing importance of institutional investors as stockholders has raised a number of corporate governance issues. Looking at only the largest 100 American corporations, institutions own, on average, 53 percent of the outstanding stock. Their ownership is much greater in some corporations: 82 percent of General Motors Corporation, 74 percent of Mobil Oil, 70 percent of Citicorp, 86 percent of Amoco, and so forth.[22] The large stock ownership by institutions, especially pension funds, has raised questions regarding the appropriate role of institutions on corporate boards and about how active institutional investors should be in monitoring managerial performance and replacing underperforming corporate managers.[23]

Should we care about the decline of banking? And why?

To explore the policy implications of the increased competition between banks and nonbank intermediaries, and the resultant decline in the banking industry, let us construct a hypothetical scenario involving a specific case of competition from a nonbank intermediary: money market mutual funds (MMMFs). Further, to strip away the

Table 21
Aggregate U.S. Purchases and Sales of Foreign Securities by Geographic Region, 1980-1989

(in billions of U.S. dollars)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1980-89 CARG[1]	1989 Market Share
Canada	6.7	4.9	2.9	5.0	4.4	6.8	9.8	18.9	9.7	10.9	5.5%	4.7%
Total Europe	6.9	5.7	6.5	13.6	13.3	21.5	55.3	101.4	75.6	128.9	38.5%	56.0%
United Kingdom	2.8	2.9	3.6	6.5	7.8	13.3	32.6	67.9	51.2	80.1	45.3%	34.8%
Switzerland	1.6	0.9	0.7	1.8	1.3	1.6	3.2	6.3	5.3	8.5	20.8%	3.7%
Other Europe	2.5	1.9	2.2	5.4	4.2	6.6	19.5	27.2	19.1	40.3	36.0%	17.5%
Total Asia	3.3	6.5	5.1	9.4	10.7	14.0	30.1	56.7	56.2	75.8	41.8%	32.9%
Japan	2.7	5.4	4.3	8.0	9.0	11.6	25.6	47.8	50.4	65.8	42.4%	28.6%
Other Asia	0.6	1.1	0.8	1.4	1.6	2.5	4.5	8.9	5.8	10.1	38.0%	4.3%
Latin America	0.7	1.1	0.8	1.6	0.9	1.2	3.6	7.1	5.3	9.3	33.3%	4.0%
All Other	0.3	0.4	0.3	0.8	1.1	2.0	2.7	5.8	4.8	5.4	36.4%	2.3%
Total	17.9	18.6	15.7	30.3	30.4	45.6	101.5	189.8	151.4	230.3	32.8%	100%

[1]CARG is the cumulative annual growth rate.

Source: Office of the Secretary, U.S. Department of Treasury, ***Treasury Bulletin.*** Table CM-V-5, Spring issues.

Joseph A. Grundfest, "Internationalization of This World's Securities Markets: Economic Causes and Regulatory Consequences," ***Journal*** of ***Financial Services,*** vol. ***4*** (December 1990), pp. 349-78.

chaff of the debate so that we can see the kernel of the key policy issue, let us simplify our hypothetical by making four assumptions. First, assume that, because of a technological change, nonbank financial intermediaries are suddenly able to provide good (but not perfect)

Table 22
Markets for Selected Derivative Instruments
Notional Principal Amounts Outstanding at Yearend
(in Billions of U.S. Dollar Equivalent)

	1986	1990	1991	1992
Exchange-traded Instruments (1)	588	2,291	3,520	4,783
Interest Rate Futures	370	1,454	2,157	3,048
Interest Rate Options (2)	146	600	1,073	1,385
Currency Futures	10	16	18	25
Currency Options (2)	39	56	59	80
Stock Market Index Futures	15	70	77	81
Options on Stock Market Indexes	8	95	136	164
Over-the-counter Instruments (3)	500 (e)	3,451	4,449	n.a.
Interest Rate Swaps (4)	400 (e)	2,312	3,065	n.a.
Currency and Cross-Country Interest Rate Swaps (4), (5)	100 (e)	578	807	n.a.
Other Derivative Instruments (4), (6)		561	577	n.a.
Memorandum Item:				
Cross-border plus local foreign currency claims of BIS reporting banks	4,031	7,578	7,497	7,352

(e) = estimate
(1) Excludes options on individual shares and derivatives invoving commodity contracts.
(2) Calls plus puts.
(3) Only data collected by ISDA. Excludes information on contracts such as forward rate agreements, over-the-counter options, forward foreign exchange positions, equity swaps, and warrants on equity.
(4) Contracts between ISDA members reported only once.
(5) Adjusted for reporting of both currencies.
(6) Caps, collars, floors, and swaptions.
Source: BIS

substitutes for certain products and services formerly provided only by banks. Second, assume that, if they wish to, banks can respond to this competitive threat by providing the same products offered by nonbank competitors on exactly the same terms as their nonbank competitors.[24] In other words, banks are not encumbered by regulations that prevent them from responding to this competition. Third, assume, nevertheless, that banks themselves (as opposed to any nonbank subsidiaries they might have) are still at a cost disadvantage relative to nonbank competitors because of certain regulations which are imposed on them but not on nonbank intermediaries.[25] Finally, assume that the additional regulation imposed on banks is necessary to achieve specified (and accepted) social objectives, such as the prevention of bank runs. In other words, we are ruling out "excessive" or "unnecessary" regulation as a cause of the declining fortunes of banks by explicitly recognizing that banks are different from nonbanks and as a consequence require greater regulation.[26]

Using these assumptions, let us take the concrete example of nonbank-sponsored MMMFs. MMMF shares are good but not perfect substitutes for bank checkable deposits—they do not provide a legal promise of par value, are not government-insured, often do not permit unrestricted access, are not supported by a branch network, and so forth. Because we have assumed that banks are subject to greater regulatory costs, MMMFs can pay higher yields on their shares than banks can pay on deposits. Households, therefore, can be expected to shift at least some of their assets from bank deposits to MMMF shares in order to obtain the higher yield. The quantity of assets that will be shifted will depend on the preferences of households. If households are highly risk-averse, and consequently value highly deposit insurance, few assets will be shifted. If, on the other hand, this protection is not highly valued, large numbers of households may shift to MMMF shares.

Confronted with a potential erosion in their customer base, we would expect banks to respond by sponsoring and offering their own money market mutual funds. We have assumed that banks are free to provide MMMF services on terms equal to those of nonbank competitors, and, at least with respect to their mutual funds subsidiaries, are not at any cost disadvantage. They can, consequently, pay the same

rate of interest on MMMF shares as their nonbank competitors. Under this scenario we can expect some households to switch to bank-sponsored MMMFs and others to switch to nonbank-sponsored MMMFs. In either case, however, households' holdings of bank deposits ***relative*** to their holdings of MMMF shares (both bank and nonbank sponsored) will decline. Thus, measured in terms of ***bank deposits,*** banks' share of financial intermediation will shrink.

Suppose that for some reason households preferred bank-sponsored MMMFs to others, so that most or all households who moved their deposits to MMMFs ended up holding bank-sponsored MMMFs. In this case, the share of financial intermediary ***assets*** under management by banks would not decline, or would not decline to the same extent. In other words, when measured in terms of all intermediary assets, as opposed to just bank deposits, banks' share of financial intermediation would decline very little. In the extreme case where bank-sponsored MMMFs captured all of the shifting household assets, there would be no decline at all in banks' share of financial intermediation when measured in terms of assets under management. Further, if banks' share of financial intermediation were measured in terms of, say, gross revenues earned, we might also find little or no decline in banking.

This example, therefore, demonstrates that different measures of financial intermediation can give different impressions about the declining role of commercial banks as financial intermediaries. In this paper I have emphasized ***deposits*** as the appropriate measure of the declining importance of banking because I believe this measure to be the most relevant to the key policy issues.

In particular, whether we should care about a decline in the banking industry--or a decline in the importance of bank deposits in the economy—should turn on the view that we have about the role of banks and bank deposits in the economy, and of bank regulation. The success of nonbank MMMFs (and the consequent decline in banking) under our hypothetical scenario, after all, stemmed from nonbank MMMFs being able to pay higher yields on MMMF shares because of the additional regulatory burdens imposed on banks. An obvious question, therefore, is: "Should the same regulatory burdens (or costs)

be imposed on MMMFs?" And, if not, why not? The answer to these questions in turn depends on the answer to the following question: "Is it necessary to impose bank-type regulations on MMMFs in order to achieve the social objectives underlying bank regulation?'

Historically, the two primary social objectives of bank regulation have been to facilitate the implementation of monetary policy and to maintain systemic stability by containing or eliminating "bank runs." To achieve the first objective, reserve requirements are imposed on banks. To achieve the second, deposit insurance together with capital requirements, portfolio restrictions, and so forth, are imposed on banks. Subsidiary (in my view) social objectives of bank regulation have been to provide a safe harbor for small depositors (through deposit insurance) and to allocate credit to high-priority sectors of the economy (such as via the Community Reinvestment Act).

Thus, the question of whether we should care about the decline of banking (or of bank deposits) is fundamentally a question about whether this decline jeopardizes the objectives of bank regulation. In particular, does it undercut the effectiveness of monetary policy by, for example, changing (or making less predictable) the relationship between bank reserves and the targeted monetary aggregates, or between the monetary aggregates and aggregate economic activity? Does it increase the risk of systemic collapse by increasing the proportion of household liquid assets that are held in an uninsured (or nondeposit) form? Or, in the context of our hypothetical, are MMMFs as vulnerable to shareholder "runs" as banks are to depositor "runs"?

If the answer to these questions is "yes," the correct policy response is to extend bank-type regulations to nonbank competitors, such as MMMFs. If, on the other hand, the answer is "no," we should not intervene to prevent the banking industry from shrinking in response to financial innovations and market conditions. Many once-successful industries have ultimately suffered a decline as a consequence of technological change: the anthracite coal industry was supplanted by the oil industry, and the horsedrawn carriage industry by the automobile industry. Financial service industries are not immune to this kind of market Darwinism.

The questions posed above, I presume, will be the subject of subsequent papers presented at this conference. They will also, undoubtedly, be the subject of much future research by academics. While I hold some preliminary views on these matters, it is not the role of this paper to address these questions. I leave that to subsequent speakers, and I very much look forward to hearing what they have to say.

Author's Note: The author thanks his colleagues Glenn Hubbard and Rick Mishkin for helpful comments on an earlier draft, and Mike Canter for excellent research assistance.

Endnotes

[1]See Gordon H. Sellon, Jr., "Changes in Financial Intermediation: The Role of Pension and Mutual Funds," ***Economic Review,*** Federal Reserve Bank of Kansas City, (Third Quarter 1992), pp. 53-69.

[2]See Gary Gorton and George Pennacchi, "Financial Innovation and the Provision of Liquidity Services," in James R. Barth and R. Dan Bmmbaugh, Jr., eds., ***The Reform of Federal Deposit Insurance,*** (Harper Collins Publishers, 1992).

[3]See Eli M. Remolona and Kurt C. Wulfekuhler, "Finance Companies, Bank Competition, and Niche Markets," ***Quarterly Review,*** Federal Reserve Bank of New York, (Summer 1992) pp. 25-38.

[4]See Mitchell A. Post, "The Evolution of the U.S. Commercial Paper Market Since 1980," ***Federal Reserve Bulletin,*** (December 1992), pp. 879-91.

[5]Jane W. D'Arista and Tom Schlesinger, 'The Parallel Banking System," Economic Policy Institute Briefing Paper, 1993, pp. 14-17.

[6]See, for example, James R. Barth and Philip Bartholomew, "The Thrift Industry Crisis: Revealed Weaknesses in the Federal Deposit Insurance System." in James R. Barth and R. Dan Bmmbaugh, Jr., eds., ***The Reform of Federal Deposit Insurance*** and James R. Barth, R. Dan Bmmbaugh, Jr., and Robert E. Litan, ***The Future of American Banking,*** (M.C. Sharpe, Inc., 1992).

[7]See, for example, Jane W. D'Arista and Tom Schlesinger, "The Parallel Banking System," Economic Policy Institute Briefing Paper, 1992; Kenneth H. Bacon, "Banks' Declining Role in the Economy Worries Fed, May Hurt Firms," ***Wall Street Journal,*** June 9, 1993, p. A1, col. 6; and Paul Starobin, "Make 'Em Pay," ***National Tar Journal,*** July 24, 1993, pp. 1856-60.

[8]See F. Black, "Bank Funds Management in an Efficient Market." ***Journal of Financial Economics,*** vol. 2, 1975, pp. 323-39; E.F. Fama, "What's Different About Banks?" ***Journal of Monetary Economics,*** vol. 15, 1985, pp. 29-39; and M.K. Lewis, "Theory and Practice of the Banking Firm," in C. Green and D.T. Llewellyn, eds., ***Survey of Monetary Economics,*** (Blackwell Press, 1991).

[9]It should be recognized, however, that commercial mortgage lending has accounted for much of the growth in banks' real estate lending during the 1980s. Even so, there is no reason to believe that banks have a particular informational advantage with respect to commercial mortgage lending. They are only one of several financial intermediaries that make such loans, and they have recently suffered large losses as a consequence of making these loans. If these are the fruits of the comparative advantage banks are purported to enjoy, they are indeed bitter ones.

[10]Unlike banks, finance companies have tended to make loans that are secured by accounts receivables, inventory, equipment, and other property—so-called "asset-based" loans. Banks prefer loans based upon a firm's cash flow projections, which generally means dealing with more credit-worthy borrowers. Which is more "information-intensive?" According to a recent article in the ***Wall Street Journal,*** asset-based loans are. This article states that making asset-based loans requires a "nuts-and-bolts knowledge of . . . industnes" and "requires constant

monitoring. . . '' Thus, finance companies may be the ones making the more "information-intensive" loans. See Leslie Scism, "Commercial Finance Firms Have New Rivals in Banks," ***Wall Street Journal***, June **24, 1993,** p. **B4,** col. **3.**

[11]See Christopher James, "Some Evidence on the Uniqueness of Bank Loans," ***Journal of Financial Economics,*** vol. **19. 1987,** pp. **217-35;** and Dale K. Osborne and Tarek S. Zaher, "Reserve Requirements, Bank Share Prices, and the Uniqueness of Bank Loans," ***Journal of Banking and Finance,*** vol. **16,1992,** pp. 799-812.

[12]Sean Becketti and Charles Moms, "Are Bank Loans Still Special?" ***Economic Review,*** Federal Reserve Bank of Kansas City, (Third Quarter **1992),** pp. **71-84.**

[13]Linda Hooks and Tim C. Opler, 'The Determinants of Corporate Bank Borrowing," ***Financial Industry Studies Working Paper, No. 1-93.*** Federal Reserve Bank of Dallas (May **1993).**

[14]See Gordon H. Sellon, Jr., "Changes in Financial Intermediation: The Role of Pension and Mutual Funds," ***Economic Review,*** Federal Reserve Bank of Kansas City, **1992.**

[15]See Kenneth A. Froot, Andre F. Perold, and Jeremy Stein, "Shareholder Trading Practices and Corporate Investment Horizons," prepared for the Time Horizons of American Management Project, **1992,** Table **1.**

[16]See Business Bulletin, ***Wall Street Journal***, June **12, 1986,** p. 1; and Franklin R. Edwards, "Financial Markets and Managerial Myopia: Making America More Competitive," in G. Kaufman, **ed.,** ***Reforming Financial Institutions and Markets in the United States,*** (Kluwer Academic Publishers, **1993).**

[17]See Hans R. Stoll, "Organization of the Stock Market: Competition or Fragmentation?, ***Journal of Applied Corporate Finance,*** vol. *5,* no. **4** (Winter 1993), **pp. 89-93.**

[18]See Joseph A. Grundfest, "Internationalization of the World's Security Markets: Economic Causes and Regulatory Consequences," ***Journal of Financial Services Research,*** vol. **4,** no. **4,** (December 1990), **pp. 99-100.**

[19]Ibid.

[20]See Franklin R. Edwards, "Listing of Foreign Securities on U.S. Exchanges," ***Journal of Applied Corporate Finance,*** vol. **5,** no. **4** (Winter 1993), pp. **28-36.**

[21]See Eli M. Remolona, "The Recent Growth of Financial Derivative Markets," ***Quarterly Review,*** Federal Reserve Bank of New York (Winter 1992-3), pp. **28-43.**

[22]See C. Brancato and P. Gaughan, "Institutional Investors and Capital Markets," Center for Law and Economics, Columbia University, ***1991 Update,*** Table **10.**

[23]See Bernard S. Black, 'The Value of Institutional Investor Monitoring: The Empirical Evidence," ***UCLA Law Review,*** vol. **30, no. 4, 1992,** pp. **895-939;** and Bernard S. Black, "Agents Watching Agents: The Promise of Institutional Investor Voice." ***UCLA Law Review,*** vol. **39,** no. **3, 1992,** pp. **813-.**

[24]For example, we assume that banks can establish separate subsidiaries that can provide the

identical products on the same terms. This means, among other things, that bank subsidiaries and nonbank competitors have the same production and cost functions, and, in particular, that bank subsidiaries are not at a disadvantage because of regulation. This assumption, therefore, abstracts from potential regulatory complications due to possible conflicts of interest behveen banks and their subsidiaries.

[25]Implicitly, therefore, we assume that the benefits to individual banks from government regulation (or deposit insurance) are less than their costs due to the required regulation. This may occur because of the externalities and incentive problems associated with deposit insurance.

[26]Arguably, an example of justifiable bank regulation is the recent regulatory initiative embodied in the Federal Deposit Insurance Corporation Improvement Act of 1991 (FIDICIA). The intent of this act is to assure that the full costs of guaranteeing bank deposits is passed on to banks and their customers. The act requires, among other things, an increase in the capitalization of depositories and that prompt corrective action by regulators be taken against "critically-undercapitalized institutions. In addition, it imposes additional operating restrictions on depositories that are not "well-capitalized and provides for the institution of risk-based deposit-insurance premiums.

References

Bacon, Kenneth H. "Banks' Declining Role in the Economy Worries Fed, May Hurt Firms," ***Wall Street Journal,*** June 9, 1993, p. A1, col. 6.

Barth, James R., R. Dan Bmmbaugh, Jr., and Robert E. Litan. ***The Future of American Banking.*** Armonk, New York: M.E. Sharpe, Inc., 1992.

_____, and Philip Bartholomew. "The Thrift Industry Crisis: Revealed Weaknesses in the Federal Deposit Insurance System," in ***The Reform of Federal Deposit Insurance*** by James R. Barth and R. Dan Bmmbaugh, Jr., eds., Harper Collins Publishers Inc., 1992.

Becketti, Sean, and Charles Morris. "Are Bank Loans Still Special?" ***Economic Review,*** Federal Reserve Bank of Kansas City, Third Quarter, 1992, pp. 71-84.

Black, Bernard S. "The Value of Institutional Investor Monitoring: The Empirical Evidence," ***UCLA Law Review,*** vol. 39, no. 4, 1992, pp. 859-939.

_____. "Agents Watching Agents: The Promise of Institutional Investor Voice," ***UCLA Law Review,*** vol. 39, no. 3, 1992, pp. 813-

Black, F. "Bank Funds Management in an Efficient Market," ***Journal of Financial Economics,*** vol. 2, 1975, pp. 323-39.

Brancato, C., and P. Gaughan. "Institutional Investors and Capital Markets," Center for Law and Economics. Columbia University, ***1991 Update,*** Table 10.

Business Bulletin, ***Wall Street Journal,*** June 12, 1986, p. 1.

D'Arista. Jane W., and Tom Schlesinger. "The Parallel Banking System," Briefing Paper, ***Economic Policy Institute,*** 1993; pp. 14-17.

Edwards, Franklin R. "Financial Markets and Managerial Myopia: Making America More Competitive," in ***Reforming Financial Institutions and Markets in the United States*** by ***G.*** Kaufman, ed. Boston: Kluwer Academic Publishers, 1993.

_____."Listing of Foreign Securities on U.S. Exchanges," ***Journal of Applied Corporate Finance,*** vol. 5, no. 4 (Winter 1993), pp. 28-36.

Fama, E.F. "What's Different About Banks?" ***Journal of Monetary Economics,*** vol. **15, 1985,** pp. **29-36.**

Froot, Kenneth A., Andre F. Perold, and Jeremy Stein. "Shareholder Trading Practices and Corporate Investment Horizons," prepared for the Time Horizons of American Management Project, **1992,** Table 1.

Gorton, Gary, and George Pennacchi. "Financial Innovation and the Provision of the Liquidity Services," in James R. Barth and R. Dan Brumbaugh, Jr., eds., ***The Reform of Federal Deposit Insurance.*** Harper Collins Publishers, **1992.**

Grundfest, Joseph A. "Internationalization of the World's Securities Markets: Economic Causes and Regulatory Consequences," ***Journal of Financial Services Research,*** vol. **4,** no. **4** (December 1990), pp. **99-100.**

Hooks, Linda, and Tim C. Opler. "The Determinants of Corporate Bank Borrowing," ***Financial Industry Studies Working Paper; No. 1-93.*** Federal Reserve Bank of Dallas. (May **1993).**

James, Christopher. "Some Evidence on the Uniqueness of Bank Loans," ***Journal of Financial Economics,*** vol. 19, **1987.** pp. 217-35.

Lewis, M.K. "Theory and Practice of the Banking Firm" in ***Survey of Monetary Economics Vol. II*** by C. Green and D.T. Llewellyn, eds. London: Blackwell Press, **1991.**

Osborne, Dale K., and Tarek S. Zaher. "Reserve Requirements, Bank Share Prices, and the Uniqueness of Bank Loans," ***Journal of Banking and Finance,*** vol. **16, 1992,** pp. 799-812.

Post, Mitchell A. "The Evolution of the U.S. Commercial Paper Market Since 1980," ***Federal Reserve Bulletin,*** (December 1992), pp. **879-91.**

Remolona, Eli M. "The Recent Growth of Financial Derivative Markets," ***Quarterly Review,*** Federal Reserve Bank of New York, (Winter 1992-93), pp. **28-43.**

_____, and Kurt C. Wulfekuhler. "Finance Companies, Bank Competition, and Niche Markets," ***Quarterly Review,*** Federal Reserve Bank of New York, (Summer 1992), pp. **25-38.**

Scism, Leslie. "Commercial Finance Firms Have New Rivals in Banks," ***Wall Street Journal,*** June **24, 1993,** p. **B4,** col. **3.**

Sellon, Gordon H., Jr. "Changes in Financial Intermediation: The Role of Pension and Mutual Funds," ***Economic Review,*** Federal Reserve Bank of Kansas City, (Third Quarter 1992), pp. **53-70.**

Starobin, Paul. "Make 'Em Pay," ***National Tax Journal,*** July **24, 1993,** pp. **1856-60.**

Stoll, Hans R. "Organization of the Stock Market: Competition or Fragmentation?' ***The Journal of Applied Corporate Finance,*** vol. **5,** no. **4** (Winter 1993), pp. **89-93.**

Commentary: Financial Markets in Transition—or The Decline of Commercial Banking

Kumiharu Shigehara

There is no doubt that the financial sectors of most of the industrialized countries have been undergoing enormous structural changes for at least the past decade, and are likely to continue to do so for the foreseeable future. Professor Edwards' paper should prove a valuable reference on this subject; it provides a useful combination of factual material putting these developments in historical perspective, analysis of their driving forces, and discussion of their policy implications, particularly in the area of financial regulatory policies. My comments that follow are concerned mainly with questions of emphasis and with amplifying in a few areas where this can usefully be done.

Factual background

Let me first take up the factual part of the paper. It puts together an impressive collection of data to illustrate the nature of the structural changes that have been taking place. The main stylized facts to emerge could be summarized as follows:

(1) Commercial banks in the United States have suffered a long-term decline in their share of the financial sector—roughly a halving of market share, measured by total assets, since the beginning of this century. The corresponding gainers have been pension and insurance funds and other kinds of collective investment institutions.

(2) This trend has tended to accelerate in periods of rapid financial expansion and innovation, notably in the 1920s and 1980s.

(3) The changing institutional structure of financial intermediation in the United States has been accompanied by substantial changes in the instruments and technology of financial intermediation, including particularly the trend toward securitization of financial claims and the increasing availability of derivative instruments.

(4) During the past decade, similar trends to these have been evident in several other countries including the United Kingdom, Japan, Australia, and the Scandinavian countries—broadly the group of countries that experienced the most pronounced financial expansions during the 1980s.

I would not seriously dispute any of these conclusions emerging from factual analysis, and indeed they are in broad agreement with observations made in a number of recent studies by the Organization for Economic Cooperation and Development (OECD).[1] However, the data shown in the paper probably exaggerate the extent of the decline of the banking sector. Regulations that discriminate between types of activities by institutions create incentives for them to change legal forms even when there may be little or no change in the substance of what they are doing; examples include the setting-up of nonbank subsidiary companies by banks or the creation of new financial instruments to bypass regulatory constraints, trends which would tend to reduce banks' apparent market share when measured using balance-sheet data. This said, however, it is clear that the financial trends outlined in the paper are of considerable importance.

Two key features of financial market trends

My somewhat more detailed comments shall focus on two key features of financial market trends, especially from the point of view of comparison across OECD countries, since the paper basically discusses the U.S. situation. They are the trends toward securitization and financial conglomeration.

Securitization

Some observers argue that securitization, which is one of the striking features of financial development in the 1980s, will inevitably erode the scope of the franchise traditionally enjoyed by banks. Increased recourse to the traditional forms of securitization such as the issuance of bonds and commercial paper has been observed in most OECD countries, but there has been growing divergence between the United States and other OECD countries with respect to the more sophisticated "generation" of securitized activities. The development of asset-backed and mortgage-backed securities has made major inroads only in the United States. Most of the mechanisms currently being used in securitization were developed in the United States, and thus reflected U.S. laws and practices. Incompatibilities of legal systems can arise when attempts are made to transfer American techniques to other countries. However, even in such countries as the United Kingdom and Canada where the legal system is relatively similar to that of the United States and the transfer of "securitization technology" should be relatively easy, markets in asset-backed and mortgage-backed securities do exist, but have not attained the proportions reached in the United States. There must also be other factors at work.

There are some special features of the U.S. banking system that have encouraged the expansion of securitization, such as the large number of small banks and the lack of geographic dispersion. The tradition of competition between banks and capital markets and the recourse to fixed-rate mortgages have also been significant factors. On the other hand, the prevalence of the universal banking system and the consequent capability of indigenous banks to prevent competitors from encroaching on traditionally profitable areas of activity are often cited as among the factors that have inhibited the advance of securitization in continental Europe. Some aspects of attitudes in the European financial community can also be noted. Securitization has come to be perceived as a "distress technique" that is used by institutions which have difficulties or which have low-quality assets they wish to sell. Moreover, in many countries, the spreads among borrowers with different risk ratings are not as wide as in the United States, thus lessening incentives to engage in securitization. For many European

countries, the capacity of banks to hold onto their traditional business has been backed up by the authorities who, observing the experience of countries with radical disintermediation and concluding that the results have on balance been unfavorable, have limited the scope for disintermediation.

In Japan, the downgrading of banks and the overhang of impaired assets as well as internationally agreed capital adequacy rules tend to create more favorable conditions for securitization. Even so, it is unlikely that securitization will undergo major expansion in corning years, given the cautious stance of the authorities and the attitude of nonbank investors which may remain highly risk-averse, following the financial excess of the late 1980s.

Regardless of how far it may advance in particular countries in coming years, securitization represents a permanent change in the financial systems of virtually all OECD countries, and banks would have to adapt their activities accordingly. Notably in the United States, where the banks had long ago lost their large and highly rated corporate borrowers to the capital markets, securitization has offered an opportunity to recapture some of their business opportunities by acting as originators or servicers of securitized assets. Indeed, securitization can be seen as the process through which banks seek to earn fee-based income rather than holding assets on the books at a time when banks are under internal pressure as well as constraints from supervisory authorities to maintain relatively high capital/asset ratios. In the financial markets of the future, banks are likely to earmark greater resources in this direction as opposed to traditional lending.

Conglomeration

The second key development is the trend toward financial conglomeration which has generally accentuated in OECD countries during the past fifteen years or so. This has been particularly the case for ownership and operational linkages between banks and securities firms on the one hand, and banks and insurance companies on the other. The creation of fully fledged conglomerates (linking institutions operating in *all* segments of the financial services industry) has been rare. But the subject has become increasingly topical in Europe

in the context of the Second Banking Directive of the European Community (EC) under which EC credit institutions are allowed to carry out investment business, as well as traditional banking business, anywhere in the EC.

However, it is far from proven that economies of scale and scope are so large as to justify a rush into conglomeration. The OECD-sponsored survey of the literature on this issue[2] confirms that, on the basis of the findings of more than 100 studies carried out between 1982-1991, existing empirical studies do not yield conclusive results as to the existence of significant economies of scale and scope in the financial services industry and that, at the level of cost efficiency, the effects of organizational inefficiency (failure to attain cost control and efficiency at the management level) are much more important. These observations are particularly relevant in the context of mergers and acquisitions, and the related issue of the extent to which they could contribute to remedy the problem of overcapacity in the financial services industries. The problem of overcapacity cannot be solved by mergers, unless they are accompanied by a substantial release of resources previously employed in the financial institutions. Once financial institutions reach a relatively moderate size, it is not certain that they can become more efficient with growth. Experience would seem to suggest that often very large financial organizations become progressively less profitable, as growth is sought as an end in itself.

When OECD governments intensified the policy of liberalization and deregulation of financial markets in the 1980s, many observed that the future would hold a growing despecialization and internationalization. Recent developments suggest that the actual picture will be more nuanced. Regulatory changes and technological development in the future may further weaken the segmentation of financial markets in many OECD countries, and increase the possibility for financial institutions to enter new grounds at their discretion. However, rather than an exclusive despecialization and conglomeration, individual financial institutions may become more inclined to select only those activities which they themselves judge as best-suited for their specific circumstances.

This scenario leads into the final set of issues raised in Professor

Edwards' paper, namely, does the relative decline of traditional banking matter, and how should regulatory policies respond? I shall leave issues concerning the implications for the conduct of monetary policy to speakers in the subsequent sessions.

Implications for regulatory policies

As Professor Edwards' paper suggests, answers to the question raised above depend importantly on one's view of the underlying rationale for financial regulations. To put this issue somewhat differently from the way it is set out in the paper, two broad approaches can be distinguished. The first, what I would call the functional appro'ach, holds that banks and other financial institutions are regulated primarily because of the adverse externalities they may generate. For example, it might be argued that financial intermediation without 100 percent reserve backing inherently carries the risk of "runs" occurring in individual institutions which could also threaten the stability of the financial system as a whole. In this view, it makes sense to design regulations on a functional basis, across institutional boundaries: that is, to regulate the particular activities that are thought to generate these systemic risks, whatever institutions are engaged in them. This is the thrust of the argument of those who favor, for example, a "level playing field" between banks and securities firms.[3]

The second view, which I would call the institutional approach, is that institutions are regulated to ensure a spectrum of choice for the purchaser of financial services. This would argue that, since many of those purchasers (especially consumers and small businesses) cannot easily monitor the safety of financial institutions, it makes sense for regulators to set up a regulated "safe" class of institutions (for example, banks), whose optimal size can then be determined by market forces. Agents would also be free to conduct their business outside the regulated sector where that was more efficient. In this view, a decline in the relative size of the regulated sector would not be a cause for concern, provided it was not brought about by some defect in the regulations themselves.

Our current system of regulations clearly has elements of both these approaches underlying it. However, current trends appear to be for a

shift in the direction of a more functional approach to regulation, toward greater consistency of regulations across institutional types. This is at least partly a response to the expanding market share being gained by the nonbanks. Whether or not this is a sensible response, and how far it should go, may be something that can usefully be discussed in this conference.

Endnotes

[1]See, for example, the OECD's recent submission to the G-10 study, ***International Capital Movements and Foreign Exchange Markers,*** April 1993 (Annex III); see also OECD, ***Banks Under Stress,*** 1992.

[2]See Giancarlo Frestieri, "Economies of Scale and Scope in the Financial Services Industry: A Review of Recent Literature," in ***Financial Conglomerates,*** OECD, 1993.

[3]For a critique of this approach, see Schaefer, "The Regulation of Banks and Securities Firms," ***London Business School,*** (August 1989).

Credit Channel or Credit Actions? An Interpretation of the Postwar Transmission Mechanism

Christina D. Romer
David H. Romer

Monetary policy actions affect credit flows in two ways. First, tightening of policy leads to increases in the overall level of interest rates. When prevailing interest rates rise, borrowers may choose to borrow less, and lenders may choose to ration funds to certain types of borrowers. This is the "interest rate side" of the monetary transmission mechanism. Second, monetary policy actions may directly affect the ability of certain types of lenders to obtain funds. Because banks obtain a large portion of their funds from instruments subject to reserve requirements, open market operations, which alter the quantity of reserves, may affect the opportunity cost of funds to banks beyond their impact on general interest rates. Monetary policy may therefore particularly affect firms and households that depend on banks for loans. Such effects on the ability of particular classes of lenders to obtain funds are the "credit side" of the transmission mechanism.[1]

Both of these components of the monetary transmission mechanism could be affected by recent changes in American financial institutions and regulations. For example, the development of substitutes for demand deposits and currency, such as money market mutual funds, may lessen the Federal Reserve's ability to control short-term interest rates. Similarly, banks' increased reliance on nondeposit sources of funds, such as certificates of deposit, and the growth of alternatives

to bank loans, such as commercial paper and finance company loans, may reduce the ability of Federal Reserve actions to influence the supply of bank loans.

To understand how these recent changes in financial markets and regulations have actually changed the monetary transmission mechanism, one has to understand the components and functioning of the transmission mechanism in the past. To this end, the first section of this paper is devoted to a systematic analysis of the transmission mechanism in episodes of contractionary Federal Reserve policy in the postwar era.

This narrative analysis suggests three important facts about the postwar transmission mechanism. First, there has been an interest rate channel throughout the postwar era. Even though financial institutions have changed substantially over time, tightening by the Federal Reserve has consistently led to significant rises in interest rates. Second, even though financial markets have become more diversified and less regulated in recent years, the U.S. financial system has been remarkably flexible throughout the postwar era. In response to contractions by the Federal Reserve, banks in the 1950s, 1960s, and 1970s found ways of raising funds and adjusting their portfolios so that they could maintain lending. And third, to the degree that banks' ability to lend was reduced during monetary contractions, it was typically because the Federal Reserve (often in conjunction with Congress and the President) used regulatory actions and moral suasion to restrain bank lending directly, not because of an inherent link between monetary tightening and bank loans.[2]

In the second section, we supplement these narrative accounts with simple statistical tests of the effects of general monetary tightening and direct credit actions on the availability of bank loans and on real activity. We find that direct credit actions are followed by large, rapid, and statistically significant decreases in the quantity of bank lending relative to commercial paper issuance (the "mix") and increases in the difference between the interest rates on bank loans and on commercial paper (the "spread"). Thus the regressions confirm the narrative evidence that the direct credit actions disrupt bank lending.

The regression results concerning the impact of general tightening on banks' ability to lend are less clear-cut. Kashyap, Stein, and Wilcox (1993) demonstrate that periods of tight policy are associated with declines in the mix and rises in the spread. They interpret these findings as evidence of a bank credit channel of open market operations. Subsequent research, however, has shown that substantial parts of these movements reflect changes in the relative riskiness of different types of borrowers, rather than in the relative ability of different types of lenders to obtain funds (Gertler and Gilchrist, 1993; Oliner and Rudebusch, 1993). We find that including a dummy variable for Federal Reserve credit actions eliminates a large part of the remaining estimated effect of general monetary policy on the mix and the spread. Thus the regression results are consistent with the narrative evidence suggesting the absence of a significant bank credit channel of monetary transmission for open market operations.

In contrast to the results for lending, the regressions for real output are fairly clear concerning the effects of general tightening, but somewhat ambiguous concerning the effects of credit actions. Controlling for the effects of Federal Reserve credit actions does not affect our earlier finding (Romer and Romer, 1989, 1992) that Federal Reserve shifts to anti-inflationary policy are followed by large and statistically significant declines in real activity. The impact of the credit actions, on the other hand, is not precisely estimated. When the general policy shifts are controlled for, the point estimates suggest that the credit actions lead to moderate declines in real output. But neither the hypothesis that the effect is zero nor the hypothesis that it is considerably larger can be rejected.

Taken together, the narrative and statistical evidence suggest a new candidate interpretation of the credit side of the transmission mechanism. Monetary policy has a large impact on banks' ability to lend only when open-market operations are supplemented by actions aimed directly at restricting lending. At the same time, the main real effects of monetary policy come from the interest rate effects of open market operations rather than from these credit actions.

This view of the interest rate and credit sides of monetary transmission in the postwar era implies that the recent changes in financial

market institutions and regulations should only affect the transmission mechanism if they fundamentally alter the ability of the Federal Reserve to affect interest rates or to curtail lending directly. In the third section of the paper, we argue that there are neither empirical nor theoretical reasons to expect the Federal Reserve's control of interest rates to diminish in the foreseeable future. We also find that, while the role of banks has certainly changed over time, banks are still central to firm finance and bank loans would still respond to direct credit actions. Thus, the central elements of the transmission mechanism have not been altered by recent institutional and regulatory changes.

While our analysis suggests that recent changes in financial markets have not fundamentally changed the transmission mechanism, this does not imply that the transmission mechanism has not changed for other reasons. In particular, while the interest rate component of monetary transmission may have been relatively constant, the credit component appears to have changed substantially. Specifically, as we describe in the third section, in recent episodes of monetary tightening the Federal Reserve has relied much less on direct credit actions and has focused instead on movements in interest rates. It is this change in the behavior of the Federal Reserve that we believe mainly accounts for any lessening of the credit component of monetary transmission.

Narrative evidence

Overview

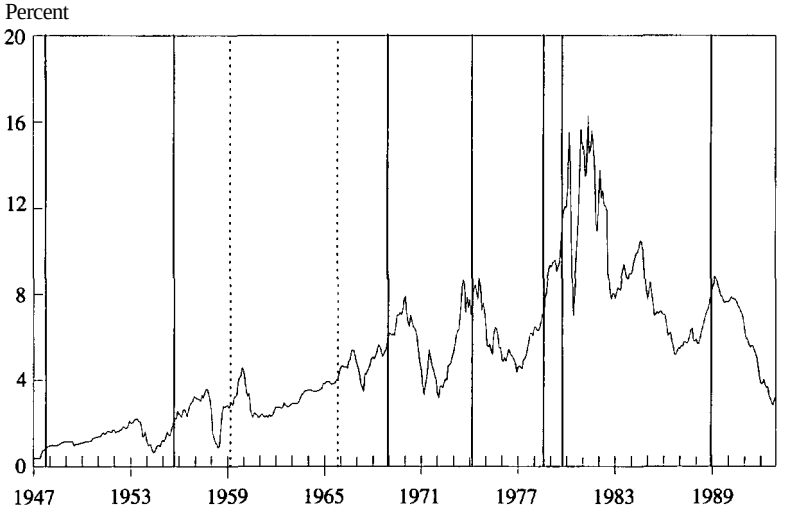
Much can be learned about the transmission mechanism by looking at the response of the economy to identifiable monetary contractions. In previous work (Romer and Romer, 1989, 1992), we identified seven episodes in which the Federal Reserve moved to reduce inflation and appeared willing to accept the output sacrifices necessary to do so. The dates of these seven monetary policy shocks, which we identified from both the published accounts of the decisions of the Federal Open Market Committee and, when available, the Minutes of the FOMC Meetings, are October 1947, September 1955, December 1968, April 1974, August 1978, October 1979, and December 1988. In addition to these episodes, there are other times in which the Federal

Reserve sought to counteract fiscal stimulus and hold inflation steady in response to significant inflationary pressures. The most important of these episodes occurred in March 1959 and December 1965.

In all of these nine episodes interest rates clearly rose. This can be seen in Chart 1, which shows a graph of the three-month Treasury bill rate.[3] The dates of contractionary monetary policy shocks are marked with solid vertical lines and the dates of the two less severe monetary tightenings are marked with dotted vertical lines. While there is obviously considerable variation in the size of the interest rate movements, in all episodes the three-month Treasury bill rate rose substantially. On average over the nine episodes, the highest Treasury bill rate during the six months after the shock was 213 basis points more than the lowest rate during the six months before the shock. Other interest rates, such as the federal funds rate, the commercial paperrate, and the corporate bond rate, show the same consistent rises in the episodes.

Chart 1

Treasury Bill Rate and Monetary Contractions (1947 - 1992)



This rise in interest rates after monetary contractions is a fundamental component of monetary transmission. In a previous paper (Romer and Romer, 1990), we argue that the "interest rate channel" of the transmission mechanism is the most significant way in which decisions by the Federal Reserve affect the real economy. This suggests that, in contemplating recent changes in the financial system, an important question to ask is whether any of the changes have altered the ability of the Federal Reserve to affect interest rates. While we analyze this question in more depth below, Chart 1 shows that there has been no obvious change in the ability of the Federal Reserve to control short-term rates. It may have taken larger or smaller movements in reserves to achieve a certain movement in interest rates in various eras, but the empirical evidence clearly suggests that the Federal Reserve has consistently been able to make rates move.

As discussed above, monetary contractions may raise the cost of funds to banks beyond their effect on the general level of interest rates. This direct effect on banks is the piece of the transmission mechanism that is most often thought to be affected by the increasing diversification and deregulation of the American financial system. To understand why effects on banks' ability to lend are a component of the transmission mechanism, and especially how the transmission mechanism may have been affected by recent changes in financial markets, we consider each of the episodes of tight monetary policy in turn. We begin with the periods of tight policy from the 1966 "credit crunch" to the 1980 credit controls, since these illustrate banks' flexibility and the Federal Reserve's reliance on direct credit actions most clearly. We then describe the episodes of tight policy in the early postwar years. The discussion of the most recent episodes of tight policy is deferred to the third section of the paper, where we consider recent changes in the transmission mechanism.

Episodes, *1965-1980*

This subsection discusses the major episodes of tight monetary policy in the 1960s and 1970s.[4] We argue that the limitations on intermediaries' ability to lend that arose in these periods were largely the result of direct actions by the Federal Reserve and of particular regulations (notably Regulation Q). In the absence of these actions

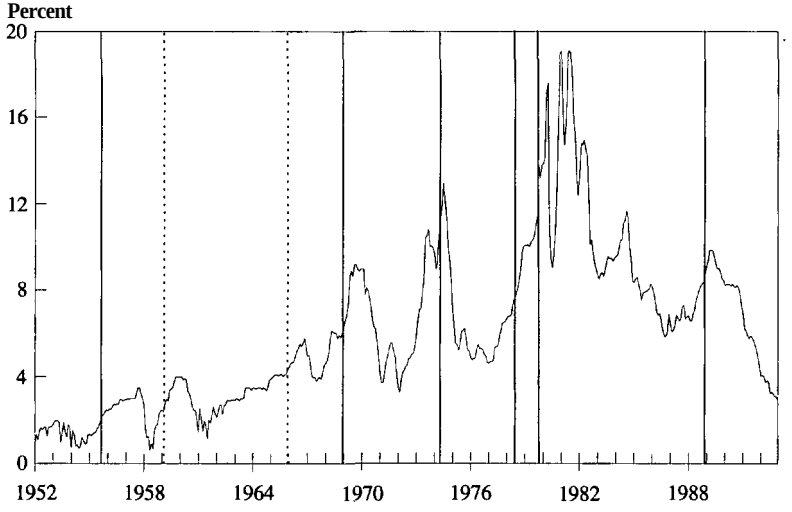
and regulations, intermediaries would have had sufficient flexibility in their portfolios and in their ability to raise funds to avoid sharp reductions in lending.

1965. The first episode of restrictive policy we consider is the 1966 "credit crunch." The Federal Reserve shifted to tighter policy in 1965 in response to expansionary pressures caused by the Vietnam War, the 1964 tax cut, and high investment spending. The federal funds rate, shown in Chart 2 with the dates of monetary contractions and tightenings marked with vertical lines, rose from 4.01 percent in September 1965 to a peak of 5.77 percent in November 1966.[5] As described in the 1967 ***Economic Report of the President*** (p. 55), banks:

> "obtained additional loanable funds by increasing their borrowings from the Federal Reserve, reducing their investments in securities, bringing back funds from foreign branches, and attracting additional time deposits through higher interest rates (particularly on negotiable CDs and savings certificates). As a result,

Chart 2

Federal Funds Rate and Monetary Contractions (1952 - 1992)



> they were able to expand business loans at an annual rate of about 20 percent in the first half of 1966."

Over the course of 1966, the Federal Reserve's concern about the rapid growth of lending, falls in the prices of state and municipal securities resulting from banks' reductions of their security holdings, and the outflow of funds from thrifts to banks caused it to adopt increasingly strong measures aimed at restricting lending. Early in the year, the System began to exert moderate direct pressure on banks to reduce their lending. It allowed the existing Regulation Q interest rate ceiling to become binding in July 1966; the System's reason for not raising the ceiling was specifically to reduce banks' ability to make business loans (Monhollon, 1970; Burger, 1969). In addition, the Federal Reserve, the Administration, and Congress acted to lower the maximum interest rates on certain types of bank liabilities in July and again in September. To further limit banks' ability to raise funds, the Federal Reserve raised reserve requirements on time deposits in July and September, and made short-term promissory notes subject to reserve requirements and Regulation Q in September. Finally, the System stepped up its direct pressure on banks to reduce their lending, culminating in its well-known September 1 letter. The letter stated in part:

> 'The System believes that the national economic interest would be better served by a slower rate of expansion of bank loans to business . . . Further substantial adjustments through bank liquidation of municipal securities or other investments would add to pressures on financial markets. Hence, the System believes that a greater share of member bank adjustments should take the form of moderation in the rate of expansion of loans, and particularly business loans.
>
> "Accordingly, this objective will be kept in mind by the Federal Reserve Banks in their extensions of credit to member banks through the discount window."

Owens and Schreft (1993) conclude, based on contemporary banking industry sources, that the Federal Reserve's pressure had a substantial impact on lending.

1968-1969. The Federal Reserve's next shift toward tighter policy began in late 1967. The federal funds rate rose from a low of 3.79 percent in July 1967 to a high of 9.19 percent in August 1969. Regulation Q became binding in November 1968. Banks displayed even more flexibility than in the 1966 episode in responding to the resulting outflow of funds: they reduced their security holdings, borrowed heavily in the Eurodollar market, issued new small denomination time deposits, increased their borrowing at the discount window, entered loan repurchase agreements with their borrowers, and issued commercial paper through bank holding companies. The Federal Reserve responded by effectively prohibiting repurchase agreements in August 1969, and by placing reserve requirements on additional Eurodollar borrowings in September. In addition, throughout 1969 there was pressure—backed by the threat of legislation—from the Federal Reserve, Congress, and the Administration on banks to keep loan interest rates low and to limit their lending. This pressure appears to have prevented banks from raising the prime rate after June 1969 despite large increases in prevailing interest rates. The resulting low rates of return on loans, together with the direct pressure to restrict loan growth, appear to have had a large effect on banks' lending (Owens and Schreft, 1993, and Wojnilower, 1980).

1974. The third episode of tight monetary policy took place in 1973-1974. The federal funds rate rose from slightly over 5 percent in late 1972 to 10.78 percent in September 1973; it then declined to 8.97 percent in February 1974 before rising to a peak of almost 13 percent in July 1974. Again banks resorted to alternative sources of funds to maintain their lending. Most notably, issuance of CDs, which were no longer subject to interest rate ceilings, exploded in 1973 and 1974. Banks also increased their Eurodollar borrowings, reduced their security holdings, and issued commercial paper and variable interest rate bonds through bank holding companies.

Again the Federal Reserve took actions to attempt to limit banks' efforts to maintain their lending. It increased the marginal reserve requirement on large CDs and bank-related commercial paper from 5 percent to 8 percent in May 1973 and to 11 percent in September. These large increases appear to have been the source of the pause in the rise in the quantity of CDs and in bank business lending in late

1973 and the increase in business borrowing through the commercial paper market (***Economic Report of the President,*** 1974). The marginal reserve requirements were lowered to 8 percent in December, and during the period of tight policy in 1974, the Federal Reserve does not appear to have made significant direct efforts to discourage bank lending.[6] Indeed, the difficulties of Franklin National Bank in May and the failure of the German Herstatt Bank in June disrupted the commercial paper market and led to a shift of borrowing toward banks (***Federal Reserve Bulletin,*** August 1974). The only notable direct disruptions of lending by intermediaries in 1974 appear to have been in the mortgage market, where state usury ceilings were binding in many states.

1978-1980. The final episode we consider in this subsection is 1978-1980. The Federal Reserve shifted to an anti-inflationary policy in 1978, and then dramatically strengthened this policy in October 1979. The federal funds rate rose from slightly under 7 percent in early 1978 to 11.43 percent in September 1979; after the October policy shift, it rose rapidly to 17.61 percent in April 1980. Even more so than in the previous episodes, both banks and thrifts were able to resort to a variety of means of continuing to finance their lending, including CDs, money market certificates, NOW and ATS accounts, repurchase agreements, reduced security holdings, and Eurodollar borrowings. As a result, lending continued to grow rapidly in the first three quarters of 1979, and financial intermediaries' share in total lending actually rose during this period (***Economic Report of the President,*** 1980).

Once again, however, the Federal Reserve took direct action to restrict lending. In conjunction with its change in operating procedures in October 1979, the System established a marginal reserve requirement for member banks of 8 percent for large CDs, Eurodollar borrowings, repurchase agreements, and borrowings in the federal funds market from lenders not subject to the reserve requirement. More important, at the direction of President Carter, the Federal Reserve instituted formal credit controls in March 1980. The control program had a variety of parts, including a broadening and a further increase to 10 percent in the marginal reserve requirement on managed liabilities, restrictions on overall loan growth, and reserve requirements on increases in consumer loans; many of the provisions applied

to nondepository lenders as well as to banks (see Schreft, 1990, for a more complete description). Finally, the high interest rates again caused state usury laws on consumer loans to become binding in many states.[7] Thus, as in the earlier episodes, the restrictions on intermediaries' ability to lend in this episode appear to have arisen primarily from direct Federal Reserve actions and particular regulations, not from general features of monetary policy and the financial system.

Episodes, *1947-1964*

This subsection discusses the major episodes of tight monetary policy in the 1940s and 1950s.[8] We find that in all of these episodes banks sought to maintain lending by selling off government securities at rapid rates. In 1947 the Federal Reserve intervened to restrict lending directly, while in both 1955 and 1959 the Federal Reserve appears to have let interest rates be the only mechanism for restraining credit creation.

1947. In October 1947 the Federal Reserve moved to stem the high rate of inflation that accompanied the return to peacetime consumer spending patterns. Among the actions taken in late 1947 and early 1948 were a small rise in the discount rate and an agreement with the Treasury to allow the rate on short-term government securities to rise from its low pegged level (though the rate on long-term government bonds remained fixed). The immediate response of the banking system to the contractionary policy was to sell off some of its vast holdings of wartime government debt in order to maintain lending. These sales, coupled with an inflow of gold from abroad, caused the monetary contraction to have little immediate impact on bank lending.

As in the contractionary episodes of the later postwar era, the Federal Reserve responded to evidence of flexibility in the banking system by taking additional measures to restrict lending directly. In a joint statement issued on November 24, 1947, the Federal Reserve, the Comptroller of the Currency, the FDIC, and the National Association of Supervisors of State Banks urged bankers to "exercise extreme caution in their lending policies" (Federal *Reserve* Bulletin, December 1947, p. 1465). Further weight was given to the call for voluntary credit restraint by a proposal submitted to Congress by

Federal Reserve Chairman Mariner Eccles for a special temporary reserve requirement, held in the form of government securities, of an additional 25 percent on demand deposits (Federal Reserve Bulletin, January 1948, p. 14).

The most substantive action taken to restrain credit was directed not against business loans but against consumer installment credit. In August 1948, the Federal Reserve convinced Congress to reimpose the restraints on consumer installment loans that had existed during the war (though in a somewhat more lenient form than in the early 1940s). These restraints, which became effective in September 1948, set minimum down payments and maximum maturities for installment loans. They are cited by the Federal Reserve as an important cause of the leveling off in the growth of installment credit in the fourth quarter of 1948 (Federal Reserve Bulletin, April 1949, p. 336).

1955. In late 1955 the Federal Reserve again became concerned about the current level of inflation and moved to a more restrictive monetary stance. The discount rate was raised four times in 1955 and the FOMC authorized contractionary open market operations. This switch to tighter policy is clearly evident in both the federal funds rate, which increased by over 100 basis points during 1955, and the rate on short-term government securities, which increased by roughly 150 basis points in the same period. Short-term rates continued to rise in 1956 and early 1957, with the T-bill rate reaching a peak value of 3.59 percent in October 1957.

As in 1947, banks responded to the pressure on reserves caused by the contractionary open market operations by selling off government securities in record amounts. Bank holdings of government securities declined nearly 11 percent in 1956. This reduction in investments allowed banks to maintain loans to businesses. In contrast to its behavior in 1947 and in the later episodes, the Federal Reserve took no additional actions to restrict credit during the 1955 episode. Indeed, in January 1957 the Federal Reserve raised the Regulation Q ceiling on the maximum interest rate payable on time deposits, apparently to prevent a squeeze on bank lending (Federal Reserve Bulletin, February 1957, p. 123). Testimony by Federal Reserve Chairman William McChesney Martin in February 1957 shows that the Federal Reserve

was very willing to allow allocation by price and actively opposed direct credit restrictions. In response to the question "Is there any acceptable way of restraining the demand for loans without raising interest rates?" Martin answered:

> "Essentially, the problem is one of rationing, and involves many of the same sorts of difficulties and problems that have attended such programs in other areas. In a peacetime economy there is no ***acceptable*** way of administratively determining who is to be permitted to borrow and who is to be forbidden . . . An attempt to develop any system of general administrative rationing of credit would . . . create inequities . . . [and] would tend to undermine the flexible and progressive character of our economy" ***(Federal Reserve Bulletin,*** February 1957, p. 150, emphasis in the original).

In June 1957 the Board of Governors also issued a statement declaring that "a special peacetime authority to regulate consumer installment credit is not now advisable" ***(Federal Reserve Bulletin,*** June 1957, p. 648).

1959. The recovery from the 1957-1958 recession was sufficiently rapid that the Federal Reserve became concerned about inflation late in 1958. However, in this instance, the Federal Reserve was not sufficiently concerned about inflation that it was willing to accept output losses to reduce it. Rather, in 1958 and 1959 it took actions only to prevent the expansion from becoming too brisk. In both August and October 1958 the Federal Reserve raised the discount rate ***(Federal Reserve Bulletin,*** February 1959, pp. 107-8). In early 1959 the Federal Reserve began contractionary open-market operations and in March 1959 imposed the first of three additional increases in the discount rate ***(Economic Report of the President,*** 1960, p. ***44).*** The federal funds rate rose from 0.68 percent in July 1958, when the Federal Reserve was working to end the recession, to 2.8 percent in March 1959, when it was seriously trying to limit expansion. The federal funds rate continued to rise during 1959, peaking in November at 4 percent.

Banks responded to the contraction in reserves by once again selling

off short-term government securities. Commercial bank holdings of government securities declined 16 percent between 1958 and 1960 and "at the end of 1959, the ratio of bank holdings of government securities to total deposits was the lowest since before World War 11" (Federal Reserve Bulletin, February 1960, p.122). As in 1955, the Federal Reserve appears to have been willing to let banks maintain lending and rely only on the rise in interest rates to restrict credit creation. Chairman Martin testified in February 1960:

> "The task of supplying this huge demand for credit without severe inflationary consequences has been accomplished chiefly by the sound and democratic process of letting those who would borrow provide those who would save with an inducement to risk voluntarily the loan of their savings" (Federal Reserve Bulletin, February 1960, p. 126).

No direct controls on credit were ever issued, and with the slowdown in economic activity in the middle of 1960 the Federal Reserve switched from contractionary to expansionary policy.

Statistical evidence

The preceding section provides narrative evidence that the disruptions of bank lending associated with postwar monetary contractions were largely the result of deliberate actions by the Federal Reserve. In this section we examine whether this conclusion is consistent with the behavior of two indicators of credit market conditions: the spread between the prime bank loan rate and the commercial paper rate, and the mix of credit outstanding between bank loans and commercial paper. We find that there is a systematic relationship between credit actions and these indicators, and that the credit actions account for an important part of the relationship between monetary policy and the indicators.

This section also examines whether Federal Reserve credit actions have a significant impact on industrial production. We find that they appear to have a moderate effect on real output when the general stance of monetary policy is controlled for, but that these effects are measured imprecisely.

The mix and the spread

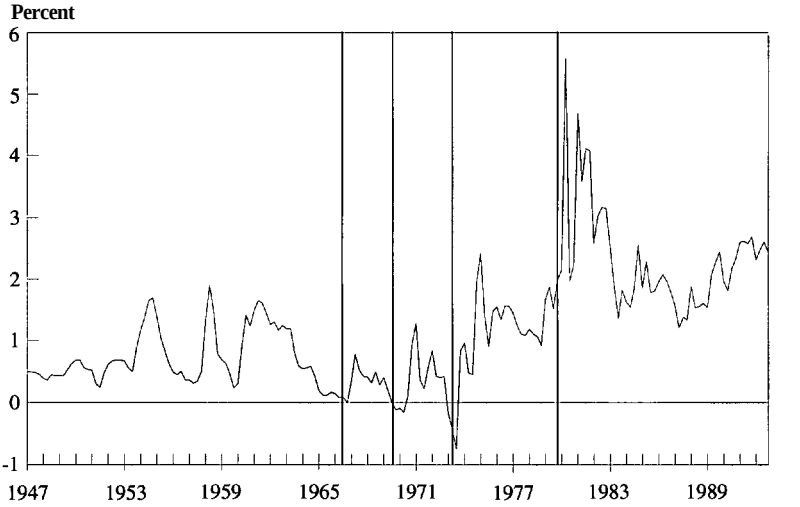
Kashyap, Stein, and Wilcox (1993) point out that to examine the relative availability of bank and nonbank lending, one can examine either relative quantities or relative prices. If monetary policy actions force banks to reduce their lending, bank loans will fall and firms that are able will turn to alternative sources of finance. Kashyap, Stein, and Wilcox therefore use the mix of external finance, which they define as the ratio of bank loans outstanding to the sum of bank loans and commercial paper outstanding, as an indicator of restrictions on banks' ability to lend. Similarly, if some businesses can only borrow from banks, then the spread is likely to rise if bank lending is restrained more than other types of lending.

The mix and the spread are, however, imperfect indicators of banks' ability to lend. Firms that depend on banks for funds are generally riskier than firms that issue commercial paper. Thus bank loans may fall relative to commercial paper in response to tight monetary policy not because banks have difficulty in obtaining funds, but because lenders do not wish to lend to relatively risky firms in times when interest rates are high and the economy is weakening. Indeed, Gertler and Gilchrist (1993) and Oliner and Rudebusch (1993) show that most of the response of the mix to tight monetary policy documented by Kashyap, Stein, and Wilcox reflects a shift in lending by ***all*** types of lenders away from small firms (which are largely bankdependent) toward large firms (which are much less bank-dependent). This component of movements in the mix does not reflect a differential impact of monetary policy on banks' ability to obtain funds. Similarly, some portion of the response of the spread to monetary policy presumably simply reflects the fact that tight policy increases the riskiness of bank loans relative to commercial paper.

Charts. Despite these limitations, it is still instructive to see what happens to the spread and the mix after the Federal Reserve credit actions described in the previous section. Chart 3 shows the quarterly spread from 1947 to 1992.[9] The vertical lines denote the dates at which the Federal Reserve began to interfere directly in the provision of bank credit. We date the starts of the credit actions (in quarters) as 1966:3, 1969:3, 1973:2, and 1979:4. As described above, the Federal

Chart 3

The Spread and Credit Actions (1947 - 1992)

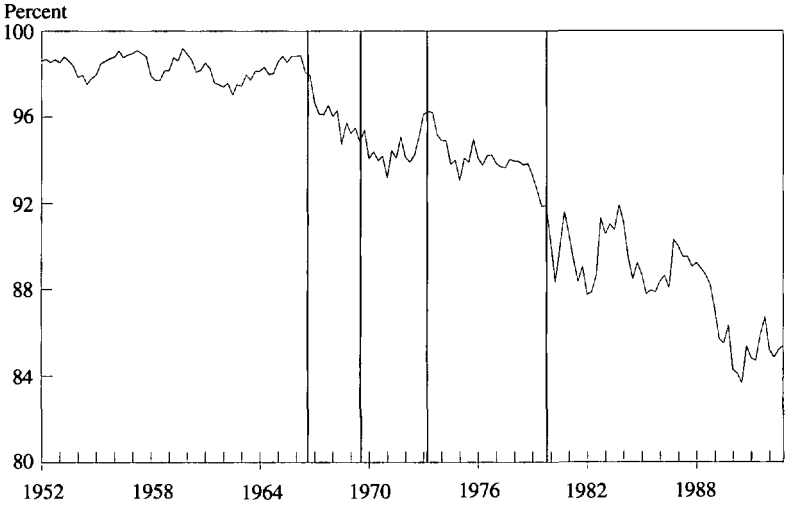


Reserve also undertook some credit actions in September 1948. However, because the most significant of those actions, the restrictions on installment credit, were directed at consumer loans, one would not expect a large impact on business lending. For this reason, we exclude the 1948 action from the analysis of the mix and the spread. We do, however, include it in the analysis of the effect of credit actions on industrial production.

The response of the spread to the credit actions is truly remarkable. In all four instances the spread rose substantially within a year of the action. There is, however, a noticeable variation in the size and timing of the change. In 1966 the spread rose from roughly zero at the time of the action to 0.78 three quarters later; in 1979 it rose from 1.98 at the time of the action to 5.57 just two quarters later. In 1969 the spread was negative for three quarters after the credit action because banks, under threat of legislation, did not increase the prime rate as other rates rose. However, even in this instance the spread rose by more than a point in late 1970, presumably as soon as the threat abated.

Chart 4

The Mix and Credit Actions (1952 - 1992)



From the chart it is clear that Federal Reserve credit actions are not the only source of movements in the spread. For example, in both 1954 and 1958 the spread jumped by roughly a point. Based on timing, the Federal Reserve's shift to anti-inflationary policy in late 1955 does not appear to be a candidate explanation for these rises. This is consistent with the view that credit market disruptions are the result of direct credit market actions and other shocks, not a by-product of general monetary tightening.

Chart 4 shows the quarterly mix of external finance for 1952 to 1992.[10] Once again, the dates of Federal Reserve credit actions are shown by vertical lines. The behavior of the mix is somewhat hard to discern because it has had a strong downward trend since the mid-1960s. However, it is certainly the case that the mix declines after each of the credit actions in the postwar era. The decline is most noticeable after the action in 1973, when the mix changes abruptly from rising to **falling,** and after the action in 1979, when the mix falls rapidly from a level base. As with the spread, the mix moves very

little during the monetary contractions of 1955 and 1959. This is consistent with our narrative evidence that the Federal Reserve did not take direct actions in these episodes to restrict banks' business lending.

Regressions with dummy variables. The behavior of the spread and the mix shown in Charts 3 and 4 is consistent with the view that Federal Reserve credit actions cause disruptions in bank lending. However, it is useful to supplement these charts with more formal statistical tests of the effect of credit actions on these indicators of bank lending. To test for the effect of monetary policy on the spread and the mix, Kashyap, Stein, and Wilcox (1993) regress the change in the spread or the mix on several own lags and several lags of the Romer and Romer dummy variable for the dates of Federal Reserve switches to anti-inflationary monetary policy. This same framework can be used to analyze the effects of credit actions by replacing the monetary policy variable with a dummy variable for credit actions.

Lines 1 and 7 of Table 1 essentially replicate the Kashyap, Stein, and Wilcox results. Like them, we regress the change in the spread and the change in the mix, respectively, on eight own lags and eight lags of the Romer and Romer monetary policy dummy variable over the sample period 1964:1 to 1989:4.[11] All the data are quarterly. We use the regression results to compute the cumulative impulse response function of the left-hand side variable (either the spread or the mix) to the monetary policy dummy. The table reports the level of the impulse response function and the associated *t* statistic for the quarter of maximum statistical significance over the first eight quarters after the shock to the policy dummy.[12] consistent with Kashyap, Stein, and Wilcox's results, we find a large and highly significant association between monetary policy shifts and the spread and the mix. The estimated peak responses are a rise of 1.89 percentage points in the spread and a decline of 2.64 percentage points in the mix.

Extending the Kashyap, Stein, Wilcox sample period to cover as much of the postwar era as data availability allows (see Lines 2 and 8) changes the results somewhat.[13] For the spread, including the 1950s reduces the estimated impact of the monetary policy dummy variable by about a third and reduces the significance level somewhat.

Table 1
Spread and Mix Regressions with Monetary Policy Dummy Variable

Cumulative Impulse Response at Lag with Maximum Significance

(In percent, lag in brackets, t statistic in parentheses)

Sample	Monetary Policy Dummy	Credit Action Dummy
Spread		
1. 1964-1989	1.89 [7]	
	(4.31)	
2.1954-1992	1.21 [7]	
	(3.12)	
3.1964-1989		1.78 [2]
		(4.78)
4. 1954-1992		1.75 [2]
		(5.09)
5. 1964-1989	1.41 [7]	1.32 [2]
	(3.61)	(3.68)
6. 1954-1992	0.80 [7]	1.43 [2]
	(2.19)	(4.07)
Mix		
7. 1964-1989	-2.64 [7]	
	(-3.29)	
8. 1954-1992	-2.32 [7]	
	(-3.52)	
9. 1964-1989		-1.92 [2]
		(-3.76)
10. 1954-1992		-1.93 [2]
		(-4.33)
11. 1964-1989	-1.98 [7]	-1.51 [2]
	(-2.32)	(-2.90)
12. 1954-1992	-1.74 [7]	-1.56 [2]
	(-2.58)	(-3.48)

Note: For the regressions reported in Lines 2 and 6, the second lag is slightly more significant than the seventh lag. However, to preserve comparability with the other results, we report the cumulative impulse response and *t* statistic for the seventh lag.

For the mix, expanding the sample period reduces the impulse response function by about 10 percent, though it raises the significance level slightly. The fact that expanding the sample period reduces the impulse responses to the monetary policy dummy variable in both cases is consistent with Charts 3 and 4, which show that neither the spread nor the mix moved much in response to the monetary policy shock in 1955.

To see if credit actions are important to the behavior of the spread and the mix, we redo the Kashyap, Stein, Wilcox regressions with eight lags of a dummy variable for the onset of Federal Reserve credit actions. As shown in Charts 3 and 4, the quarterly dates of the actions are 1966:3, 1969:3, 1973:2, and 1979:4. However, because the credit action in 1969 took the form of restrictions on the prime rate, we exclude the 1969 date from the spread regression.[14] We run this regression both over the shorter Kashyap, Stein, Wilcox sample of 1964-1989 and over the longer period of 1954-1992.

The results in Lines 3, 4, 9, and 10 of Table 1 show that the credit action dummy variable has a great deal of predictive power. When it is included in place of the monetary policy dummy, the impulse responses for both the spread and the mix regressions are of the expected sign and highly statistically significant. For the shorter sample, the point estimates imply that a credit action is followed by a rapid rise in the spread of 1.78 percentage points after two quarters and 1.96 points after seven, and by an equally rapid decline in the mix of 1.92 percentage points after two quarters and 2.37 points after seven. The point estimates of the effects of credit actions are virtually unchanged in the longer sample for both the spread and the mix, but the significance levels are higher.

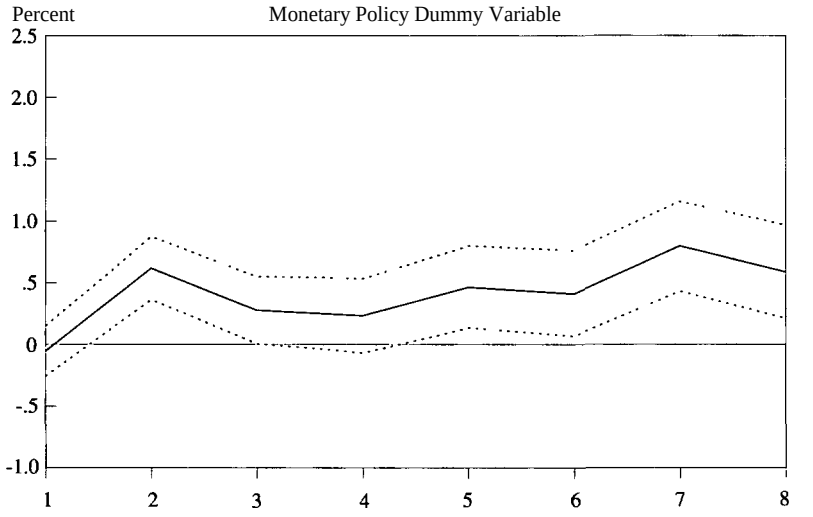
Because credit actions typically accompany general monetary contractions, it is more interesting to investigate the effects of credit actions controlling for the general tenor of monetary policy. Lines 5 and 11 show the results of the regression including both variables for the shorter sample period and Lines 6 and 12 show the results for the combined regression over the longer sample period. In the regressions including both dummy variables, the estimated impacts of credit actions on both the spread and the mix remain large and highly

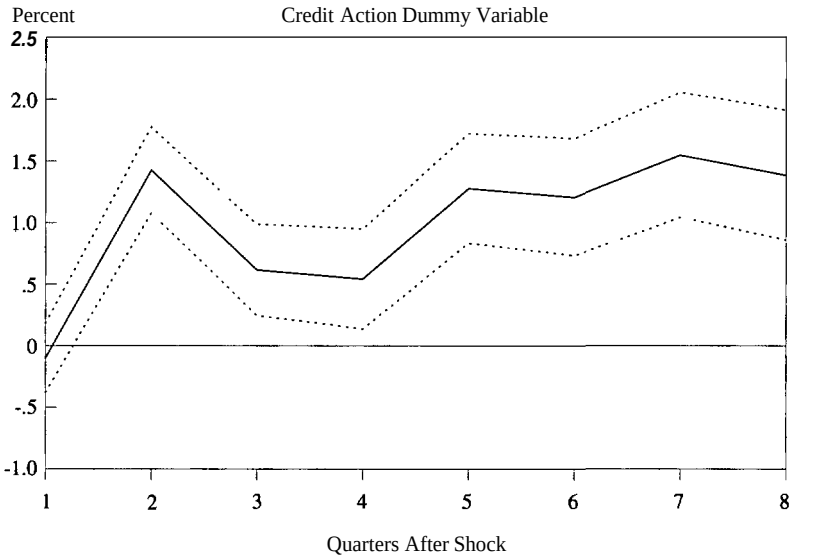
significant. Thus the regressions suggest that the movements in the spread and the mix following the credit actions reflect disruptions of bank lending stemming from these actions, rather than effects of the overall monetary policy tightenings that generally occur around the same times.

In addition, the credit action variable takes away a considerable part of the explanatory power of the monetary policy variable. For both the spread and the mix, the impulse responses to the monetary policy dummy fall by about a quarter when the credit action dummy is included. If one accepts Gertler and Gilchrist's and Oliner and Rudebusch's evidence that the majority of the overall relationship between the monetary policy shifts and the mix is due to compositional effects rather than to changes in banks' ability to lend, the results here for the mix leave only a small portion of the relationship to be explained by a bank credit channel.[15] We do not have quantitative estimates of the extent to which the overall link between monetary policy and the spread is driven by changes in the relative riskiness of bank loans. However, if the results for the mix are indicative of the sources of movement in the spread, the relationship between monetary policy and the spread would also for the most part not reflect a credit channel of monetary transmission.[16]

Charts 5 and 6 plot the estimated cumulative impulse response functions, along with the associated one standard error bands, of the spread and the mix to the monetary policy dummy and the credit action dummy implied by the regressions with both variables for the full sample period (Lines 6 and 12 of Table 1). The time patterns of these impulse responses are representative of those implied by the other regressions in the table. For the general monetary policy shift, the estimates imply a gradual response of both the spread and the mix. This could be consistent with the notion that monetary tightening affects credit markets by gradually affecting the creditworthiness of borrowers. For the credit actions, in contrast, the results suggest a very sharp response of both the spread and the mix after two quarters, a considerable reversal of the initial effect over the next two quarters, and then a gradually increasing effect over the second year. These results, particularly the rapid strong effects and the quick rebound, are consistent with the narrative evidence of the previous section that the

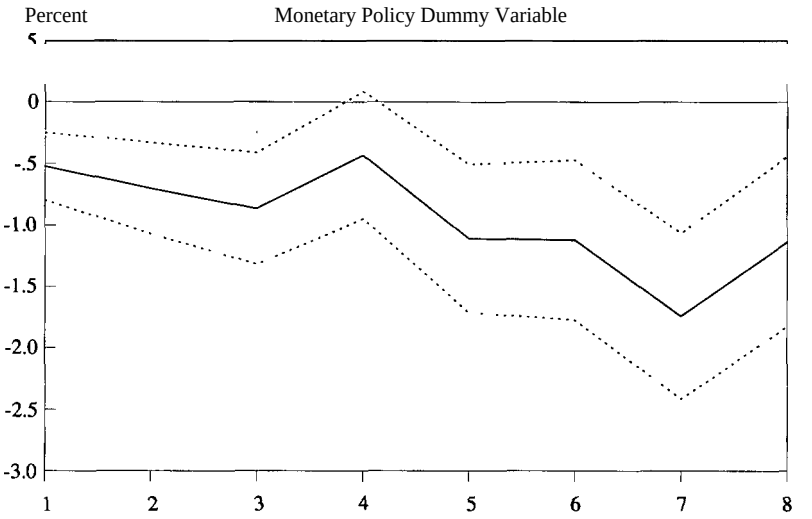
Chart 5
Impulse Response Functions for the Spread

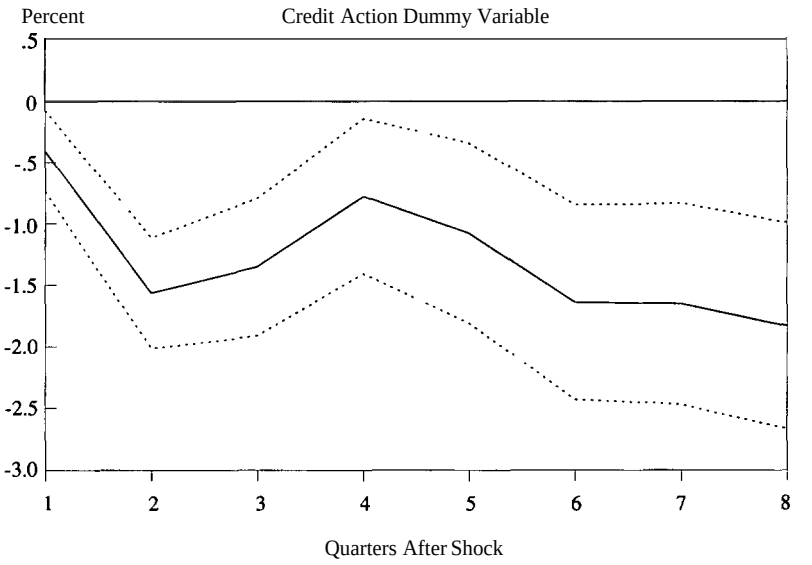




Notes: The impulse response functions are based on the regression of the change in the spread on eight own lags, eight lags of the dummy variable for monetary policy actions, and eight lags of the dummy variable for credit actions, over the sample period 1954-1992. The impulse responses have been cumulated to show the impact on the level of the spread. The dotted lines show the one standard error bands.

Chart 6
Impulse Response Functions for the Mix





Notes: The impulse response functions are based on the regression of the change in the mix on eight own lags, eight lags of the dummy variable for monetary policy actions, and eight lags of the dummy variable for credit actions, over the sample period 1954-1992. The impulse responses have been cumulated to show the impact on the level of the mix. The dotted lines show the one standard error bands.

actions caused immediate but short-lived disruptions of bank lending.[17]

Regressions with interest rates. Kashyap, Stein, and Wilcox also consider regressions of the change in the spread and in the mix on eight own lags and eight lags of the change in the federal funds rate. This follows the work of Bernanke and Blinder (1992), who argue that the federal funds rate is the best continuous indicator of the stance of monetary policy. Table 2 therefore presents regression results using the change in the federal funds rate in place of the monetary policy dummy variable. For comparability with the other results, we compute the implied impulse responses of the spread and the mix to the average rise in the funds rate during the episodes of general monetary policy tightening. Specifically, the average across the six episodes of general tightening since 1954 of the difference between the lowest value of the funds rate in the two quarters before the policy shift and the highest value in the two quarters after is 2.84 percentage points; we therefore find the impulse responses to a 2.84-percentage-point shock to the funds rate.

Lines 1 and 7 replicate Kashyap, Stein, and Wilcox's finding that there is a highly significant relationship between the federal funds rate and both the spread and the mix. Lines 2 and 8 show that extending the sample period reduces the impulse response functions slightly. Lines 3, 4, 9, and 10 replace the funds rate with the credit action dummy; these regressions are the same as those reported in the corresponding lines of Table 1.

Lines 5, 6, 11, and 12 include both the funds rate and the credit action dummy. We view these regressions as providing a lower bound on the effects of credit actions relative to general monetary policy shifts: general monetary policy is measured by a continuous (and at times surely endogenous) indicator of monetary policy for the full sample, while credit actions are measured solely by a dummy variable for just four dates (three for the spread). Nonetheless, the results suggest a large and significant link between credit actions and the spread and the mix. The results for the full sample suggest that the impact of a credit action on the spread after two quarters is as large as the maximum effect of a rise of six percentage points in the federal

Table 2
Spread and Mix Regressions with Federal Funds Rate

Cumulative Impulse Response at Lag with Maximum Significance

(In percent, lag in brackets, t statistic in parentheses)

Sample	Change in Federal Funds Rate	Credit Action Dummy
Spread		
1. 1964-1989	0.89 [7]	
	(3.91)	
2. 1954-1992	0.78 [7]	
	(3.84)	
3. 1964-1989		1.78 [2]
		(4.78)
4. 1954-1992		1.75 [2]
		(5.09)
5. 1964-1989	0.69 [7]	1.26 [2]
	(2.85)	(3.13)
6. 1954-1992	0.61 [7]	1.31 [2]
	(2.94)	(3.49)
Mix		
7.1964-1989	-1.28 [3]	
	(-4.53)	
8. 1954-1992	-1.14 [3]	
	(-4.71)	
9. 1964-1989		-1.92 [2]
		(-3.76)
10. 1954-1992		-1.93 [2]
		(-4.33)
11. 1964-1989	-1.07 [3]	-1.20 [2]
	(-3.68)	(-2.26)
12.1954-1992	-0.91 [3]	-1.29 [2]
	(-3.69)	(-2.75)

Note: For comparability between the two impulse response functions, the impulse to the federal funds rate is set equal to 2.84, which is the average change in the federal funds rate from its lowest value in the two quarters before a Romer and Romer monetary policy shock and its highest value in the two quarters after.

funds rate. For the mix, the estimated effect after two quarters is as large as the maximum effect of a 4 percentage-point rise in the funds rate. In all cases, the estimated maximum effect is strongly significant. In addition, inclusion of the credit action dummy again reduces the estimated effect of the indicator of general monetary policy; the estimated effect of the funds rate on both the spread and the mix falls by about a fifth.[18]

Charts 7 and 8 show the cumulative impulse responses and one standard error bands of the spread and the mix to a rise of 2.84 percentage points in the funds rate and to the credit action dummy for the regressions including both variables and run over the full sample. Again, the patterns of the impulse responses are representative of those for the other regressions. The only notable difference between these impulse responses and those shown in Charts 5 and 6 is that the response of the mix to the funds rate is essentially complete in three quarters rather than occurring gradually over seven, as it does in response to the monetary policy dummy.

Taken together, the regression results confirm the narrative evidence of the previous section that Federal Reserve credit actions cause important disruptions of bank lending. The regressions' implications for the credit channel of monetary transmission are complicated by the likely impact of general tightening on the spread and the mix through mechanisms other than a credit channel. The results are certainly consistent with the narrative evidence indicating that banks have generally found ways of avoiding restrictions on their ability to obtain funds in the face of tight policy; they are not, however, decisive on this point.

Industrial production

Even if credit actions do affect bank lending, there remains the question of whether disruptions in bank lending affect real output. To analyze this question, we examine how industrial production responds to credit actions.[19] Chart 9 graphs the monthly Federal Reserve Index of Industrial Production (in logarithms) with the dates of credit actions shown with vertical lines.[20] For this analysis we include the credit action in September 1948. While the consumer credit controls in this

episode would not be expected to affect the mix and the spread, they should affect consumer spending and hence output.[21] Chart 9 suggests that there is certainly a correlation between credit actions and declines in real output: after every credit action industrial production declines noticeably within two years.

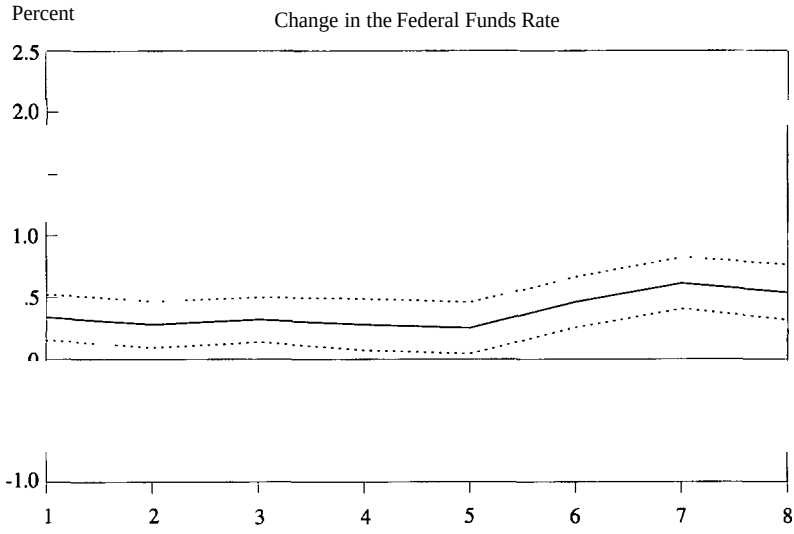
As with the previous analysis of the mix and the spread, however, it is important to supplement simple charts with regression analysis. In Romer and Romer (1989, 1992) we test the impact of contractionary monetary policy on real output by regressing the monthly change in industrial production on 24 own lags and the contemporaneous value and 36 lags of the dummy variable for Federal Reserve switches to anti-inflationary monetary policy.[22] This same framework can be used to test the effect of credit actions on industrial production.

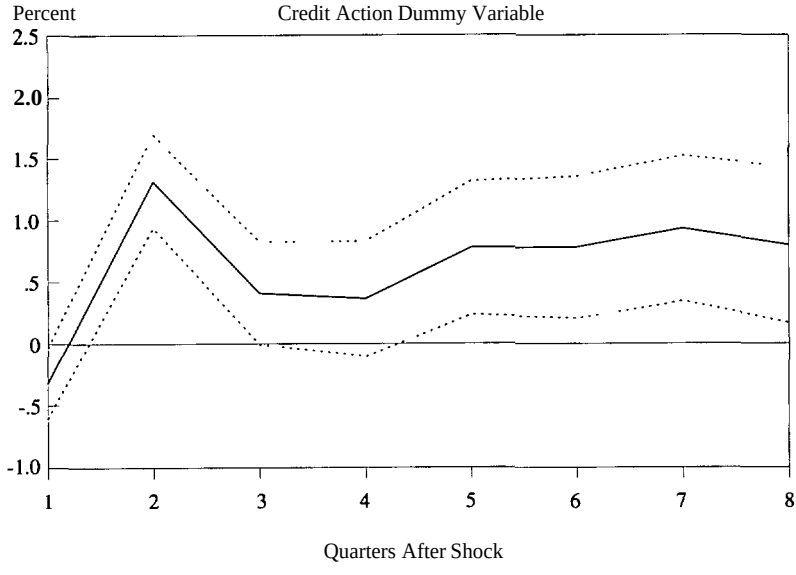
Table 3 shows the results of this analysis. As with the regressions for the mix and the spread, we report the cumulative value of the impulse response function at the point of maximum significance. Line 1 simply replicates our previous monetary policy regressions. It suggests that a switch to anti-inflationary monetary policy causes industrial production 30 months later to be 11 percent lower than it otherwise would have been. This decline is highly statistically significant.

Line 2 shows that when the credit action dummy variable is substituted for the monetary policy variable in the regression, the most significant impact is felt just nine months later. This suggests that direct credit actions have a much more rapid effect on output than does general monetary tightening. The quantitative effect, however, is noticeably smaller than that of the monetary policy dummy variable: a credit action reduces industrial production nine months later by roughly 6 percent relative to what it otherwise would have been. This decline is statistically significant at the 98 percent level.

Because credit actions and general monetary tightening typically occur together, the more interesting question is what the effects of credit actions are, taking into account monetary policy. Line 3 shows the results of including the contemporaneous value and 36 lags of both the monetary policy dummy and the credit action dummy. Chart 10

Chart 7
Impulse Response Functions for the Spread

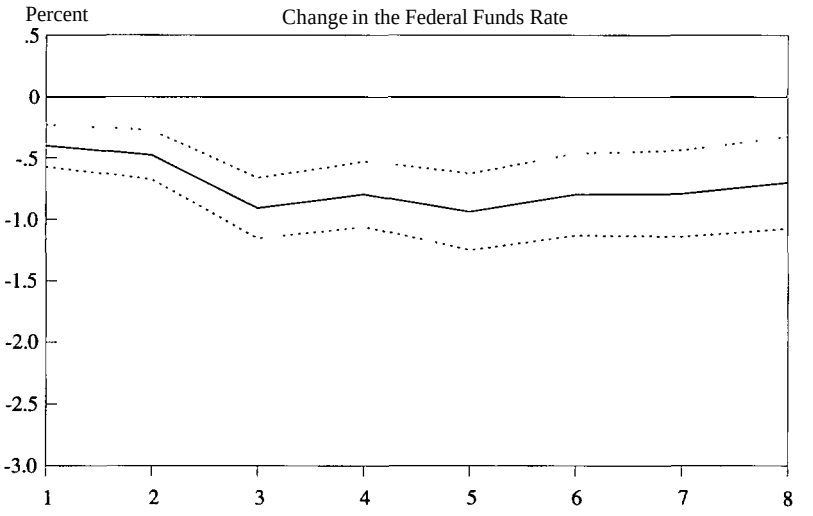


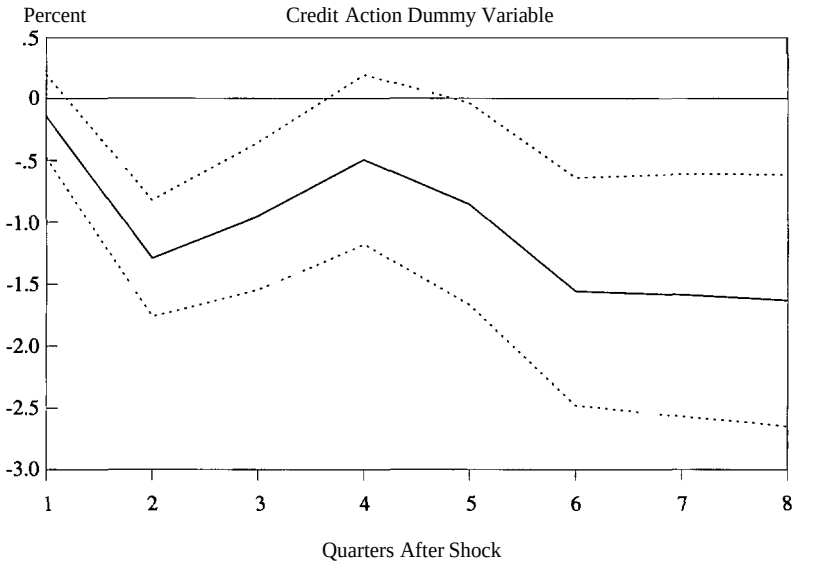


Notes: The impulse response functions are based on the regression of the change in the spread on eight own lags, eight lags of the change in the federal funds rate, and eight lags of the dummy variable for credit actions, over the sample period 1954-1992. The impulse responses have been cumulated to show the impact on the level of the spread. The dotted lines show the one standard error bands.

Chart 8

Impulse Response Functions for the Mix





Notes: The impulse response functions are based on the regression of the change in the mix on eight own lags, eight lags of the change in the federal funds rate, and eight lags of the dummy variable for credit actions, over the sample period 1954-1992. The impulse responses have been cumulated to show the impact on the level of the mix. The dotted Lines show the one standard error bands.

Chart 9

Industrial Production and Credit Actions (1945 - 1992)

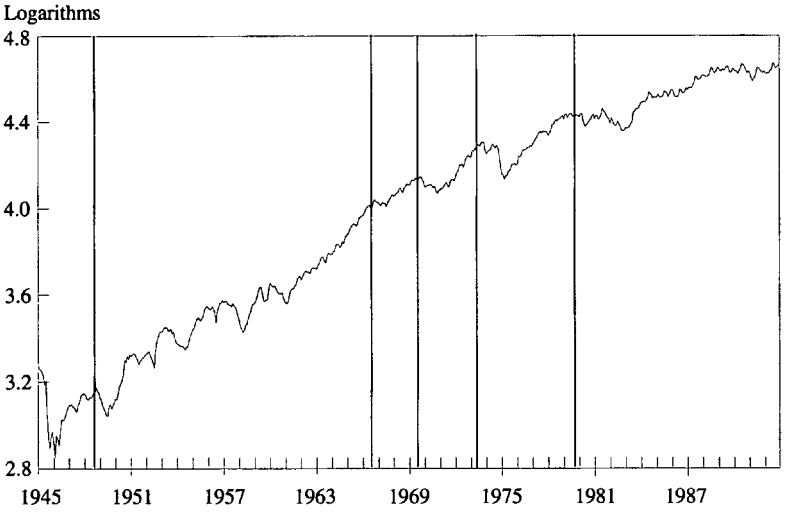


Table 3

Industrial Production Regressions

Cumulative Impulse Response at Lag with Maximum Significance

(In percent, lag in brackets, t statistic in parentheses)

Sample	Monetary Policy Dummy	Credit Action Dummy
1. 1948-1992	-10.82 [30]	
	(-3.62)	
2. 1948-1992		-5.95 [9]
		(-2.38)
3. 1948-1992	-10.49 [30]	-4.15 [9]
	(-2.96)	(-1.60)

Note: The data used are monthly.

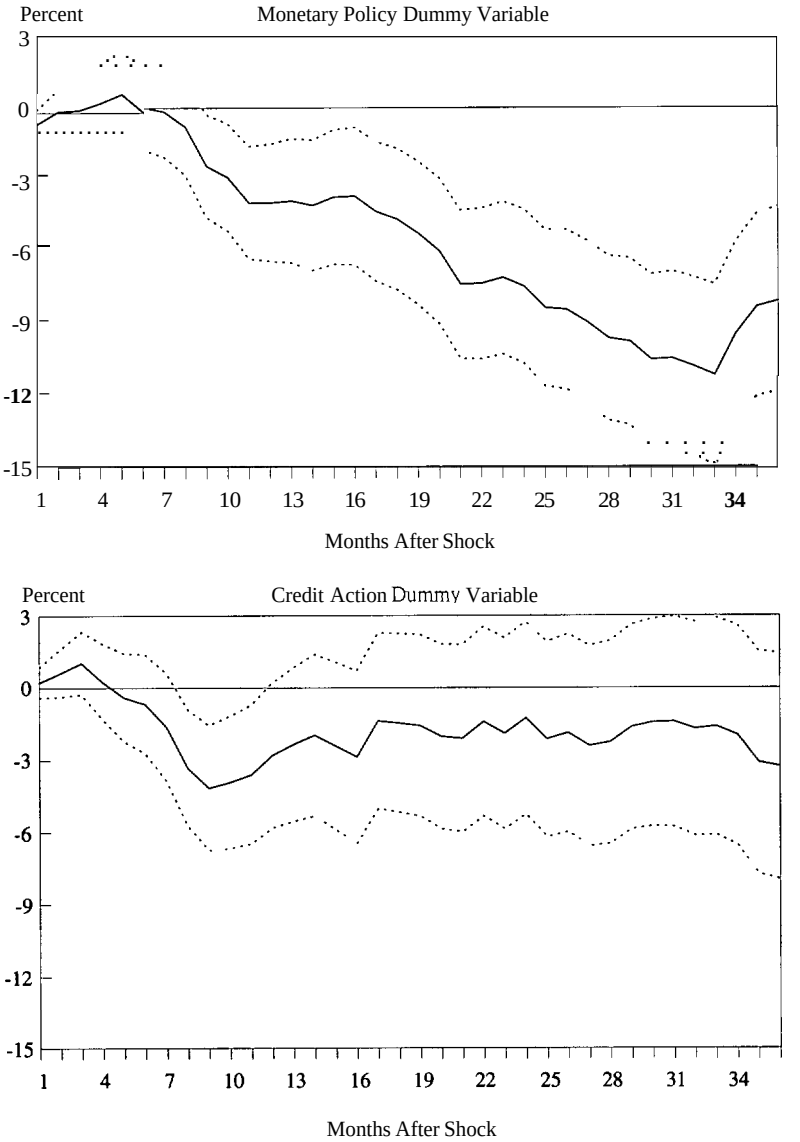
shows the impulse response functions with one standard error bounds for both variables. The impact of the monetary policy variable is essentially unaffected by the inclusion of the credit action variable: the cumulative impact remains large and highly statistically significant. The point estimate of the impact of the credit action dummy variable, however, is reduced by almost a third: the cumulative impact of a credit action at the point of maximum significance is now -4.2 percent. This effect is statistically significant at slightly less than the 90 percent confidence level.

The point estimates from this regression suggest that credit actions have a moderate effect on industrial production. However, the fact that the effect of credit actions is not statistically significant at conventional levels indicates that there is substantial uncertainty about the importance of the bank credit side of the transmission mechanism: the actual effect could be either substantially larger or trivial. At the same time, the fact that monetary policy actions do have a very large and significant impact on industrial production suggests that some part of the transmission mechanism, most likely the interest rate side, is quantitatively very important.

The impact of financial innovation

The narrative analysis of the postwar transmission mechanism suggests that, even before the recent changes in financial markets, the American financial system was remarkably flexible. In nearly every episode of contractionary monetary policy that we examine, banks sought and found innovative ways to raise funds and maintain lending. Both the narrative and statistical evidence suggest that to the extent that credit market disruptions occurred, it was because the Federal Reserve stepped in to prevent such innovation. Thus, the credit side of the transmission mechanism throughout the postwar era has been largely the result of deliberate Federal Reserve actions, not the consequence of a special link between bank lending and monetary policy. The evidence also indicates that the interest rate component of monetary transmission has been remarkably stable over time. Despite the flexibility of the postwar American financial system, the Federal Reserve has consistently been able to raise interest rates when it felt conditions warranted.

Chart 10
Impulse Response Functions for Industrial Production



Notes: The impulse response functions are based on the regression of the change in industrial production on 24 own lags and the contemporaneous value and 36 lags of both the dummy variable for monetary contractions and the dummy variable for credit actions, over the sample period 1948-1992. The impulse responses have been cumulated to show the impact on the level of the industrial production. The dotted lines show the one standard error bands.

This description of the transmission mechanism provides important perspective on the likely impact of the recent financial innovations. If the American financial system were already very flexible, then the recent changes would transform the transmission mechanism only if they fundamentally alter one of the channels by which Federal Reserve actions affect the economy. In particular, as long as the Federal Reserve can still affect interest rates and can still restrict lending directly through persuasion and regulatory changes, the recent changes should not lead to major changes in the transmission of monetary policy.

The interest rate side

If financial innovations were to proceed to the point where bank liabilities subject to reserve requirements coexisted as perfect substitutes with liabilities of nonbank institutions not subject to reserve requirements, monetary policy would lose its power over general interest rates. In such a situation, investors would respond to changes in the supply of reserves simply by shifting their assets between bank and nonbank institutions. The Federal Reserve's only power to influence the economy would be through its ability to affect lending. Some observers have suggested that the U.S. financial system may be moving toward such a situation (for example, Bernanke, 1993).

As a practical matter, it is clear that this description does not fit the U.S. economy today. The Federal Reserve is able to use open market operations to move the federal funds rate quite precisely when it wishes to. Nor should this be surprising. The only plausible case in which bank liabilities subject to reserve requirements and nonbank liabilities not subject to reserve requirements would be perfect substitutes would be when they provided essentially identical services. But since reserve requirements force banks to offer a lower rate of return, in such a situation the nonbank liabilities would dominate the bank liabilities. Thus perfect substitutability would lead not to a loss of Federal Reserve control over interest rates, but to the disappearance of liabilities subject to reserve requirements.

Even the disappearance of such liabilities would not eliminate the Federal Reserve's control over interest rates. Institutions offering

transactions deposits and other highly liquid instruments would still need to hold reserves to provide liquidity services; in choosing the quantity of reserves, they would face the usual tradeoff between greater foregone interest from holding more reserves and lower liquidity from holding fewer. Similarly, individuals and firms would still hold currency, and their holdings would be determined by the tradeoff between foregone interest and inconvenience. Thus there would continue to be a demand for high-powered money that varied with prevailing interest rates. The Federal Reserve's control over the supply of high-powered money would therefore continue to give it control over interest rates. It is possible that financial innovations will make the demand for high-powered money less stable, but the Federal Reserve can maintain its control over interest rates in the face of such instability simply by adjusting the supply of high-powered money in response to fluctuations in demand.

Only in the extreme case of a cashless economy would open market operations no longer allow the Federal Reserve to alter interest rates. Although the functioning of an economy without currency is an interesting theoretical subject, it is far from relevant to the U.S. economy. The ratio of currency holdings to GDP, for example, exhibits only a slight downward trend over the past thirty years. Thus, the interest rate channel is not likely to change in the near, or even not-so-near, future.

The credit side

For the "credit side" of the transmission mechanism to still be relevant, bank lending must remain important and the Federal Reserve must still have the capacity to affect bank lending directly. In this subsection, we provide evidence that both of these conditions are satisfied. But we also argue that the evidence from the most recent episodes of tight policy indicates that the Federal Reserve is much less inclined today to intervene directly in credit markets than before. Thus the main change in monetary transmission is not in the characteristics of financial markets, but in the nature of Federal Reserve actions.

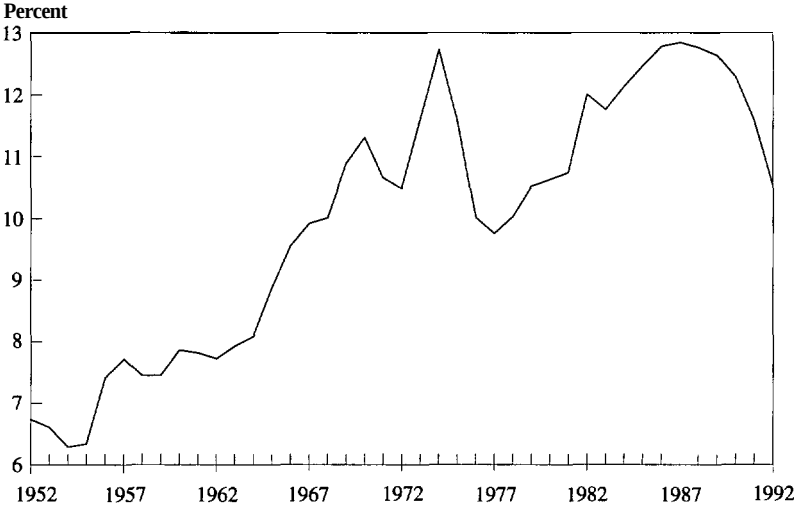
Importance of banks and Federal Reserve actions. The simplest evidence of banks' continued importance in U.S. credit markets is

provided by direct measures of the magnitude of bank lending relative to the size of the economy. Chart 11 plots bank loans to businesses relative to GDP for the period 1952-1992.[23] The chart shows that although the ratio declined sharply in the 1970s, this decline only partly reversed the spectacular rise in the 1960s. As a result, the ratio of loans to GDP was roughly twice as large in 1980 as in 1960. There was another dramatic fall in the series in the early 1990s, but this again only partly offset an even larger rise in the 1980s. Thus, according to this measure, bank lending is if anything more important today than in the early postwar era.[24]

Chart 11 almost surely understates the current importance of bank lending. Because banks' off-balance-sheet activities have been growing, the ratio of bank loans to the capital stock has become an increasingly inaccurate measure of banks' importance in credit markets. As documented by Boyd and Gertler (1993), banks provide backup lines of credit for almost all of the rapidly expanding commercial paper market (including finance company paper); they pro-

Chart 11

Ratio of Bank Loans to GDP
(1952 - 1992)



vide a growing volume of loan commitments; and they have been increasingly selling and securitizing their loans. A simple indication of the importance of these off-balance sheet activities is that fee income now accounts for about a third of total bank income, up from about a fifth in the late 1970s. After reviewing these trends, Boyd and Gertler (1993, p. 10) conclude that "commercial banks remain involved in virtually all short-term working capital lending in the U.S. economy."

While banks remain central to credit allocation, it is reasonable to question whether the Federal Reserve still has the capacity to disrupt lending directly. Its jawboning and other efforts to encourage lending over the past few years do not appear to have had any substantial impact on lending. In addition, interest rate ceilings have been eliminated, and the 1969 Credit Control Act, which provided the legislative authority for some elements of the 1980 credit controls, was repealed effective in 1982.

Despite these developments, the Federal Reserve's capacity to disrupt lending remains substantial. Earlier jawboning efforts, in contrast to the recent ones, were backed by implicit or explicit threats of limitations on access to the discount window and of legislative restrictions on interest rates or lending. There is no reason to expect that such threats would not be effective today. In addition, the Federal Reserve maintains its authority to alter existing reserve requirements, or impose new ones, on various classes of bank liabilities. Given the increased competition between bank liabilities and other assets, it is likely that such reserve requirements would have even larger impacts on banks' cost of funds today than before. Thus, the Federal Reserve still has access to most of the tools it used in its previous direct efforts to restrict lending, and those tools are unlikely to have lost their ability to affect banks' lending activities. Given the continued central role of bank lending, we conclude that the Federal Reserve still has the ability to affect credit flows significantly through direct credit actions if it wishes to.

Changes in Federal Reserve actions. Although the Federal Reserve still has the ability to restrict banks' lending activities directly, in recent episodes of tight monetary policy it has chosen not to do so.

There have been two significant episodes of tight monetary policy since 1980. The first episode occurred in 1981-1982.[25] After ending the credit control program and allowing interest rates to fall in response to the 1980 recession, the Federal Reserve began to tighten again in late 1980. This tightening was a continuation of the general anti-inflationary strategy the System had adopted in 1978 and 1979. The federal funds rate rose from a low of 9.03 percent in July 1980 to over 19 percent in January 1981; it remained around 15 percent through mid-1982.

In contrast to its behavior in many of the earlier episodes, the Federal Reserve took no steps to attempt to restrict lending directly in 1981-1982. In addition, interest rate regulations, though not entirely eliminated, were much less strict than in preceding decades. As a result, there does not appear to have been any notable direct curtailment of banks' and thrifts' ability to lend in this period. The large changes in interest rates and the introduction of new types of demand and savings deposits led to large variations in the growth rate of core deposits during this period. But intermediaries were able to respond to these variations simply by adjusting their issuance of large CDs (see, for example, the ***Federal Reserve*** Bulletin, November 1980, February 1981, May 1981, March 1982, and August 1982).

Our final episode of tight monetary policy is the moderate anti-inflationary tightening of 1988 and 1989. The federal funds rate rose from a low of 6.58 percent in early 1988 to a high of 9.85 percent in early 1989. As in 1981, the Federal Reserve did not attempt to supplement its tight policy by direct efforts to reduce lending. Indeed, beginning in the second half of 1990, well after policy had begun to ease, the System attempted to encourage lending.

As others have emphasized (for example, Owens and Schreft, 1993, and Cantor and Wenninger, 1993), the behavior of credit markets in this episode differed fundamentally from their behavior in earlier periods of tight policy. Most importantly for our purposes, banks simply did not attempt to turn to alternative sources of funds to maintain their lending. The most plausible interpretation of banks' behavior, in our view, is simply that a variety of factors largely unrelated to the tightening of policy acted to reduce intermediaries'

ability or desire to lend. Among the factors were the overbuilding of commercial real estate in the 1980s, reduced tax incentives for investment, firms' high debt burdens, tighter capital standards and lower levels of capital, the savings and loan crisis, and stricter regulatory oversight. Because of these factors, this episode provides little evidence concerning banks' ability to maintain their lending in the face of tight policy.

An alternative view of the recent episode is that the slowdown in lending was largely the consequence of the tight monetary policy working through the asset side of banks' balance sheets, rather than of these other factors. If this view is correct, recent financial changes–particularly banks' weakened capital positions—have created a strong credit channel for monetary policy where there was only a weak one before.

We are highly skeptical of this view for two reasons. First, a substantial direct impact of the additional factors on bank lending is well documented (see for example Cantor and Wenninger, 1993, and Bernanke and Lown, 1991). Second, and even more tellingly, the view that there is now a strong credit channel implies that the decline of nearly 7 points in the federal funds rate—almost double the 1988-1989 increase—should have resulted in a boom in bank lending. Instead, bank lending has remained weak.

Whatever one's interpretation of the 1988 episode, it seems clear that the Federal Reserve did not undertake the sort of direct credit actions that were so common in the 1960s and 1970s. This raises the obvious question of whether the move away from credit actions represents a permanent change or a temporary aberration. Two factors suggest that it might be only temporary. First, the Monetary Control Act of 1980 provided for a multi-year phase-in of new reserve requirements. As a result, it is possible that the Federal Reserve chose not to change reserve requirements in the 1981-1982 monetary tightening simply because it would have been administratively difficult.

More intriguing is the possibility that the use of credit actions may depend on the political climate. Owens and Schreft (1993) show that Wright Patman, as chairman of the House Banking Committee, had

a significant influence on Federal Reserve policy in the 1960s. Because Patman threatened to legislate credit controls and to urge an antitrust investigation of the setting of the prime rate, the Federal Reserve may have been forced to rely more on direct credit actions than it otherwise would have. Similarly, the impetus for the 1980 credit controls clearly came from the Carter administration rather than from the Federal Reserve.[26] One interpretation of these facts is that the Federal Reserve employs credit actions when it feels constrained by political forces from raising interest rates. This interpretation is consistent with the fact that the four monetary tightenings that were not accompanied by credit actions (1955,1959, 1981, and 1988) all occurred during Republic administrations.

Conclusion

The preceding analysis suggests that, to the extent that the monetary transmission mechanism has changed in recent years, it is largely because of changes in Federal Reserve policy actions, not because of changes in financial structure or regulations. The credit side of the transmission mechanism is less important today mainly because the Federal Reserve has become more willing to let high interest rates ration credit and has stopped undertaking actions aimed at reducing bank lending directly. This view of the source of changes in the transmission mechanism raises an obvious question about what the Federal Reserve should do in the future. Should the monetary authorities continue to rely solely on the interest rate side of the transmission mechanism, or should they go back to the credit actions of the 1960s and 1970s?

The arguments against credit actions come naturally to economists. Direct restrictions on bank lending make it difficult for certain borrowers to obtain loans, or force particular borrowers to pay a premium for funds that is not justified by simple differences in risk. As a result, certain borrowers are dissuaded from investment for no reason other than that they are only able to borrow from banks. Thus, Federal Reserve credit actions create an inefficiency in the provision of credit. In contrast, a reliance on interest rates assures that loans go to the borrowers who provide the highest anticipated returns.

There is also no strong distributional argument in favor of direct credit actions. On the one hand, small firms are particularly dependent on banks for finance; thus actions that directly restrict bank lending would tend to have a disproportionate impact on small firms. On the other hand, when the Federal Reserve has taken direct credit actions, it has generally also used moral suasion to attempt to shift the composition of banks' lending toward smaller firms; these attempts may have served to reduce the impact of the credit actions on small firms. The net impact of these forces is not clear, but there is certainly no evidence that direct credit actions have insulated small firms from the impact of tight policy.

Thus, arguments in favor of continued reliance on credit actions must rely on market imperfections or political considerations. For example, if one believes that bank regulations are inadequate or that deposit insurance creates incentives for banks to make risky loans and that these problems are more serious in times of tight monetary policy, then direct restrictions on bank lending may be appropriate. Similarly, if one believes, following Wojnilower (1980), that high interest rates must ultimately lead to a credit crunch, then it may be desirable for the Federal Reserve to crunch by design, rather than to allow a crunch by accident. Finally, if one believes that high interest rates may lead to legislation that regulates interest rates or reduces the Federal Reserve's independence, credit actions may be the most prudent way to restrain credit flows.

The recent monetary contractions where credit actions were not used seem to contradict such arguments. In both the 1981-1982 recession and the 1988 monetary shock, high interest rates did not lead to bank insolvency, accidental credit crunches, or harmful legislation. Monetary tightening without credit actions was adequate for achieving the desired slowdowns in economic activity and inflation. For this reason, we view the recent movement away from Federal Reserve credit actions and the consequent changes in the transmission mechanism as highly desirable. The Federal Reserve would do well to follow its own lead in future monetary contractions.

Endnotes

[1] See Bernanke and Blinder (1988) for a simple theoretical model of this effect. Kashyap and Stein (1993) survey work in this area. Of course, credit market imperfections are also likely to play a role in the interest rate side of the transmission mechanism. For example, tight monetary policy makes loans riskier by increasing firms' interest costs and reducing overall economic activity. This in turn is likely to reduce the availability of credit to smaller, less established firms relative to larger, older firms (see, for example, Gertler and Gilchrist, 1992). Because it is difficult to see how recent financial market innovations could have significantly affected this component of the transmission mechanism, in this paper we focus on the narrowly defined "credit side" of the transmission mechanism rather than attempting to consider credit market imperfections in general. For analyses of more general credit market effects of monetary policy, see Oliner and Rudebusch (1992), Morgan (1992), Kashyap, Lamont, and Stein (1993), and Gertler and Gilchrist (1992). For analyses of changes in recent decades in other aspects in the transmission mechanism, see Friedman (1989) and Bosworth (1989).

[2] Our conclusion about the importance of policy actions and regulations in limiting banks' ability to lend is consistent with Owens and Schreft's (1993) conclusion that policy actions are the source of credit crunches. The type of credit market disruption we focus on, however, differs fundamentally from that considered by Owens and Schreft. Their focus is on periods of "sharply increased nonprice credit rationing" by any lenders (1993, p. 2). Our interest, in contrast, is in policy-induced limitations on *banks'* ability to lend, regardless of whether they result in credit rationing, and regardless of whether they result from an inherent link between monetary policy and bank lending or from actions aimed at either banks' access to funds or their ability to use those funds.

[3] The data on the Treasury bill rate are from the Citibase databank, April 1993 update.

[4] Our accounts of the episodes are based on the ***Economic Report of the President*** and the ***Federal Reserve Bulletin*** for the relevant years, Burger (1969), Monhollon (1970), Wojnilower (1980). Schreft (1990), and Owens and Schreft (1993).

[5] The federal funds rate data from 1955 to 1992 are from the Citibase databank, April 1993 update. The data for 1952 through 1954 are deduced from a graph presented in Martens (1958, Exhibit 16, p. 99). The graph is attributed to Garvin, Bantel, and Co., which was the largest federal funds broker in the 1950s. For 1955, the first year for which published data are available, the numbers deduced from the graph are always within 2 basis points of the Citibase data.

[6] The Federal Reserve did issue two letters to banks about their lending activities during this period, one in April 1973 expressing "concern" about "the heavy volume of bank loan commitments to commercial and industrial companies and financial institutions" and one in September 1974 urging banks to respond to the tight money market conditions by "selecting carefully and responsibly the uses to which they put their loanable funds" (***Federal Reserve Bulletin,*** April 1973, p. 313, and September 1974, pp. 679-80). The letters were not strongly worded, however, and contemporary observers do not cite them as having had significant impacts on banks' behavior.

[7] State usury ceilings were also often binding on mortgage rates in 1979; these ceilings were overridden by federal legislation at the end of the year, however.

[8] Our accounts of these episodes are based on the ***Economic Report of the President*** and the

Federal Reserve Bulletin for the relevant years, and on Wojnilower (1980).

[9]The spread is calculated as the difference between the prime rate charged by banks on short-term business loans and the rate on six-month commercial paper. The data are from the Citibase databank, April 1993 update. Quarterly interest rates are calculated as the average of monthly observations. We use quarterly data, even though monthly data are available, to maintain consistency with the mix data, which are only available quarterly.

[10]Following Kashyap, Stein, and Wilcox (1993), we use data on the mix from the Federal Reserve Board's flow of funds accounts. The loans series is the sum of bank loans not elsewhere classified in the nonfarm, noncorporate business sector and in the nonfinancial corporate business sector. The commercial paper series is total nonfinancial corporations' commercial paper outstanding. The data are from the Federal Reserve's flow of funds database and are available from 1952:1 to 1992:4. The data are described in the ***Introduction to Flow of Funds,*** Board of Governors (1980a). The mix is multiplied by 100 to convert it to percent.

[11]We also include a constant in all regressions. Following Kashyap, Stein, and Wilcox, we do not include either a trend or seasonal dummy variables in the regressions. The regressions are not identical to Kashyap, Stein, and Wilcox's because we update the list of contractionary monetary policy shocks to include the 1988:4 episode. However. inclusion of the 1988 shock changes the results only slightly.

[12]As described in the notes to Table 1, in all cases but two the highest statistical significance of the effect of the monetary policy dummy occurs after seven quarters; in the remaining two cases, the impulse response is slightly more significant after two quarters. To make the results for the level of the impulse response function comparable across regressions, for these two cases we report the cumulative impulse response and *t* statistic after seven quarters rather than after two.

[13]The flow of funds data on the mix begin in 1952:1, so the earliest starting date for the mix regression is 1954:2. We use this sample period for the spread as well. Since consistent data on the spread are available starting in 1947, the longer sample period 1949:2 to 1992:4 can also be used for the spread regressions. The results for this longer sample are similar to those for the sample starting in 1954.

[14]Including 1969 in the list of credit actions does not change the regression results for the spread appreciably.

[15]A natural test of this interpretation of the results would be to investigate the relationship between movements in Oliner and Rudebusch's 'tomposition-adjusted mix and monetary policy shifts and credit actions. Unfortunately, there has been only one credit action since the inception of the data on small and large firms employed by Oliner and Rudebusch and Gertler and Gilchrist. Thus this test is not feasible.

[16]Following Kashyap, Stein, and Wilcox, we exclude the contemporaneous value of the monetary policy and credit action dummy variables. However, the results are robust to their inclusion. In the regression for the spread including both dummy variables and run over the longer sample period, the cumulative impulse response function at the point of maximum significance is 0.78 [Lag 7] with a t statistic of 2.04 for the monetary policy variable and 1.44 [Lag 2] with a *t* statistic of 3.83 for the credit action variable. In the regression for the mix including both dummy variables and run over the longer sample period, the cumulative impulse response function at the point of maximum significance is -1.80 [Lag 7] with a *t* statistic of

-2.60 for the monetary policy variable and -1.56 [Lag 2] with a t statistic of -2.75 for the credit action variable.

[17]The findings in Table 1 may account for the puzzling behavior of measures of the importance of the credit channel of monetary policy documented by Miron, Romer, and Weil (1993). Miron, Romer, and Weil show that financial market flexibility has been increasing over the twentieth century and that the importance of banks does not show a pronounced upward trend. Thus one would expect the credit channel to be declining in importance. But standard indicators of the credit channel (such as the spread and the mix) in fact exhibit much larger movements in the episodes of tight monetary policy in the period 1960-1980 than in the episodes in other periods during the century. Our findings suggest that these anomalous results may be due to the fact that the movements in the 1960-1980 episodes are partly the result of direct credit actions rather than of a credit channel of open market operations.

[18]Including the contemporaneous values of the federal funds rate and the credit action dummy variable changes the regression for the spread somewhat. Because there is one month in early 1980 when the federal funds rate skyrockets and the spread falls. the impulse response function for the spread has an extreme saw-tooth pattern. Despite this feature, the credit action dummy variable retains most of its predictive power. In the regression run over the longer sample period and including both variables, the cumulative impulse response function at the point of maximum significance is 0.30 [Lag 1] with a t statistic of 1.94 for the change in the federal funds rate and 0.95 [Lag 2] with a t statistic of 2.45 for the credit action variable. For the mix, including the contemporaneous values of the explanatory variables has little effect. In the regression for the mix including both explanatory variables and run over the longer sample period, the cumulative impulse response function at the point of maximum significance is -0.86 [Lag 3] with a t statistic of -3.26 for the change in the funds rate and -1.17 [Lag 2] with a *t* statistic of -1.93 for the credit action variable. While this robustness is reassuring, we feel that including contemporaneous values of the federal funds rate is highly questionable because there is such a large endogenous component in its movements over short horizons.

[19]We are grateful to Benjamin Friedman and Mark Gertler for suggesting that we include the output analysis in the paper. Our approach is similar to that suggested by Owens and Schreft (1993).

[20]We seasonally adjust this series by regressing it on a linear trend, a constant, and eleven monthly dummy variables. The seasonally unadjusted index was provided to us by the Board of Governors of the Federal Reserve System.

[21]The monthly dates of the other credit actions are 1966:7, 1969:8, 1973:5, and 1979:10.

[22]Because the industrial production series that we use in the regression is not seasonally adjusted, we also include a constant and eleven monthly dummy variables.

[23]The data on bank loans are the same as those used in the calculation of the mix in the previous section. Since these data are nominal, we scale them by nominal GDP. The GDP data are from the Citibase databank, April 1993 update.

[24]Miron, Romer, and Weil (1993) provide additional evidence of the increasing importance of bank loans over the postwar era. They show that loans are a larger fraction of total liabilities plus equities for corporations in the 1980s than in the 1950s, and that since the mid-1960s the liabilities of unincorporated businesses, which are the firms most likely to have to borrow from banks, have been growing faster than the liabilities of corporations.

[25]Our accounts of these episodes are based on the ***Economic Report of the President*** and the ***Federal Reserve Bulletin*** for the relevant years, Owens and Schreft (1993), and Cantor and Wenninger (1993).

[26]See Schreft (1990), ***Economic Report of the President,*** 1981, and Board of Governors of the Federal Reserve System, (1980b).

Authors' Note: We are grateful to Anil Kashyap and David Wilcox for providing data, computer programs, and helpful comments, and to our discussants, Charles Freedman and Mark Gertler, for insightful comments and suggestions. We also received helpful comments and suggestions from Laurence Ball, Fischer Black, William English, Stanley Fischer, Benjamin Friedman, Michael Gibson, Philip Jefferson, Donald Kohn, David Lindsey, and Glenn Rudebusch. We are grateful to Matthew Jones for research assistance and to the National Science Foundation and the Alfred P. Sloan Foundation for financial support.

References

Bernanke, Ben S. "Credit in the Macroeconomy," Federal Reserve Bank of New York, ***Quarterly Review*** 18 (Spring 1993), pp. 50-70.

_____ and Alan S. Blinder. "Credit, Money, and Aggregate Demand," ***American Economic Review*** 78 (May 1988), pp. 435-9.

_____ and _____. "The Federal Funds Rate and the Channels of Monetary Transmission," ***American Economic Review*** 82 (September 1992), pp. 901-21.

_____ and Cara S. Lown. "The Credit Crunch," ***Brookings Papers on Economic Acrivity*** (1991:2), pp. 205-39.

Bosworth, Barry. "Institutional Change and the Efficacy of Monetary Policy," ***Brookings Papers on Economic Activity*** (1989:1), pp. 77-110.

Boyd. John H., and Mark Gertler. "U.S. Commercial Banking: Trends, Cycles, and Policy," ***NBER Macroeconomics Annual*** 8 (1993), pp. 319-68.

Burger, Albert E. "A Historical Analysis of the Credit Crunch of 1966," Federal Reserve Bank of St. Louis, ***Review*** 51 (September 1969), pp. 13-30.

Cantor, Richard, and John Wenninger. "Perspective on the Credit Slowdown," Federal Reserve Bank of New York. ***Quarterly Review*** 18 (Spring 1993). pp. 3-36.

Friedman, Benjamin M. "Changing Effects of Monetary Policy on Real Economic Activity," in ***Monetary Policy Issues in the 1990s.*** Federal Reserve Bank of Kansas City, 1989, pp. 55-111.

Gertler, Mark, and Simon Gilchrist. "Monetary Policy. Business Cycles and the Behavior of Small Manufacturing Firms," New York University and Federal Reserve Board (December 1992), mimeo.

_____ and _____. "The Role of Credit Market Imperfections in the Monetary Transmission Mechanism: Arguments and Evidence," ***Scandinavian Journal of Economics*** 95 (1993), pp. 43-64.

Kashyap, Anil K, and Jeremy C. Stein. "Monetary Policy and Bank Lending," NBER Working Paper No. 4317 (April 1993). Forthcoming in N. Gregory Mankiw, ed., ***Monetary Policy.***

_____, and David W. Wilcox. "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance," ***American Economic Review*** 83 (March 1993), pp. 78-98.

_____, Owen A. Lamont, and Jeremy C. Stein. "Credit Conditions and the Cyclical Behavior of Inventories," Federal Reserve Bank of Chicago Working Paper No. 93-7 (June 1993).

Martens, Edward J. ***Federal Funds: A Money Market Device.*** Thesis, Pacific Coast Banking School, University of Washington, Seattle, 1958.

Miron, Jeffrey A., Christina D. Romer, and David N. Weil. "Historical Perspectives on the Monetary Transmission Mechanism," NBER Working Paper No. 4326 (April 1993). Forthcoming in N. Gregory Mankiw, ed., ***Monetary Policy.***

Monhollon, Jimmie R. "Regulation Q: An Instrument of Monetary Policy," Federal Reserve Bank of Richmond, ***Monthly Review*** 56 (July 1970), pp. 2-8.

Morgan, Donald P. 'The Lending View of Monetary Policy and Bank Loan Commitments," Federal Reserve Bank of Kansas City (November 1992). mimeo.

Oliner, Stephen D.. and Glenn D. Rudebusch. "Is There a Broad Credit Channel for Monetary Policy?' Federal Reserve Board (1992), mimeo.

_____ and _____. "Is There a Bank Credit Channel for Monetary Policy?" Federal Reserve Board, Finance and Economics Discussion Series No. 93-8 (March 1993).

Owens, Raymond E., and Stacey L. Schreft. "Identifying Credit Crunches," Federal Reserve Bank of Richmond Working Paper No. 93-2 (March 1993).

Romer, Christina D., and David H. Romer. "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz," ***NBER Macroeconomics Annual*** 4 (1989). pp. 121-70.

_____ and _____. "New Evidence on the Monetary Transmission Mechanism." ***Brookings Papers on Economic Activity*** (1990:1), pp. 149-213.

_____ and _____. "Monetary Policy Matters," University of California, Berkeley

(November 1992). mimeo. Forthcoming in ***Journal of Monetary Economics.***

Schreft, Stacey L. "Credit Controls: 1980," Federal Reserve Bank of Richmond, ***Economic Review 76*** (November/December 1990), pp. 25-55.

Wojnilower, Albert M. "The Central Role of Credit Crunches in Recent Financial History," ***Brookings Papers on Economic Activity*** (1980:2), pp. 277-326.

U.S. Board of Governors of the Federal Reserve System. ***Federal Reserve Bulletin.*** Various years.

U.S. Board of Governors of the Federal Reserve System. ***Introduction to Flow of Funds,*** 1980. (a)

U.S. Board of Governors of the Federal Reserve System. ***Federal Reserve Credit Restraint Program.*** Interim reports by the staff of the Board of Governors of the Federal Reserve System, July 21, 1980.(b)

U.S. President. ***Economic Report of the President.*** Various years.

Commentary: Credit Channel or Credit Actions? An Interpretation of the Postwar Transmission Mechanism

Charles Freedman

In recent years we have seen the development of a new literature on credit, based largely on the asymmetry of the information available to lenders and borrowers and drawing out various implications of this asymmetric information hypothesis. The primary emphasis of the earlier part of this new literature was on microeconornic phenomena and it contributed importantly to our understanding of the behavior of lenders and borrowers and the nature of the credit-granting process by financial intermediaries. More recently, there has been an increased tendency to focus on the macroeconomic implications of the credit-granting decision and a long debate has been waged over the relative importance in the transmission mechanism of the so-called credit channel and the so-called money channel, although the latter should be more appropriately called the monetary conditions channel. Romer and Romer have been important contributors to this debate, as has Mark Gertler, the other discussant this morning.

As an interested central bank observer of this debate, I have been struck by the quasi-theological nature of the dispute about what is meant by the credit view or the credit channel. In fact, there are a number of hypotheses that could be subsumed under the rubric of the credit view and part of the difficulty in tracking the debate lies in the necessity of distinguishing among the various elements of the credit view, especially in assessing the empirical results provided by the protagonists in the debate.

One can usefully distinguish between what might be called stronger versions of the credit view and weaker versions. Among the stronger versions would be the joint hypothesis, first, that there is a direct link between the decline of reserves following tightening actions by the central bank and the supply of credit by banks (and perhaps other financial institutions) and, second, that the shifts in the supply of loans by financial institutions will have a significant effect on overall spending, over and above the demand-side effects of the rise in the level of market interest rates. Among weaker versions of the credit view would be the hypothesis that, because of informational asymmetries, interest rate increases are accompanied by a rise in default risk and result in a reduction in the availability or an increase in the cost of credit to small firms relative to large firms. (I would note, however, that whether or not such a change leads to an overall decline in spending will depend, among other things, on the ability of large firms to increase their share of the economy at the expense of that of small firms under such conditions.) Both stronger and weaker versions of the credit view have a market-clearing variant in which the reduction in loans (overall or to small firms) occurs via the rise in loan rates in relation to market interest rates, a non-market-clearing variant with rationing by banks, and an intermediate variant in which banks adjust their non-price terms and conditions of lending to clear the market. Not only do the various versions of the credit view have different macroeconomic implications, but the ways of testing the associated hypotheses can be very different.

The most direct way of testing for the broad macroeconomic significance of credit would be to assess the marginal contribution of credit measures (whether bank credit or total credit) to the explanation of output or demand growth in the context of reduced-form or VAR-type models.' However, since such tests are rarely conclusive and, in any case, throw little light on the details of the transmission mechanisms involved, a number of less direct tests have been used to evaluate various implications of the credit view, such as movements in the mix of loans and commercial paper and movements in the "risky spread" (the differential between the interest rates on private obligations and government obligations) in response to policy tightening and easing.

Most of the Romer and Romer paper takes this latter, less direct approach to testing the credit view. The first half of the paper, which I found very interesting, examines the various postwar episodes of credit restraint and argues that these typically developed not as part of the ordinary transmission mechanism but as a result of Fed actions that impinged more or less directly on credit. The latter part of the paper, which I found less convincing, argues that these credit actions explain much of the movement in the spread between loan rates and market rates as well as the mix between loans and commercial paper over the postwar period.

As just noted, I found the Romers' discussion of the episodes of tightening in the postwar period to be both interesting and insightful. I would like to recast their argument somewhat, focusing more directly on the changing capacity of banks to adjust to central bank actions, and comparing U.S. and Canadian developments over the period. These comments are intended to complement the analysis in Romer and Romer.

The simple textbook story of money and credit multipliers in which banks reduce loans in direct response to a shortage of reserves may be a useful teaching device but it is far removed from reality, where there is no such direct link between reserve changes and bank loans. Banks finding themselves short of reserves (or of settlement balances in countries where reserves have been eliminated) initially respond by borrowing from the central bank (where that is acceptable) or by selling liquid assets or by bidding more aggressively for wholesale deposits.[2] Typically, only at a later stage in the process is bank lending affected. Of course, some of these adjustment mechanisms were not available in the early postwar period and that is an important part of the story of the various episodes told by the Romers.

Borrowing from the Fed has traditionally been the first response of the banking system as a whole in the United States to a reduction in non-borrowed reserves. However, because banks were not supposed to use borrowed reserves as a continuing source of funds and because large, sophisticated banks were not supposed to use them at all, the initial response by many banks in the early postwar period to a shortfall of reserves was to sell liquid assets. In Canada, since bor-

rowing from the central bank was infrequent and very small in amount through most of the postwar period,[3] liquid asset adjustment always played a key role in the response by banks to central bank actions. Since the banks in both countries came out of the wartime period with large stocks of such assets, their provision of loans could be insulated from the effects of central bank actions for quite some period of time. Of course, if the central bank continued to put reserve pressure on the banks, their declining liquid asset ratios would have made them increasingly less comfortable with their evolving portfolio mix and they would eventually have cut back on loans.[4]

Since central banks at that time focused on "credit conditions" (a term that included both the cost and availability of loans) as a key element in the transmission of policy, there was concern that the lags in the response of loans to the reduction in the supply of reserves could be excessively long and, therefore, supplementary techniques were used from time to time to speed up the response. Thus, in both Canada and the United States, moral suasion was used to slow down lending more directly and more predictably than reliance solely on bank responses to liquid asset declines would have done. In Canada, the moral suasion was directed not only to slowing down overall credit but also to ensuring that certain types of borrowers (for example, small business, residential mortgage borrowers, farmers) were not unduly affected, particularly given their lack of access to other credit markets. In Canada, moreover, the authorities introduced a minimum liquid asset ratio (subsequently formalized as a secondary reserve requirement), which required the banks to hold specified amounts of certain liquid assets. This was intended to tighten up the link between the central bank actions and bank lending by limiting the capacity of the banks to sell off liquid assets and hence speeding up the lending response of the banks to a deteriorating liquidity situation.[5]

In the 1960s, the raising of funds in deposit markets, especially wholesale markets, became the preferred adjustment mechanism of banks to a shortfall of reserves, although liquid asset reduction continued to be an alternative avenue of response. The ability to raise funds by adjusting deposit rates also had the effect of slowing markedly the need for banks to respond to central bank tightening by cutting back on the provision of loans.[6] Rather than rely only on the

effect of interest rate changes on the demand for credit, the Fed was able to make use of deposit rate ceilings (Regulation Q), which had been introduced for other reasons, to limit bank access to funds and this became an important part of the transmission mechanism for a number of years. In practice, a considerable part of the impact of Regulation Q ceilings seems to have fallen on residential construction? which was financed to an important extent in those years by locally based banks and savings and loan associations without good access to wholesale deposit markets.

Another method used by the Fed to tighten the link between its actions and the extension of loans by financial institutions was the imposition of marginal reserve requirements on wholesale deposits. The purpose of these marginal reserve requirements was not to drain reserves from the system, since open market operations were a much more efficient means of reserve management, but rather to influence the desire of banks to extend loans by reducing the profit margin on lending or to cause a rise in loan rates relative to market rates. For example, with interest rates at 10 percent the imposition of a marginal reserve requirement of 10 percentage points would reduce the net spread between loan rates and deposit rates by 100 basis points, or would force banks to raise the gross spread by 100 basis points by some combination of loan rate rise and deposit rate decline,[8] or would result in some intermediate outcome. In the first case, the banks would act to reduce the supply of loans (by tightening non-price terms and conditions). In the second case the quantity of loans demanded would decline and those potential borrowers with less access to other types of credit would revise downward their desired expenditure plans as a result of the higher cost of bank loans.

The Bank of Canada abandoned the use of moral suasion to curtail bank lending in the early 1970s. And, with the exception of a short period in the early 1970s in which there were rate ceilings on short-term wholesale deposits, there were no restrictions on interest rates following the elimination of the interest rate ceiling on bank loans in 1967. Nor did the Bank ever make use of discretionary changes in reserve requirements on wholesale deposits. Thus, from the early 1970s, increases in interest rates in response to a surge of spending and rapid money and credit growth typically led to a divergence in

the movements of M1 and those of the broader monetary aggregates. M1, which was very interest-elastic, slowed in response to the rising level of short-term interest rates, while the broader aggregates continued to expand for quite some time as banks accessed time deposits and wholesale deposit markets to maintain a rapid growth of lending.[9] Of course, over time, spending and credit slowed but this primarily reflected the response of demanders of credit to the higher level of interest rates.

Thus, somewhat earlier in Canada and somewhat later in the United States, central banks abandoned the use of moral suasion and other mechanisms aimed at tightening the link between the actions of the central bank and the extension of loans by banks. There were a number of reasons for this change in approach. First, there was an increasing tendency philosophically to rely on the markets and interest rates to allocate credit. Second, academic and central bank research on the importance of money and the stability of money demand led to an increased focus on monetary aggregates and monetary conditions, with correspondingly reduced focus on credit conditions and the relatively less stable credit aggregates. Third, and most pertinent to the analysis of how the extension of credit changed through the postwar period, was the growing ability of many borrowers to access nonbank sources of credit. Thus, even if the central bank actions caused banks to reduce their supply of credit, many other lenders and markets stood ready to fill the gap. In the United States, for example, the widespread securitization of mortgages significantly weakened the link between the capacity of financial institutions to lend and that of homeowners to borrow.[10] And nonregulated intermediaries as well as commercial paper markets started to play a much larger role in making credit available to firms. In similar fashion, in Canada the bankers' acceptance market took an increasing share of short-term lending to business from the mid-1970s.

It was thus increasingly recognized that any direct influence on bank lending behavior by the central bank would have less effect on total credit and on spending because of the increase in substitutability on the part of many borrowers across different credit sources.[11] Moreover, those whose spending would be directly affected by such actions would be borrowers without access or with limited access to other

types of credit, such as small businesses, households, and farmers. These were the very groups that the authorities had tried to protect from credit rationing in the earlier postwar episodes, in part perhaps for political reasons, in part for fairness and efficiency reasons. In any case it was deemed inappropriate to impose controls on bank lending that would force these groups to take the brunt of monetary policy actions while others could access nonbank sources of credit.

In these circumstances, central banks around the world (and not just in North America) have come increasingly to rely on changes in monetary conditions[12] operating through market processes to influence spending, with less and less use of direct or indirect controls on lending. In analyzing the transmission mechanism, there is still the need, however, for a careful analysis and interpretation of responses of markets and financial institutions to policy actions by the central bank, whether or not one labels them as the credit channel. This would include such matters as the response to changes in market rates of "administered" rates such as the prime loan rate and certain mortgage rates, movements in non-price terms and conditions of lending over the cycle, and the differential effect, if any, of monetary actions on different classes of borrowers, notably small versus large borrowers.

In Canada we appear to have the same pattern of differential movements of loans to small businesses and large businesses in a slowdown as in the United States. It is far from clear, however, whether this is a demand-side phenomenon or a supply-side phenomenon. Do banks reduce the supply of loans to small businesses in response to such factors as the decline in the value of collateral during a slowdown? Or do small businesses reduce their demand for loans more than large businesses at times of weakening economic conditions? A relatively larger response to interest rate rises by small businesses than by large businesses might be attributable to a number of factors. For example, small firms might typically engage in different lines of business than large firms, or their greater flexibility might enable them to reduce their inventories more quickly, or their lower capital might force them to reduce their inventories more quickly, or they might be more able to substitute accounts payable for bank loans. In any case, these phenomena clearly deserve more study.

As noted earlier, I found the econometric analysis in the latter part of the paper less convincing than the discussion of the credit restraint episodes. I had some concerns about the specification of the equations as well as the interpretation offered.

In the basic spread equation the change in the differential between the prime rate and the six-month commercial paper rate is regressed on eight lags of the dependent variable and eight lags of the explanatory variable or variables. The latter include the federal funds rate, the Romer dummies, and the credit action dummies. One of my concerns with even the simplest version of this equation is that I find some of its implications very peculiar. In the regression of the change in the spread on the lagged changes in the federal funds rate, the initial response (after the one quarter lag) of the spread to a 1 percentage-point increase in the federal funds rate was 20 basis points and this jumped to its long-run increase of **30** basis points after about six quarters. It is not clear to me why there should be a large steady state effect on the spread following a rise in the level of interest rates. Rather, I would have expected a temporary downward movement in the spread followed by subsequent reversal, perhaps with some overshoot on the way to equilibrium. The expectation that the initial effect would be negative follows from the observation that movements in prime rates tend to lag somewhat behind movements in market rates. And, in fact, when the contemporaneous change in the federal funds rate is included in the equation, the initial response of the spread to a change in the federal funds rate is negative and very significant, the responses over the intermediate periods then become positive,[13] and the long-run response is about 16 basis points.

Similar results were found using Canadian data, both on a quarterly basis and a monthly basis.[14] Adding the contemporaneous variable to the equations leads to the expected negative (and very significant) initial response, a gradual reversal of this initial effect over time, and a very small and insignificant steady state response. **A** very similar path is found in the simulation of a more complex weekly model which is based on the error-correction framework.[15] Addition of dummies for periods of credit restraint in Canada left the coefficients on the interest rate changes unchanged, although the dummies themselves were significant.

Since the basic equation for the spread is problematic, one should be somewhat cautious about any inferences drawn from adding the credit action dummies to the basic equation. Indeed, adding the contemporaneous interest rate change variable results in smaller and less significant coefficients on the credit dummies.[16] Moreover, as the Romers themselves point out, the spread between the loan rate and market rates may be adjusting to perceived changes in riskiness of bank loans over the cycle and not just in response to central bank actions. I wondered whether changes in the risky spread (between commercial paper rates and Treasury bill rates) could be used to proxy for changes in default risk and remove that source of variation in the spread between the loan rate and market rates. I also wondered whether one was not picking up a term structure movement in analyzing the rise in the differential between the prime rate (effectively a very short-term rate) and a six-month rate in response to Fed actions. As well, the meaning of the spread may be changing over time since the prime rate has come to be applied to riskier borrowers and banks have extended below-prime lending to the strongest borrowers. Thus, in the United States the spread increased from an average of 30 basis points in the second half of the 1960s to 92 basis points in the 1970s and to 228 basis points in the period since 1980. Canadian spreads, in contrast, remained at about 100 basis points in these same sub-periods.

In equations for the mix variable for Canada (where the mix is defined as the ratio of loans to total short-term credit), credit restraint dummies were not significant. And the regressions indicated that an increase in interest rates led to an initial ***increase*** in loans, the opposite of the U.S. results, followed by a reversal. These results are consistent with the spread equations for Canada inasmuch as a rise in interest rates leads to an initial ***decline*** in the prime rate relative to market rates.[17]

One final issue on which I would like to comment is the role of reserve requirements in permitting the central bank to influence short-term interest rates. There is a widespread view that reserve requirements are necessary for the central bank to maintain its influence over short-term interest rates. In fact, as the Romers correctly point out, even the disappearance of liabilities subject to reserve

requirements would not eliminate the Federal Reserve's control over interest rates.

Canadian developments provide a useful perspective with regard to this issue. Legislation has been passed in Canada which will eliminate reserve requirements by mid-1994. There will, however, be no diminution in the ability of the Bank of Canada to implement monetary policy or to influence short-term interest rates.[18] What will give the Bank of Canada its leverage in a world without reserve requirements is the requirement that financial institutions continue to settle payments on the books of the Bank. This creates a demand for settlement balances on the part of clearing institutions and the Bank of Canada, as the monopoly supplier of such balances, is able to control the quantity of settlement balances available to financial institutions.[19] Maintaining such a structure for the settlement of payments is sufficient to enable the Bank to have the same degree of influence on short-term interest rates as it currently possesses.

Author's Note: The views expressed are those of the author and are not attributable to the Bank of Canada. I would like to thank Peter Thurlow, Kevin Clinton, Pierre Duguay, and David Longworth for their assistance in the preparation of these comments

Endnotes

[1]See, for example, King (1986), Bemanke and Blinder (1992), Romer and Romer (1990). and Ramey (1993). In the case of Canada, equations including both monetary and credit aggregates have been used to explain the rates of increase in nominal spending, output, and inflation. On balance, monetary aggregates are more important than credit aggregates in explaining the main macroeconomic variables. See Muller (1992).

[2]Of course, from the point of view of the banking system as a whole, borrowing reserves does relieve the shortfall in reserves (provided the central bank does not offset the borrowing by reducing nonborrowed reserves further) while selling liquid assets or issuing wholesale deposits does not. From the point of view of the individual bank, however, all three kinds of actions will lead to an increase in its reserves relative to not taking any action. All three types of adjustment actions will be accompanied by upward pressure on interest rates but only the sale of liquid assets leads to a decline in deposits and hence in the "money supply."

[3]Recent changes to the system of implementation of monetary policy in Canada in anticipation of the elimination of reserve requirements in mid-1994 have resulted in an increase in borrowing from the central bank.

[4] In early Bank of Canada econometric models, the loan equations incorporated a term for the liquid asset ratio relative to its "desired" value in order to capture these effects. See Helliwell and others (1971).

[5]The Bank of Canada (1962) dealt with these issues in its submission to the Porter commission. "In a period in which the demand for bank loans is strong, banks may allow their holdings of liquid assets to decline as a means of accommodating part or all of this demand . . . The absence of any agreed minimum ratio of liquid assets would introduce another element of uncertainty concerning the response of the banking system to central bank action; it might be impossible to predict even within quite wide limits the point at which banks as a group would feel they could no longer go on reducing their holdings of liquid assets. A minimum liquid asset ratio, therefore, makes the response of banks somewhat more predictable and in addition, it is likely to produce smoother reactions on their part."

[6]In this context, one should note that in both Canada and the United States, total reserves were adjusted passively to the growth in M3-type deposits.

[7]See, for example, de Leeuw and Gramlich (1969).

[8]The relative effect on deposit and loan rates of the rise in the reserve requirement "tax" would depend on the relative substitutability of deposits and market instruments on the one hand, and of loans and other forms of credit on the other. In the case of marginal reserve requirements on wholesale deposits, most of the tax would probably have fallen on loan rates.

[9]Given the very high degree of substitutability between interest-bearing bank deposits and market instruments, banks could attract sizable amounts of funds by raising term deposit rates slightly relative to market rates.

[10]Indeed, the use of Regulation Q ceilings was an important cause of the development of the securitized mortgage market as a way of bypassing the restrictions. This is part of the explanation for the far more rapid growth of these markets in the United States than in Canada.

[11]Indeed, the credit restrictions imposed by the Fed in 1980 were aimed at all forms of consumercredit, not just the bank loans, for precisely this reason.

[12]The term monetary conditions encompasses changes in both interest rates and exchange rates, as monetary policy actions work through both channels.

[13]The Romers' basic equation seems to be picking up mainly the reversal and overshoot of the spread following its initial negative response to interest rate changes.

[14]The Canadian spread used in the regressions is the differential between the prime rate and the three-month commercial paper rate. The monetary policy variable is the rate on three-month Treasury bills.

[15]See Hendry (1992).

[16] Moreover, I did not find the reduction in the size and significance of the coefficients on the federal funds rate in the equations once the credit action dummies were introduced to be as important as did the authors.

[17]This cost effect appears to outweigh the expectations effect whereby a rise in the level of rates would induce borrowers to lock in current rates by issuing commercial paper or bankers' acceptances in anticipation of further increases in rates.

[18]Other countries, such as the United Kingdom and New Zealand, also no longer rely upon reserve requirements in the implementation of monetary policy.

[19]Longworth and Muller (1991) note that the requirement that settlement occurs on the books of the Bank is a form of "legal restriction" and that the demand by clearing institutions for clearing balances will be a function of the pricing schedule for borrowing at the Bank, which is under the control of the Bank.

References

Bank of Canada. Submissions to the Royal Commission on Banking and Finance. 1962.

Bernanke, Ben S., and Alan S. Blinder. "The Federal Funds Rate and the Channels of Monetary Transmission," *American* Economic Review, 82 (September 1992). pp. 901-21.

Helliwell, John F., and others. The Structure of *RDX2*, Part *1*. Bank of Canada Staff Research Studies No. 7, 1971.

Hendry, Scott. Determinants of the Prime Rate: *1975-1989*. Bank of Canada Working Paper 92-2, April 1992.

King, Stephen R. "Monetary Transmission: Through Bank Loans or Bank Liabilities?" *Journal* of Money, Credit and Banking, 18 (August 1986), pp. 290-303.

de Leeuw, Frank, and Edward M. Gramlich. "The Channels of Monetary Policy," Federal Reserve Bulletin, 55 (June 1969), pp. 472-91.

Longworth, David, and Patrice Muller. Implementation of Monetary Policy in Canada with Same-Day Settlement: Issues *and Alternatives*. Bank of Canada Working Paper 91-3, August 1991.

Muller, Patrice. "The Information Content of Financial Aggregates During the 1980s" in Bank of Canada, Monetary Seminar 90, March 1992, pp. 183-304.

Ramey, Valerie. "How Important is the Credit Channel in the Transmission of Monetary Policy?" *Carnegie-Rochester* Conference Series on Public Policy (1993), forthcoming.

Romer, Christina D., and David H. Romer. "New Evidence on the Monetary Transmission Mechanism," Brookings Papers on Economic Activity (No. 1, 1990), pp. 149-98.

Commentary: Credit Channel or Credit Actions? An Interpretation of the Postwar Transmission Mechanism

Mark Gertler

Once again, Christina Romer and David Romer have done the profession a great service by poring through the historical record and the institutions in order to understand how Federal Reserve policy affects the economy. I am a great admirer of the Romers' work. And let me make clear that my frequent references to the "Romer Dummies" apply to the authors' indicator variable for monetary policy, and not to the authors themselves.

The main point of this paper is that in interpreting evidence for a credit channel of monetary policy, it is important to make the distinction between credit actions and open market operations. I completely agree. But I am going to argue that this caveat applies to all empirical work that studies how monetary policy affects the economy—not just work on the credit channel. Further, the evidence shows that credit conditions continue to influence the way open market operations ultimately affect the economy, though the precise way they matter surely has evolved over time.

Before digging into details, I would like to clarify what is meant by a credit channel to monetary policy. I have some semantic differences with the authors, and it is important to straighten them out. I interpret a credit channel as a conduit through which monetary policy affects the spread between the cost of external and internal funds for certain classes of borrowers. That is, a credit channel alters how smoothly

funds flow between lenders and borrowers.

The authors present one version that fits my definition. But I think there are at least two. I illustrate this point in Table 1. The version the authors present emphasizes what I call the reserve requirement mechanism. I call the other the balance sheet mechanism.

Table 1
Two Versions of the Credit Channel

Bank

A	L
Loans	Deposits (D)
Securities Reserves (R)	CDs

Money Market Fund

A	L
Commercial Paper (CP)	MMDS

1. Reserve Requirement Mechanism: R down $\Rightarrow$ i up and D down $\Rightarrow$ (i^p - i) up due to constraints on CD issues $\Rightarrow$ Mix declines as some bank borrowers substitute to commercial paper

2. Balance Sheet Mechanism: R down $\Rightarrow$ i up $\Rightarrow$ spending down $\Rightarrow$ i up and spending down weaken borrowers' balance sheets $\Rightarrow$ (i^p - i) up since the drain in liquidity and collateral raises the cost of external finance for borrowers with imperfect access to credit markets (for example, small and medium-sized companies and households.) $\Rightarrow$ Mix declines, reflecting a "flight to quality credit."

Note: i = riskless rate; i^p = prime lending rate; mix = bank loans / (bank loans + commercial paper)

As the authors correctly argue, the reserve requirement mechanism rests on the premise that banks cannot completely decouple lending from deposits. That is, for one reason or another, banks do not have perfect access to the certificate-of-deposit (CD) market. A decline in reserves, therefore, may directly constrain bank lending by forcing a

reduction in deposits subject to legal reserve requirements. This constriction in the pool of banks' funds forces up the spread between the bank lending and the riskless rates. Another manifestation is that the bank loan/commercial paper mix may decline, as some bank borrowers substitute to the commercial paper market.

The authors argue that this mechanism is only relevant to the extent that it is accompanied by regulatory constraints on banks' ability to issue managed liabilities—what they term credit actions. I largely agree. In the contemporary financial climate, it's hard to see how banks have restricted access to managed liabilities. One important qualification I would add, though, is that in times of financial distress, this access may dry up.[1]

The way I prefer to motivate the credit channel is with the balance sheet mechanism, exactly for the kinds of issues the authors raise. The balance sheet mechanism plays off the idea that for borrowers with imperfect access to capital markets, collateral—broadly defined—is an important determinant of the terms of credit.

Suppose that monetary policy raises short-term interest rates and that this produces an initial decline in demand. Both the rise in interest rates and the decline in demand weaken borrowers' balance sheets. Both asset values and cash flow after interest payments decline. For small and medium-size companies and households—that is, for those borrowers for whom collateral is most likely a key factor in access to credit—the terms of external finance tighten. One manifestation is a rise in the spread between the bank loan rate and the risk-free rate.[2] The short-term financing mix also shifts in favor of commercial paper. But here the decline in the mix reflects a change in the quality mix of borrowers—that is, it reflects a relative flight of credit from smaller borrowers to large high-grade borrowers who normally operate in the commercial paper market.

The balance sheet mechanism captures phenomena very similar to the reserve requirement mechanism. It similarly predicts an enhanced impact of monetary policy on borrowers with imperfect access to credit markets. Further, in either scenario, the spread between the bank loan and risk-free rates and the quality composition of credit are

important financial indicators. A key distinction, though, is that the balance sheet mechanism does not in any direct way rely on regulatory constraints. It should therefore be operative even when credit actions are absent. With these distinctions in mind let me turn to the empirical work.

The authors ask whether, after controlling for credit actions, monetary policy has any predictive power for the two measures of credit conditions: the bank loan/commercial paper mix and the spread between the prime rate and the commercial paper rate. Or do credit actions instead absorb all the forecasting power? The authors make a sensible case that credit actions have explanatory power for the financial indicators. But the evidence indicates that the explanatory power of monetary policy remains significant. In probabilistic terms, it is not appreciably altered by the addition of the credit action dummy.

To make this point plainly, I compute the dynamic response of each financial indicator to a shift in monetary policy two different ways: first, using a regression that does not control for credit actions; and, second, using a regression that does. Chart 1 presents results from using the Romer dates to measure the stance of monetary policy, and Chart 2 presents results from using the funds rate. In all four cases (two financial indicators times two monetary indicators), a shift in monetary policy has a significant impact on the financial indicator, even after controlling for credit actions. The addition of the credit dummy reduces the point estimates somewhat. Given the width of the standard error bands in the respective cases, though, it seems unlikely that one could formally reject the hypothesis that controlling for credit actions made no difference to the impact of monetary policy.

So monetary policy still matters. Not just credit actions. Thus, this evidence alone does not prove the absence of a credit channel of monetary policy.

To put another perspective on the issue, I redid the experiment using real GNP growth as the dependent variable rather than a financial indicator. That is, I asked how the inclusion of the credit action dummy affected the response of real GNP to tight money. And I also asked how a credit action influenced the dynamics of GNP. Chart 3

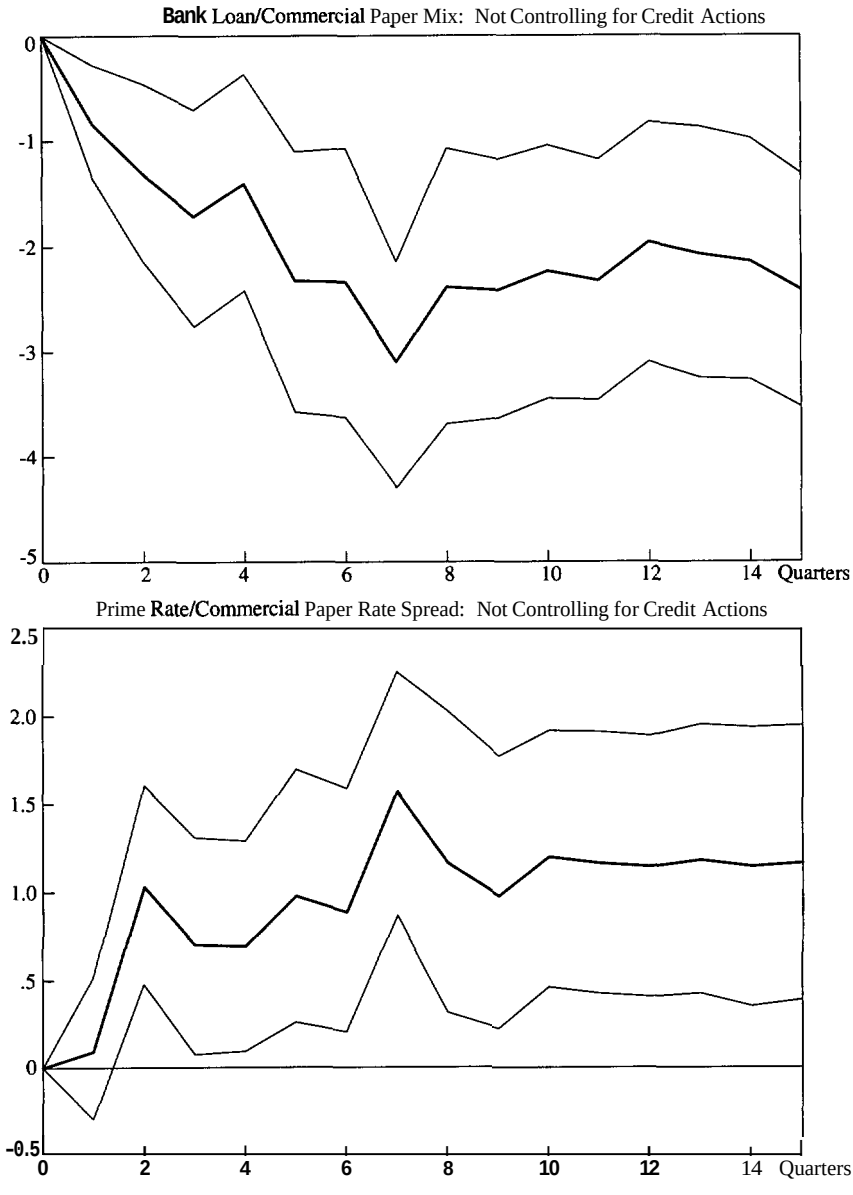
presents results for the case where the Romer dates reflect the stance of monetary policy. Interestingly, the inclusion of the credit action variable reduces the importance of monetary policy for output by about the same magnitude as it does for the financial indicators.[3] Further, the response of GNP to monetary policy is no longer statistically significant (though it is close). A credit action, however, does have a significant impact on GNP, after controlling for monetary policy. The impact, further, appears to have a greater impact on GNP than an episode of tight money. Thus, while a credit action appears to have a relatively large impact on the financial indicators, it similarly appears to have a relatively large impact on GNP growth.[4]

I am somewhat torn as to how to interpret these results. On the one hand, I am not prepared to argue that credit actions have a stronger impact on GNP growth than does monetary policy. The results could instead reflect the difficulty of distinguishing credit actions from episodes of tight money. By no accident, credit actions overlap closely periods of tight money. Around each credit action date, the funds rate rises sharply. Further, the three credit actions in the period from 1969 to 1980 line up very closely to the Romer tight money dates. It is conceivable that, in some instances, credit actions are more a symptom of tight money episodes than a true causal force. My hunch is that credit actions do matter, but that the methodology may overstate their relative importance. This could be true not only for the GNP results, of course, but also for the financial indicator results.

On the other hand, the results make plain a possibly important critique of the vast recent empirical literature on the effects of monetary policy. By ignoring credit actions, these studies likely overstate the importance of monetary policy on real activity. I think the 1980 credit controls provide the best example. The empirical studies I refer to assign the full weight of the 1980 recession to monetary policy. But it is clear that the credit controls were important. Another example might be the Basle Accord. Though it is not in the authors' list of credit actions, it fits the definition. It was a regulatory action, beginning sometime in 1988, that tightened constraints on bank lending. A researcher who completely ignores the Basle Accord might overstate the effect of the tightening of monetary policy in 1988 on the subsequent slowdown of GNP growth.

Chart 1

Impact of the Tight Money Indicator on Credit Market Variables: The Influence of the Credit Action Variable



Notes. Each box plots the cumulative percentage change in a credit market variable (the bank loan/commercial paper mix or the prime rate/commercial paper rate spread) after a policy shock in quarter 0. The bands represent 95 percent confidence intervals. The responses of the credit market variables are calculated from two types of regressions. (i) Regressions not controlling for credit actions: change in the variable on 8 own lags and 3 lags of the Romer indicar for tight money (ii) Regressions that control for credit actions: 8 lags of the credit action dummy are added to (i) The sample is 1962:Q1 - 1992:Q1.

Chart 1 (cont.)

Impact of the Tight Money Indicator on Credit Market Variables: The Influence of the Credit Action Variable

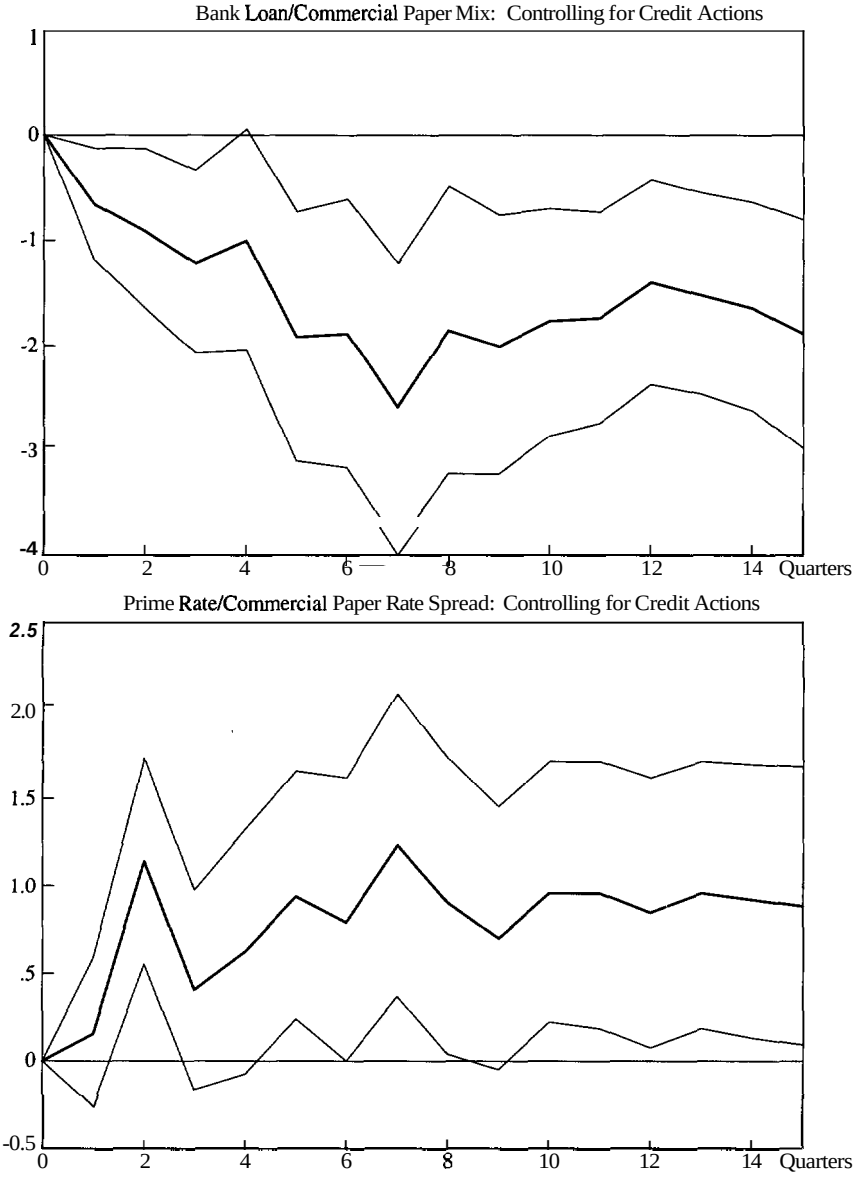
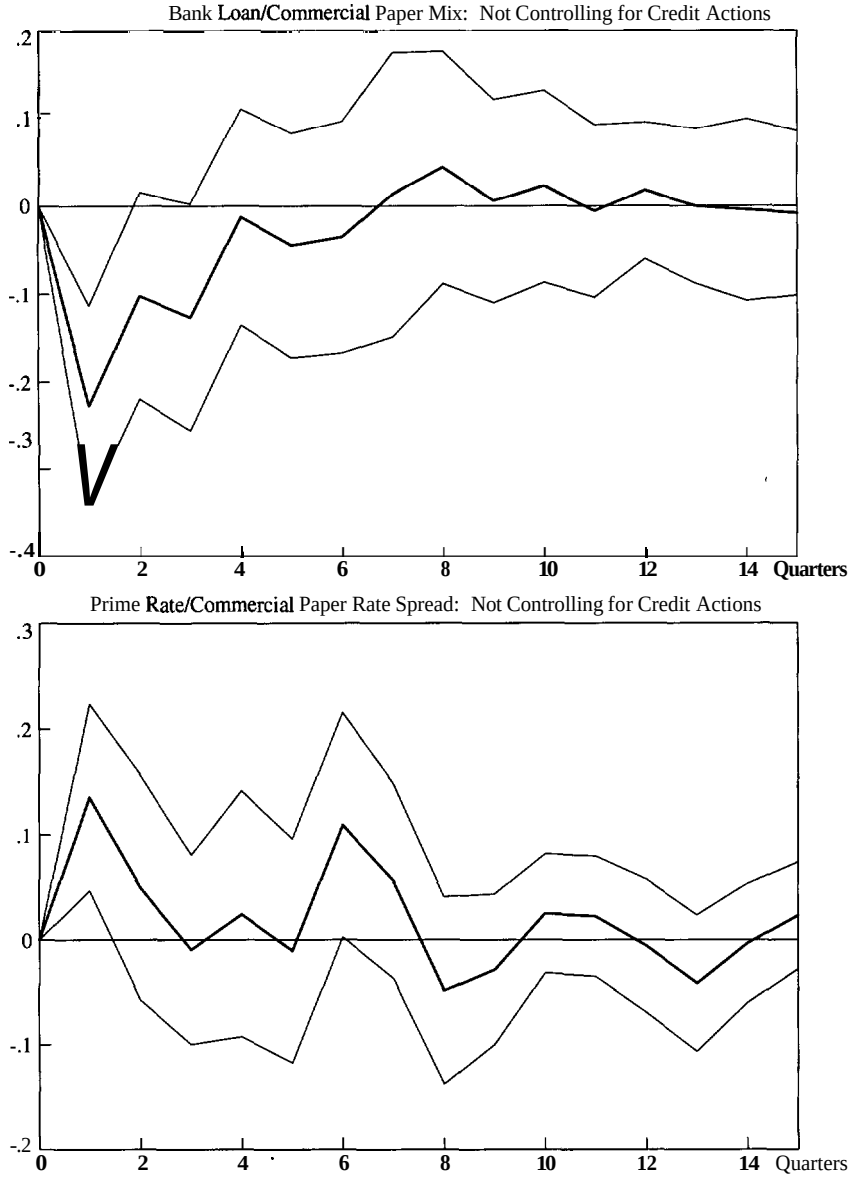


Chart 2

Impact of a Rise in the Federal Funds Rate on Credit Market Variables: The Influence of the Credit Action Variable



Notes: Each box plots the cumulative percentage change in a credit market variable (the bank loan/commercial paper mix or the prime rate/commercial paper rate spread) after a nse in the Federal Funds rate in quarter 0. The bands represent 95 percent confidence intervals. The responses of the credit market variables are calculated from two types of regressions. (i) Regressions not controlling for credit actions: change in the variable on 8 own lags and 8 lags of the Federal funds rate (ii) Regressions that control for credit achons. 8 lags of the credit action dummy are added to (i). The sample is 1962.Q1 - 1992:Q1.

Chart 2 (cont.)

Impact of a Rise in the Federal Funds Rate on Credit Market Variables: The Influence of the Credit Action Variable

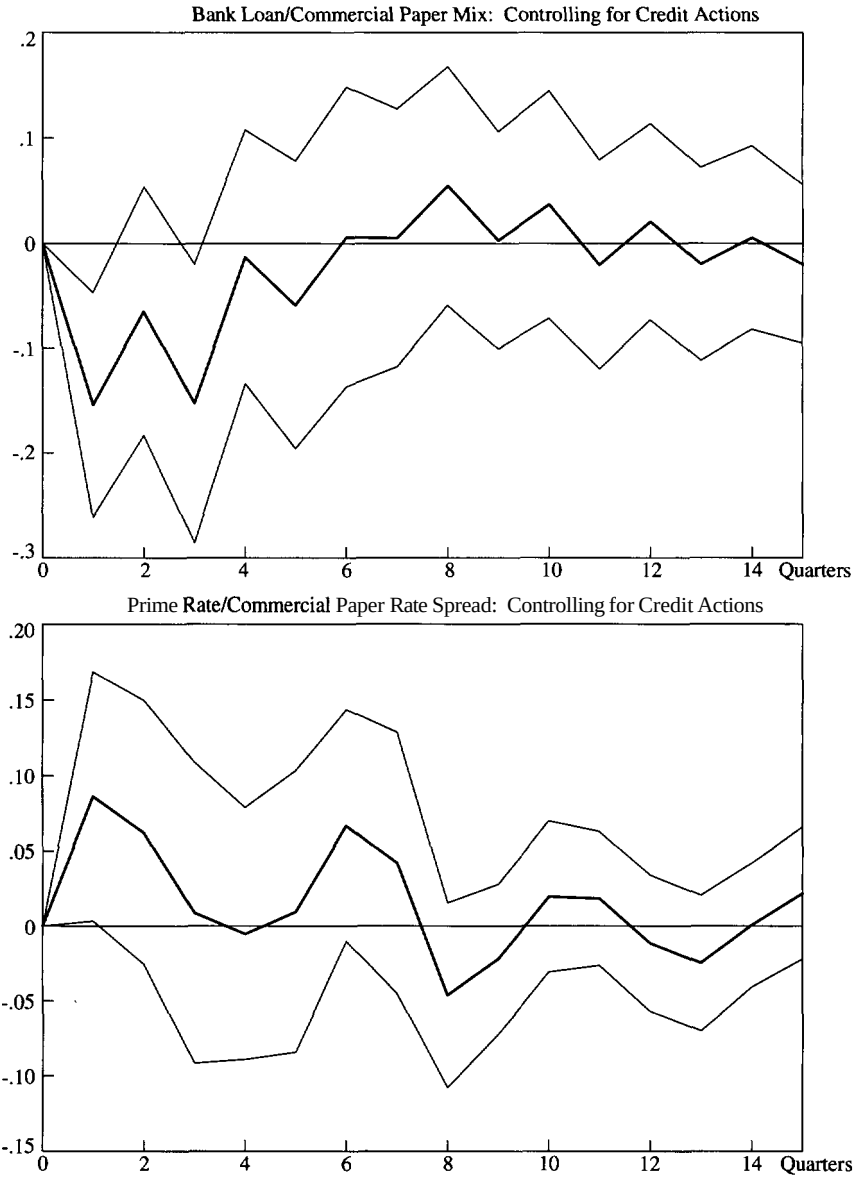
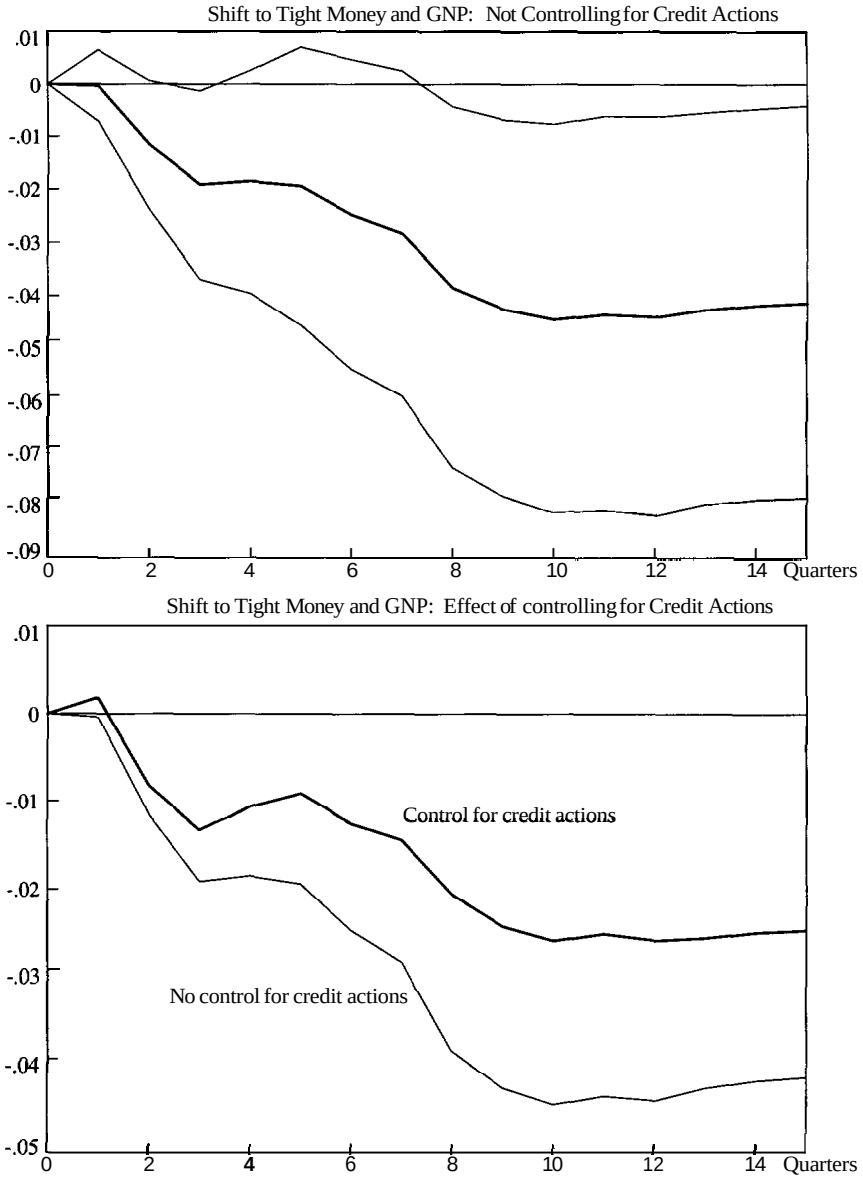
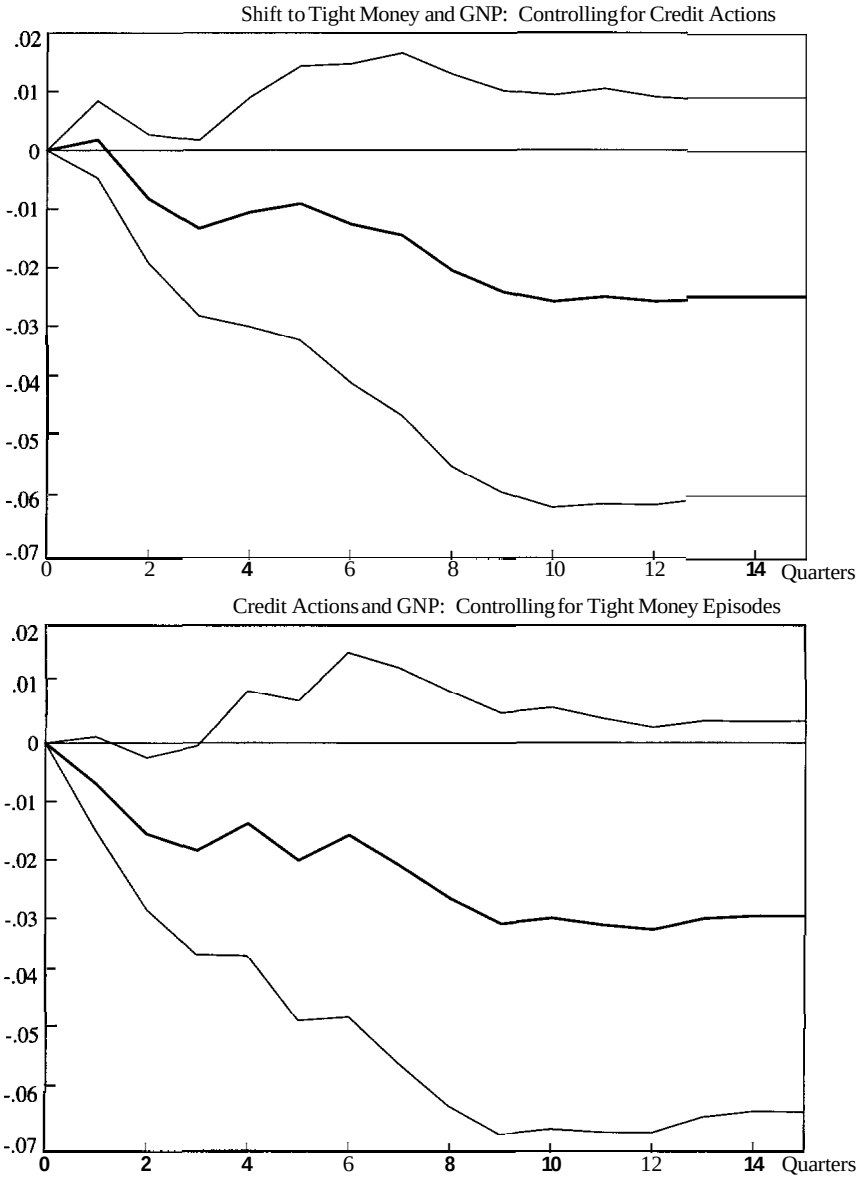


Chart 3
The Response of GNP to the Tight Money Indicator and Credit Actions



Notes: Each box plots the cumulative percentage change in GNP after a policy shock in quarter 0. The bands represent 95 percent confidence intervals. The responses of GNP are calculated from two types or regressions. (i) Regressions not controlling for credit actions: GNP growth on 8 lags of GNP growth and 8 lags of the Romer indicator for tight money. (ii) Regresstons that control for credit actions: 3 lags of the credit action dummy are added to (i). The sample is 1962:Q1 - 1992.Q1.

Chart 3 (cont.)
The Response of GNP to the Tight Money Indicator and Credit Actions



Let's now turn to the issue of how the credit channel of monetary policy may operate: that is, the issue of distinguishing the reserve requirement mechanism from the balance sheet mechanism. Here I want to present some evidence that suggests the balance sheet mechanism may be at work. The balance sheet mechanism predicts that, after tight money, credit flows to small firms should contract relative to credit flows to large firms, given that smaller firms more likely have imperfect access to credit markets. To explore this possibility, I construct another financial indicator: the ratio of short-term credit to small firms to short-term credit to large firms. For small firms, short-term credit consists mainly of bank loans. In particular, these firms do not have access to the commercial paper market. For large firms, short-term credit is divided about equally between commercial paper and bank loans. The data are from the manufacturing sector only. In the top left panel of Chart 4, I plot the average cumulative response of the logarithm of the ratio of small firm to large firm credit following each Romer episode of tight money. The pictures indicate clearly that after tight money, credit flows to small firms contract relative to credit flows to large firms. For comparison, I plot the corresponding response of the bank loan/commercial paper mix in the bottom left panel of Chart 4. Clearly, the small firm/large firm mix and the bank loan commercial paper mix behave quite similarly. This makes sense from the standpoint of the balance sheet mechanism. Credit flows to firms which don't use the commercial paper market—small firms—are contracting relative to credit flows to firms that do use the paper market—large firms. I pursue this issue further by examining the last two episodes of monetary tightening. The authors argue that in these last two episodes the Federal Reserve did not conduct complementary credit actions. Under their maintained hypothesis, the reserve requirement mechanism should have been impotent (since regulatory constraints on CD issues were not present). Based on the authors' discussion, I date the first of these episodes at 1980:Q4. This was the quarter the funds rate began to rise after the trough that followed the first Volcker tightening. The second is 1988:Q4, the last Romer episode. The top right panel of Figure 4 plots the cumulative response of the small firm/large firm mix to each of these episodes. The bottom right panel plots the response of the bank loan/commercial paper mix.

Perhaps the first point to note is that the absence of credit actions in the latter two periods did not appreciably alter the impact of tight money on the bank loan/commercial paper mix. If anything, the response was stronger than in the past.[5]

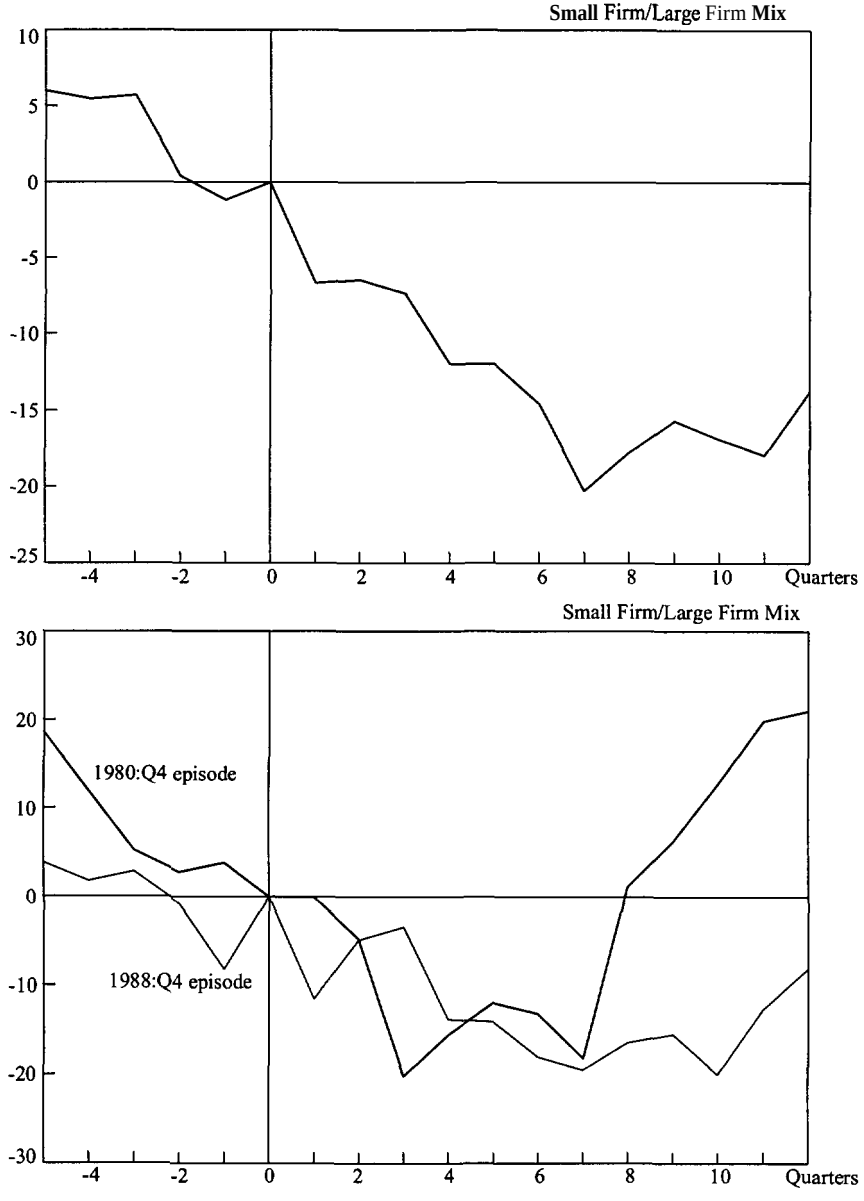
One possibility is that credit actions did occur around these episodes, contrary to the authors' premise. As I mentioned earlier, the Basle Accord fits the broad definition of a credit action. This might explain 1988:Q4. It does not account for 1980:Q4, though.

Another possibility is that the credit channel is driven mainly by the balance sheet mechanism. In this event, as I mentioned earlier, tight money should induce a decline in the bank loan/commercial paper mix, regardless of whether credit actions are accompanying. Again, a manifestation of the balance sheet mechanism is a contraction of credit flows to small firms relative to large firms. Chart 4 shows that in fact this phenomenon occurred in both the 1980:Q4 and the 1988:Q4 episodes.[6]

Let me add several points to the argument: First, the relative decline in loans to small firms is not offset by large firms supplying increased trade credit to small firms. The data indicate that trade credit to small manufacturing firms actually drops.[7] Second, it is of course possible that nonfinancial factors might account for the differences in small and large firm behavior after tight money. But a host of recent research has shown that balance sheet liquidity constrains the spending of smaller firms, particularly around episodes of tight money. And the same is not true for large high-grade companies. All this suggests to me that financial factors are at work.

Third, at a time when other financial aggregates aren't doing so well, the quality mix of credit has significant marginal predictive power for GNP. This is true for both the small firm/large firm mix and the bank loan/commercial paper mix. Chart 4 shows, further, that both mixes contracted prior to the 1990 recession. I should also mention work by Donald Morgan of the Federal Reserve Bank of Kansas City—partly to please the home crowd. Nonetheless, Morgan has constructed a quality mix of bank credit that also appears to have useful forecasting power.

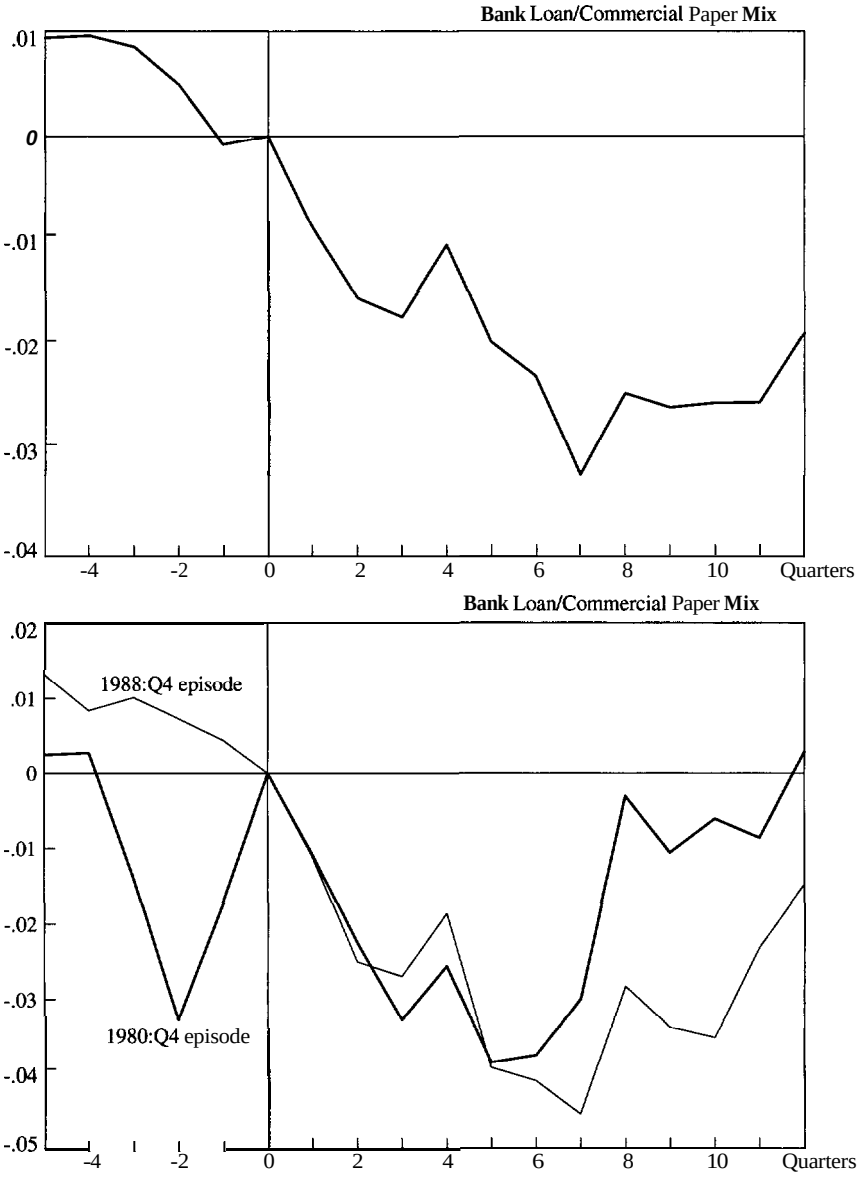
Chart 4
Comparison of the Small/Large Firm Credit Mix and the Bank Loan/Commercial Paper Mix after Tight Money



Notes: The two tap panels show the mean of the cumulative changes of a credit market variable after the Romer episodes of tight money. The two bottom panels show the cumulative change after 1980:Q4 and 1988:Q4.

Chart 4 (cont.)

Comparison of the Small/Large Firm Credit Mix and the Bank Loan/Commercial Paper Mix after Tight Money



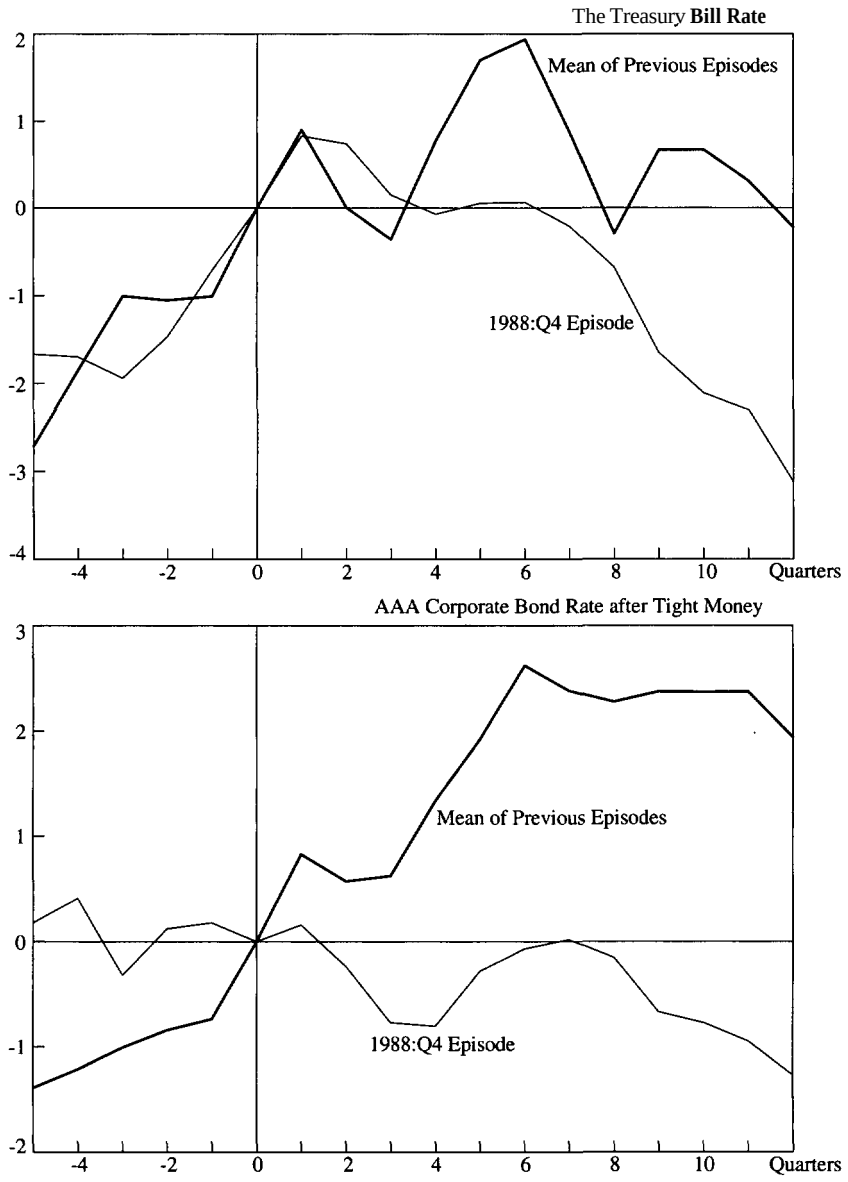
In the end, my position may not be that different from the authors. The authors seem to agree that the behavior of the financial indicators reflects not only credit actions, but also relative differences in the influence of monetary policy on credit flows to small versus large firms. In my view, the major source of this differential response across size classes is the balance sheet mechanism, which I interpret as a credit channel.

Finally, I want to address the issue of whether financial innovation has influenced the Fed's ability to regulate interest rates. I certainly wouldn't disagree that the Fed can still wiggle the three-month T-bill rate. The interesting question, I think, is whether the Fed may be losing its leverage over longer-term rates. The potency of the pure interest rate channel, I would think, rests also on the Fed's ability to influence rates of maturity longer than three months. I don't know at what maturity I would draw the line. I think this would be a very interesting research topic. In the meantime, it strikes me as a plausible hypothesis that financial innovation—in particular the increased endogeneity of money and the globalization of financial markets—has weakened the Fed's leverage over longer term rates.

To illustrate this issue, in Chart 5, I compare how the response of the AAA corporate bond rate to the 1988:Q4 rate Romer episode compared with the response in the previous episodes. For convenience, I also show the corresponding behavior of the three-month T-bill rate in the bottom panel. While it is true that the three-month rate jumps after 1988:Q4, the **AAA** rate doesn't budge much at all.[8] These pictures alone surely don't prove that the Fed has lost leverage over the term structure. **A** host of other factors could be at work. Nonetheless, I think they underscore that more evidence is necessary to evaluate whether or not the pure interest rate channel has changed.

A similar observation could be made about the sharp decline in short-term interest rates. Long-term rates were very slow to drop. And the recovery has been very weak by historical standards. Couldn't one use this evidence to argue that the traditional interest rate channel has weakened? Of course, other factors were at work over this period. But prominent among these factors were two that directly involved credit conditions. One was the bank capital crunch and the other was the

Chart 5



Notes Each panel shows the mean of the cumulative changes in either the Treasury bill rate (top panel) or the AAA corporate bond rate (bottom panel) after the episodes of tight money until 1979:Q4; and the cumulanve change after the 1988:Q4 episode

large overhang of corporate and personal debt— the famous 50 mile-an-hour headwind.

So what do we learn from all this? Even in the 1990s we cannot think about the impact of monetary policy independently of credit conditions. The nature of financial institutions will change over time. And so too will the nature of credit market problems and regulatory credit actions. But these factors will remain relevant to the efficacy of monetary policy and the general performance of the economy. Albert Wojnilower made this point many years ago. And he is as right as ever today.

Let me conclude by emphasizing how much I enjoyed reading and thinking about this paper. The kind of institutionally based research that the authors do is very important to the profession. And I look forward to seeing more of it.

Endnotes

[1]Another possibly important factor is that many banks, particularly smaller banks, may not have easy access to the CD market.

[2]The non-price terms could also move adversely.

[3]In a new version, the authors show that monetary policy remains significant when monthly industrial production is used instead of quarterly GNP and when the sample is extended back to 1948. Since the results for the financial variables pertain to a shorter sample period and to data available at the quarterly frequency, it still seems reasonable to use the shorter sample and GNP for the purpose of drawing a comparison.

[4]The results are robust to using the longer sample 1954:Q1-1992:Q1. The credit action still has a significant effect on output, but the difference with the effect of monetary policy narrows. Monetary policy is still not statistically significant. In the longer sample, there are five tight money dates and four credit actions.

[5]The behavior of the prime rate/commercial paper rate spread after each of the last two episodes of monetary tightening also resembles its behavior after previous episodes.

[6]A shred of evidence that the reserve requirement mechanism may have also been at work in the 1980:Q4 episode is that the 6-month CDIT-bill spread rose sharply, perhaps reflecting imperfect liquidity in the CD market at the time. Though not as dramatically, the spread also rose after the 1988:Q4 episode.

[7]Receivables drop at about the same pace, so that net trade credit to small firms does not rise either.

[8]The relevant consideration, of course, is whether the long-term real rate changed. My conjecture is that forecasts of long-term inflation did not change much over this period, suggesting that the movement in the nominal rate is a reasonable approximation of the movement in the real rate. It is also instructive that tight money actually raised the long-term nominal rate significantly in previous episodes, but not in the 1988:Q4 episode.

The Role of Judgment and Discretion in the Conduct of Monetary Policy: Consequences of Changing Financial Markets

Benjamin M. Friedman

> "There is no human affair which stands so constantly and so generally in close connection with chance as war. . . Pity the poor warnor who is contented to crawl about in the beggardom of rules."
>
> **Karl von Clausewitz.*On War***

It may be true that war is the human activity most vitally subject to chance and happenstance, but monetary policy surely runs a close second. Making decisions and taking action in a setting driven by the unknown and the unknowable are a large part of what the making of monetary policy is all about. The central thesis of this paper is that Clausewitz's warning against the straight-jacket of predetermined rules in waging war is no less apt in the conduct of monetary policy.

The more specific focus of this paper's argument is the largely unanticipated, indeed unanticipated, changes that have occurred in recent years—and that continue to occur and, in all likelihood, will keep on occurring—in the U.S. financial markets. Enumeration and description of particular changes in market structure or practice is not the point, however. Rather, the paper's object is to provide an overview, or more accurately a point of view or perhaps even a philosophy, in regard to the implications of such changes for the design of monetary policy.

The central tenet of that point of view, or philosophy of the matter, is that such changes are, and for the foreseeable future will be, ever-present and ongoing, to a sufficient extent as to vitiate any attempt to achieve a successful monetary policy by following a rule based on a predetermined intermediate target. This view stands in specific contrast to the idea that a distinct set of market changes has occurred but has also now concluded, so that the financial and economic relationships most relevant to monetary policy will soon "settle down" to reflect some newly prevailing equilibrium. This paper's argument is that such an equilibrium may exist in some suitably fundamental sense, but not at the level of workaday detail and operational explicitness required to underpin a formal procedure, like that surrounding the use of an intermediate target, capable of appropriately governing monetary policy.

What too often seems forgotten in the endless debate over how to conduct monetary policy is that the question crucially at issue is not whether a sufficiently clever econometrician, surveying the wreckage after the fact, can devise some new specification, or invent some new variable, capable of restoring order to a collapsed relationship. What matters is whether it is possible to identify ***before the event*** a set of regularities of sufficient centrality and robustness to provide the qualitative and quantitative basis for sound policymaking. Even a careful reader of the voluminous literature of this subject might well infer that a positive answer to the former question somehow implied a favorable resolution of the latter. But the two issues are distinct, and it is the latter that must carry the weight of actual policymaking.

The first section provides the necessary context for what follows by briefly reviewing the motivation and logic underlying the use of information variables and intermediate targets in formulating and carrying out monetary policy. A novel feature of this discussion, compared to much of the usual literature of the subject, is the importance attached to the frequency in time over which a central bank revisits its choice of target, both qualitatively and quantitatively. When the time between such reconsiderations is lengthy, the use of any intermediate target becomes indistinguishable from a fixed (that is, no-feedback) rule. But when the time interval is short, what is formally the same procedure amounts in substance to a quite different

approach based on an information variable. The first section also highlights the importance, under either an intermediate target procedure or an information variable procedure, of empirical links between the specific variable in question and nonfinancial economic activity.

The second and third sections turn to empirical evidence, documenting the collapse in recent years of some of the familiar relationships that, if they were sufficiently robust, could perhaps play a central role in guiding U.S. monetary policy. As a way of making more explicit the connection between these changes in empirical economic relationships and the changes that have taken place in the U.S. financial markets, the third section focuses on three "case study" examples: the narrow money stock (M1), which was at the center of the Federal Reserve System's most intensive effort to date to pursue monetary growth targets, during 1979-82; a broad credit aggregate, which my own work of a decade ago showed was comparable to most measures of money in its relationship to income; and the broad money stock (M2), which in recent years seems to have attracted more support as a target for U.S. monetary policy than any other such variable. With respect to M2 in particular, this paper argues that today the Federal Reserve not only does not know the magnitude but ***does not even know the sign*** of the response of M2 to open market operations.

Finally, the fourth section takes up the hard question of how to conduct monetary policy in an environment "so constantly and so generally in close connection" with chance and change. Even the traditional injunction to do less when matters are uncertain, and in the limit do nothing at all when they are uncertain enough, has no meaning when basic relationships are so subject to change that it is impossible to say what "doing nothing" means in operational terms. Yet the Federal Reserve must somehow execute to the best of its ability its responsibilities, both statutory and moral, to further the common weal. The approach suggested here involves the use of information variables that are inclusive rather than exclusive—encompassing measures not only beyond the conventional monetary aggregates but, indeed, beyond the confines of the banking system or even the financial markets more generally—together with a frequency of decisionmaking that for practical purposes renders even a single formal intermediate target substantially equivalent to an information variable.

The fifth section concludes by pointing to some valid and potentially important concerns, stemming from ongoing change in the U.S. financial markets, that remain beyond the scope of the subject's treatment here.

Targets, instruments, and information variables

In principle, the Federal Open Market Committee could conclude each of its meetings by issuing a directive simply instructing the Committee's operating arm, the securities trading desk at the Federal Reserve Bank of New York, to do whatever is appropriate to make the U.S. economy grow at such-and-such percent per year, or to limit price inflation to no more than such-and-such percent. The FOMC does not act in this way, presumably because the decisions thus taken would not be sufficiently operational. In other words, they would leave to the trading desk staff the entire matter of just what to do in order to achieve the specified growth rate, or the designated inflation.

One can, of course, imagine such a division of responsibility between staff and principals. But the FOMC has never (to my knowledge) even come close to adopting that division, perhaps because the Federal Reserve System itself, as an institution, already stands in roughly this kind of relationship to the Congress. Moreover, economic growth and inflation are subject to many influences besides monetary policy, and many of those are surrounded with great uncertainty. Actual results may therefore differ from the corresponding intended outcomes despite even the best actions ex ante by monetary policy. 'Without at least some judgment about the plausible means to the designated ends, made either before the fact or after, how could the principals on the Committee ever determine whether their appointed staff had acted appropriately and competently?

At the other extreme, the FOMC can also make decisions couched entirely in terms of quantities or prices that the trading desk's actions alone are sufficient to establish, either because desk actions are all that matters (as in the case of nonborrowed reserves) or in the sense that desk actions can readily be made dominant over other market forces, at least for a while (as in the case of the federal funds rate). The Committee has pursued approximately this kind of narrow focus

on the instruments of monetary policy at various times in the past, and such an interpretation, with the funds rate as the designated instrument variable, seems not far off the mark as a description of the most recent period. Once the Committee itself makes what amounts to the choice of instrument—meaning here not just the qualitative selection of which instrument to set but also the quantitative magnitude to be implemented—responsibility for whether that choice is the right one clearly rests with the principals.

Both the Federal Reserve System and many of its critics, however, have long sought to frame the FOMC's decisionmaking process in terms that are intermediate between these two extremes. One often stated reason is external: the desire, on the part of both the Congress and interested private citizens, to monitor the Federal Reserve's intentions and competence along just the lines suggested above in regard to the FOMC's relationship to its staff. If the economy performs in a patently undesirable way, is that the fault of monetary policy? Or was monetary policy appropriate ex ante and the poor outcome due to unforeseeable circumstances beyond Federal Reserve control—like a surprise price increase imposed by the OPEC cartel, or a stock market crash that dampened the public's spending, or credit stringency following large loan losses taken by banks and other lenders?

But much of the motivation for a more intermediate monetary policy decisionmaking framework has also been internal, in the simple sense of enhancing the likelihood of achieving more desirable ultimate outcomes. Regardless of whether it is left to staff or carried out by principals, and regardless too of whether the matter is drawn explicitly or merely left implicit, the process of establishing the policy instrument that is most likely to lead to any desired economic outcome involves tracing backward a causal trail that leads (in the forward direction) from what the central bank does to what happens to nonfinancial economic activity. Along that causal trail, central bank action and economic effect are separated ***both*** by time ***and*** by behavioral process. A change in the federal funds rate or in the quantity of nonborrowed reserves now makes a difference for economic activity later on, *and* the economic behavior that gives rise to that ultimate difference involves actions along the way that are, at least in principle,

observable. The concept of either an intermediate target for monetary policy or an information variable rests on both the time lag and the observability of steps along the way (and, of course, on the fundamental presence of uncertainty in the first place).

It is important to emphasize the joint and mutually reinforcing role played in this context by both the passage of time and the occurrence of observable intermediate behavioral actions. If the implementation of a new federal funds rate in the morning had its full effect on income and prices by lunchtime, there would be little practical interest (at least for policy purposes) in monitoring what happened along the way. Confronted by undesirable economic outcomes, the FOMC could change policy the same afternoon. Similarly, if there were no way to observe what was happening until the full economic impact of a funds rate change had occurred, the Committee would have little choice but to "wait it out" with whatever rate level seemed appropriate ex ante, even if the wait might be long indeed. In the world that confronts actual monetary policy, however, it does take time for central bank actions to achieve their full effect on economic activity. And, at least under most conceptions of how monetary policy works, the underlying economic behavior does involve steps along the way—ranging from financial actions like taking loans or making deposits, to nonfinancial actions like placing orders or obtaining building permits—that central banks can and do observe.

The specific aspect of intermediate behavior that has traditionally received the most attention in this context is the accumulation of money balances. Given that the central bank's main form of policy action in a fractional reserve banking system is the purchase or sale of securities in exchange for bank reserves, even quite disparate accounts of the behavioral process connecting monetary policy to economic activity provide at least a potential role for fluctuations in some measure of "money" to anticipate fluctuations in income, output, and spending (either real or nominal). In the most conventional rendering, open market purchases provide reserves that enable banks to increase their lending and thereby create more deposits, thus reducing interest rates (as long as the demand for deposits is negatively interest elastic) and so stimulating spending. A closely related alternative version places more emphasis on the importance of bank

lending in financing either business or household expenditures, so that movements in money anticipate spending primarily because they reflect what is happening on the other side of the banking system's balance sheet. A quite different view focuses initially on the presumed link between money and prices, associating any effects on real activity with the output decisions of producers unsure of how to interpret the limited information they receive as prices change.

In each of these representations, the behavior that ultimately generates changes in real economic activity and/or prices also involves movements of "money," and if the timing is right, the FOMC can exploit those movements as a means of checking, and if warranted changing, its chosen level for the federal funds rate or the quantity of nonborrowed reserves. The most straightforward way to do so is simply to compare the observed level (or growth rate) of "the money stock" to prior expectations, formulated in conjunction with the original instrument choice. More money (or a faster growth rate) than expected might mean that monetary policy is having a more stimulative effect on economic activity than anticipated. Or it could mean that, while monetary policy is having the anticipated effect, some independent influence—fiscal expansion, for example, or a stock market rally—is providing more stimulus than anticipated. Either way, the indicated response would be to tighten monetary policy by raising the funds rate or reducing (the growth of) nonborrowed reserves. Such a procedure amounts to using "money" as an ***information variable,*** periodically exploiting its relationship to economic activity to make mid-course corrections in the chosen policy instrument as needed, rather than simply wait until the ultimate effect on income and prices has itself become fully evident.[1]

Under most conceptions of how central bank actions affect the economy, of course, movements in money are not always a sign of movements in income and prices to come. More money (or a faster growth rate) than expected might instead mean that bank customers are simply choosing to hold larger deposits in place of alternative forms of wealth, for reasons unrelated to their spending or production decisions. Or it could mean that banks have decided that a smaller cushion of excess reserves is appropriate to newly prevailing market conditions. Whenever the FOMC uses "money" (or any other observ-

able quantity or price, for that matter) as an information variable to help guide monetary policy, it must inevitably make judgments about just such matters in order to decide whether, and if so by how much, to react when the chosen information variable behaves unexpectedly. When the Committee's judgments are right more often than not, using an information variable in this way can help it to achieve more desirable outcomes, although it does little to further the interest of those who seek to monitor monetary policy externally.

By contrast, the Committee could eschew making such judgments on a case-by-case basis and instead simply decide that it will ***always*** react to unexpected movements in money as if they convey information about nonfinancial activity that warrant a change in the funds rate or in nonborrowed reserves. The limiting case of this manner of proceeding is not only to treat all unexpected money fluctuations as informative in this sense but also, as a ***quantitative*** matter, to react to any such unexpected movements by changing the policy instrument in such a way as to offset them altogether (or to the maximum extent possible). If the FOMC had initially thought such-and-such percent money growth was consistent with achieving its objectives for income and prices, but incoming data has shown faster growth, the Committee would thus respond by raising the funds rate or withdrawing reserves to the extent now thought necessary to restore money growth to just that originally designated rate. In this case, the Committee would be using money not merely as an information variable but, further, as an ***intermediate target—*** in the sense that it is, for some period of time, conducting monetary policy as if its objective were not to influence nonfinancial economic activity but to achieve a designated rate of money growth (which, of course, is more straightforward for outsiders to monitor).

But for what period of time is that? In the vast literature discussing targets and instruments of monetary policy, analysis of this kind of intermediate target procedure typically does not designate any specific time interval for which the intermediate target is in force. For purposes of formal analysis, doing so is perhaps beside the point. But the substantive force of an intermediate target depends crucially on the length of time during which achieving a particular target actually governs the conduct of policy.

For example, suppose the FOMC determines that achieving its objectives for nonfinancial economic activity is likely to be consistent with money growth of such-and-such percent, and further resolves not to revisit this matter for the next year. Instead, during that time it will conduct open market operations solely with an eye to achieving its chosen rate of money growth. Such a practice would clearly distinguish this use of money as an intermediate target, not just as a formal matter but in substance as well. Throughout the year the Committee would, in effect, be conducting policy under the presumption, quantitative as well as qualitative, that the open market response appropriate to offsetting any unexpected movements of money is also the response appropriate to offsetting any unwanted fluctuations in nonfinancial economic activity.

By contrast, suppose the Committee adopts what is formally the same stance but also resolves to revisit the matter, including making a fresh assessment of whether the initially designated money growth rate is still consistent with the desired nonfinancial outcomes, after just one month. Here money may still be the intermediate target of monetary policy, in the sense that its movements govern open market operations within that month. But as a substantive matter the Committee is addressing, regularly and frequently, the very same questions—to what extent does the latest movement in money say anything about income or prices? and what rate of money growth now seems most consistent with achieving whatever is now the desired path of income and/or prices?—that arise when money is just an information variable.

As a substantive matter, therefore, whether the designation of a specific intermediate target for monetary policy really amounts to what the literature has associated with such a procedure depends importantly on the length of time for which it is in force. In one direction, longer time intervals give the intermediate target procedure substantive content. Indeed, as the interval becomes long enough, pursuing an intermediate target becomes indistinguishable from following a fixed money growth rule without feedback. In the other direction, shorter time intervals render an intermediate target substantively equivalent to an information variable.

Just where today's FOMC practice stands along this spectrum is ambiguous. As a rhetorical matter, under the Humphrey-Hawkins legislation the Committee reports targeted growth rates (actually ranges) to Congress for an entire year at a time, with an opportunity to revise these targets at mid-year. A year is presumably long enough to lend substantive content to an intermediate target procedure in this context. As a practical matter, however, both the observed outcomes and the Chairman's statements to Congress clearly show that the Committee feels no imperative to meet its designated targets if it judges doing so to be inappropriate. In this presumably more important sense, money is clearly serving as (at most) an information variable, not an intermediate target.

Regardless of whether the Committee uses "money"--or any other variable—as an intermediate target or just an information variable, however, two basic requirements remain. The quantity or price in question must be observable. And its movements must provide information about subsequent movements of income, or output, or prices, or whatever aspect of nonfinancial economic activity monetary policy seeks ultimately to affect. When changes in market structures or practice render a variable unobservable (as implied, for example, by the familiar claim that there is some concept of "money" that continues to be closely related to income or prices, but which does not correspond to any measure that could be revealed by the available data), or when such changes sever a variable's empirical relationship to nonfinancial economic activity so that its movements are no longer predictive, that variable's usefulness for purposes of monetary policy is ended. But on both counts, that is an empirical matter.

Evolving markets and changing empirical relationships

Financial markets, both in the United States and elsewhere, have undergone vast changes over time. In the United States during the past two decades, the markets for deposits and deposit-like instruments have been a particularly dramatic focus of change. Banks, thrifts, and other competing institutions, acting in response to relaxed government regulation as well as to new opportunities opened by technological advances in communications and data processing, have widely introduced new forms of wealth holding that either did not exist at all,

or at best were available only by special arrangement for very large accounts, just a short time before. The deposit-holding public, including businesses as well as household accounts both large and small, have responded in turn by massively shifting their patterns of deposit ownership. All this is, by now, highly familiar and well documented.[2]

From the perspective of what matters for monetary policy, the single most fundamental aspect of this sweeping change in deposit institutions has no doubt been the abolition, virtually at a stroke, of the long-standing distinction between saving balances and transactions balances. At least since the 1880s (Jevons, for example), economists have distinguished the desire to hold money as a repository of wealth from the desire to hold money as a means of consummating purchases. And at least since 1933, when the Glass-Steagall Act prohibited payment of interest on demand deposits, this conceptual distinction had corresponded in the United States to a readily visible division between different forms of deposits actually offered by banks. But in the new world of money market mutual funds, money market deposit accounts, and other instruments combining market-related interest rates and checking services, it is now standard practice for depositors to make the same account balance serve both functions.

Nor has the scope of change within the last decade or two been limited to institutions and practices affecting the public's asset holding behavior. Borrowing arrangements, too, have become sharply different. The change in this regard that has probably been of greatest significance to links between monetary policy and nonfinancial economic activity is the securitization of residential mortgages and subsequent establishment of a highly liquid secondary market for the resulting securities. This development has effectively severed the link between mortgage financing and deposit flows, a link that had previously enabled the Federal Reserve (acting in conjunction with other regulatory bodies) to exert particular influence over the pace of homebuilding by setting market interest rates either above or below the maximum interest rates legally payable on deposits. The ceilings that used to limit deposit interest rates are now mostly gone, but in all probability their presence today would make little difference for the cyclical variability of homebuilding because securitization has made available to mortgage borrowers virtually the entire market of saving

flows, not just those that pass through depository intermediaries.

The more general erosion of the position of depository intermediaries, of which mortgage securitization is just the most obvious example, is potentially of paramount importance for the way in which the Federal Reserve System conducts monetary policy. At least under current institutional arrangements, the Federal Reserve's functional role in this context is as the monopoly provider of reserves in a fractional reserve system encompassing banks and other depository intermediaries. But if the intermediary sector itself atrophies in relation to the economy's overall systems for holding wealth, executing transactions and mobilizing saving to finance expenditures, that functional role correspondingly withers in its importance and effectiveness for the determination of nonfinancial economic activity.

Chart 1 shows that the share of total wealth holding in the United States represented by depository intermediaries' liabilities has recently declined sharply (mostly because of the collapse of the savings and loan industry), after well over a decade of relative stability. Even so, these institutions' share in total wealth holding is approximately what it was two decades ago, and well above what it was three decades ago. By contrast, Chart 2 shows that the share of debt financing done by depository intermediaries has been declining for the last two decades, and at a more rapid rate in recent years. These institutions' share in total debt financing is well below any recent benchmark.

No one knows just how small reservable (or potentially reservable) deposits must become in relation to total wealth, or how small the assets of depository institutions must become in relation to total credit, before the central bank's ability to affect these institutions' behavior by providing reserves no longer translates into an ability to affect broader aspects of economic activity. But the limiting point is surely not zero, and it is implausible not to expect the relevant associated relationships to change, perhaps subtly but perhaps more dramatically, well before that point is reached.

And change they have. Table 1 reports the results of standard empirical exercises testing whether the respective growth of any of the usual money or credit aggregates conveys information about

Chart 1
Depository Institutions' Liabilities

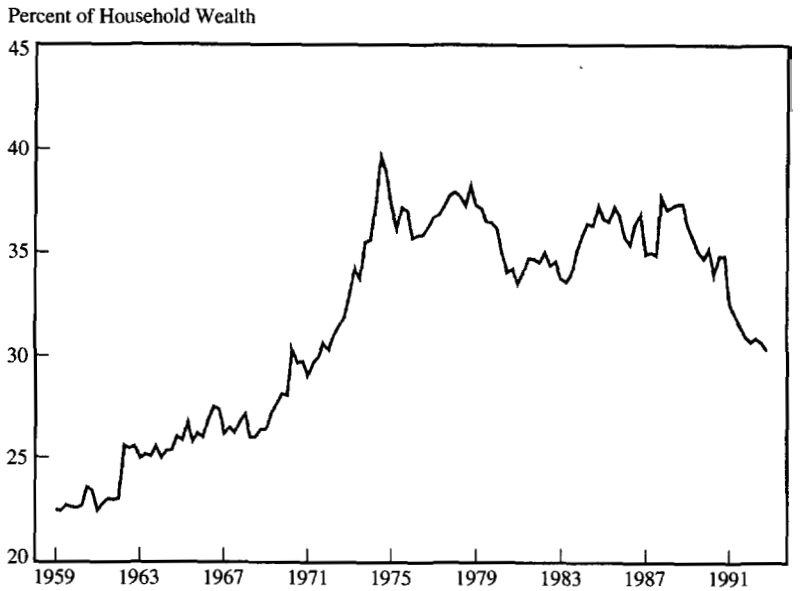


Chart 2
Depository Institutions' Assets

nominal income growth in the United States, apart from what is already known from past income growth itself and from past movements of the federal funds rate. The table presents F-statistics for tests, based on quarterly data across different time periods, of the null hypothesis that all of the coefficients on the lagged growth of the specific aggregate indicated (that is, all of the β_i) are zero in autoregressions of the form

$$(1) \quad \Delta y_t = \alpha + \sum_{i=1}^{4} \beta_i \Delta m_{t-i} + \sum_{i=1}^{4} \gamma_i \Delta r_{t-i} + \sum \delta_i \Delta y_{t-i} + u_t$$

where y and m are, respectively, the logarithms of nominal gross domestic product and the aggregate indicated; r is the federal funds rate; u is a disturbance term; and the β_i, γ_i, and δ_i are all coefficients to be estimated.[3] The five aggregates considered are the narrow (M1), broad (M2), and broader (M3) money stocks, bank loans, and total debt of domestic nonfinancial borrowers.

The first time period considered in Table 1 is 1960:2-1979:3, that is, from the earliest time for which the Federal Reserve provides data corresponding to its current definitions of the monetary aggregates until the point when it introduced new operating procedures for monetary policy. The end of the 1970s also marked the approximate onset, or the acceleration, of many of the changes in private-sector financial markets that have distinguished the more recent period. As the F-statistics presented in the table make clear, during 1960–79 *each* of the five aggregates considered contained information about future nominal income movements that was statistically significant at the .10 level or, in most cases, better. By contrast, for the period since then (1979:4-1992:4) *not* one of the five aggregates does so. Further, this sharp difference is not simply an artifact of the shortness of the second sample. Except for M3, which is just significant at the .10 level, the same result emerges when the time period under consideration also includes the entirety of the 1970s (1970:1-1992:4).

The scope and import for monetary policy of changes like those documented in Table 1 should not be underestimated. For the FOMC

Table 1
F-Statistics in Nominal Income Equations

Aggregate	1960:2-1979:3	1979:4-1992:4	1970:1-1992:4
M1	4.98***	.79	.56
M2	2.07''	1.47	1.14
M3	2.68**	1.07	2.31*
Loans	4.50***	.56	1.46
Credit	4.70***	.71	.22

Note: Estimated regressions include four lags on each of nominal **GDP**, the federal funds rate, and the aggregate shown. Nominal **GDP** and the aggregate are expressed in logarithms. All variables are in first differences.

*** significant at the .01 level
** significant at the .05 level
* significant at the .10 level

to use any of these aggregates even as an information variable, much less as an intermediate target, it must know qualitatively that a relationship between the aggregate and nonfinancial economic activity exists ***and*** it must know at least something quantitatively about what that relationship is. If the F-statistics for 1979-92 (or even 1970-92) showed the existence of such relationships, then the relevant questions for policy purposes would be whether they were the same as (or similar to) the ones that had prevailed earlier on, and if not then whether (or how) the FOMC in the past could have inferred the new relationships once they were established, and whether the Committee can now have sufficient confidence in these relationships going forward to exploit them for policy purposes. But since the F-statistics in fact show no such relationships in the first place, none of these questions arises, and certainly not the issue of exploitation for purposes of monetary policy. What could it mean to use an information variable that provides no information? Or to have an intermediate target that is not demonstrably intermediate? What is left of the familiar argument that monetary policy should be conducted according to fixed rules in order to render the economic environment more predictable for private economic decisionmakers, if the economic

outcomes that matter to private decisionmakers bear no predictable relationship to the variable on which the monetary policy rule is based?

It is always possible, of course, that any or all of these aggregates may bear a usefully informative relationship to the movement of either real income or prices separately, but that relationship is obscured here by combining real income and prices into the single measure of nominal income. Traditionally, the most fundamental theory of "money" in economics has emphasized the link to prices, leaving implications for real activity to more specific treatments embodying impediments to Walrasian equilibrium that may be realistic but rest on weaker foundations nonetheless? By contrast, much of the recent empirical literature of the subject has explicitly focused on whether fluctuations in money anticipate fluctuations in real output.[5] Either kind of relationship would potentially be useful for purposes of monetary policy, in that the FOMC as a standard matter indicates its concern for both price inflation and real outcomes.

As Tables 2 and 3 show, however, such is not the case. Table 2 presents F-statistics, analogous to those in Table 1, for the β_i coefficients in autoregressions of the form

$$(2)\quad \Delta x_t = \alpha + \sum_{i=1}^{4} \beta_i m_{t-i} + \sum_{i=1}^{4} \gamma_i r_{t-i} + \sum_{i=1}^{4} \delta_i x_{t-i} + \sum_{i=1}^{4} \varphi_i p_{t-i} + u_t$$

where x and p are the logarithms of real gross domestic product and the corresponding price deflator, respectively, and all other variables are as in equation (1). Table 3 presents analogous F-statistics for a further set of autoregressions that are identical to equation (2) except that p replaces x as the dependent variable. As is well known, none of these aggregates conveys statistically significant information about subsequent movements of real income once the relationship allows for the effects of interest rates (here represented by the federal funds rate). That was true before 1980, and it has been true since. Before 1980 most of these aggregates did convey such information about subsequent

Table 2
F-Statistics in Real Income Equations

Aggregate	1960:2-1979:3	1979:4-1992:4	1970:1-1992:4
M1	.82	1.18	1.32
M2	.92	.65	.14
M3	1.18	.18	.10
Loans	1.18	.55	.22
Credit	.55	.59	.78

Note: Estimated regressions include four lags on each of real GDP, the GDP price deflator, the federal funds rate, and the aggregate shown. Real GDP, the deflator, and the aggregate are expressed in logarithms. All variables are in first differences.

Table 3
F-Statistics in Price Equations

Aggregate	1960:2-1979:3	1979:4-1992:4	1970:1-1992:4
M1	4.99***	1.06	.38
M2	1.44	1.33	1.34
M3	2.22**	1.13	2.96**
Loans	3.85***	2.73**	3.60***
Credit	4.32***	.55	.65

Note: Estimated regressions include four lags on each of real GDP, the GDP price deflator, the federal funds rate, and the aggregate shown. Real GDP, the deflator, and the aggregate are expressed in logarithms. All variables are in first differences.

*** significant at the .01 level
** significant at the .05 level
* significant at the .10 level

movements of prices. (Interestingly, M2 is the exception.) In more recent samples only M3 and (surprisingly) bank loans have done so.

Changes of the scope and magnitude illustrated in Tables 1-3 are unlikely to be mere accident. Instead, these changes in statistical relations have more likely resulted from changes in economic behavior, presumably including—and perhaps especially including—just the kind of changes in financial market structure and practice that are at issue here.

Three case studies

As a means of illustrating the connection between the changing statistical relationships documented in the second section and specific changes in financial market structure and practice, it is helpful to focus in more detail on three of these aggregates in particular.

Narrow money

Two decades or so ago, the center of attention among economists and others who advocated a greater role for monetary aggregates in the making of U.S. monetary policy was the narrow money stock (M1), consisting essentially of currency and demand deposits. The reasons were theoretical, practical and empirical. The theory of the demand for money for transactions purposes seemed well worked out, especially in comparison to the more open-ended issues involved in demand for money as a means of wealth holding. As a practical matter, it was straightforward that currency and demand deposits were the two main ways of effecting transactions in the United States. By contrast, endless debate and ambiguity surrounded any attempt to draw a line separating what was "money" from what wasn't for portfolio purposes. Finally, although Friedman and Schwartz's (1963) historical work had used a broader aggregate also including savings deposits at commercial banks (but not thrifts), widely publicized studies by Andersen and Jordan (1968), Goldfeld (1973), and others seemed to point to M1 as the measure exhibiting greatest stability in relation to income in the United States during the post World War II period.

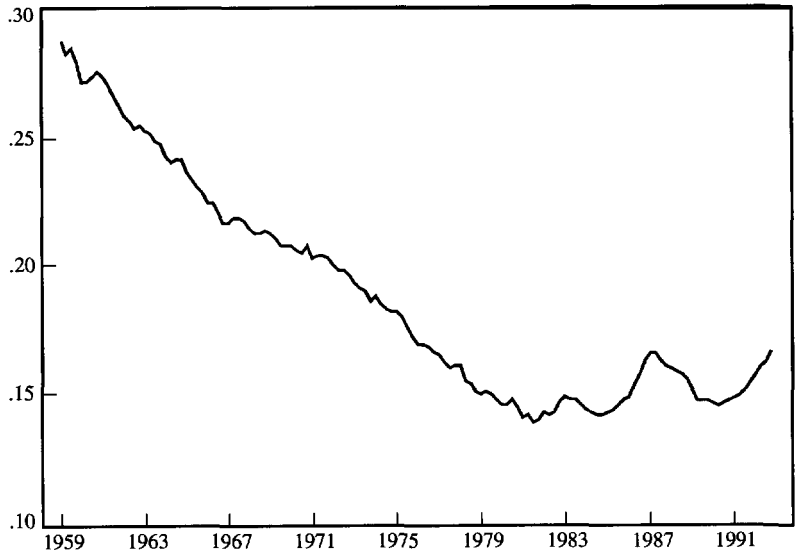
As a result, M1 usually assumed pride of place in the FOMC's on-again off-again attempts, beginning in 1970, to incorporate monetary aggregate targets (or constraints, or provisos) in its regular directives to the trading desk. When the Committee dramatically adopted new operating procedures in October 1979, much of what the change was all about was a heightened emphasis on achieving targeted rates of money growth. Again M1 was the main focus of attention.

At the same time, it was well understood that the then existing structure of reserve requirements, under which banks held reserves against not only demand deposits but also savings deposits, weakened the Federal Reserve's potential control over M1. The Federal Reserve in 1978 had proposed a new system of reserve requirements focused more narrowly on "transactions" balances, and also introducing reserves against such balances on account at nonmember banks and even at nonbank intermediaries.[6] Congress legislated approximately this system as part of the Monetary Control Act of 1980.

Ironically, just as the Federal Reserve was placing M1 at the center of its monetary policymaking framework and the Congress was revamping reserve requirements to make M1 more closely controllable, the relationship between M1 and nonfinancial economic activity had already begun to break down. Following a widely debated episode at the end of the 1973-75 recession, in which business recovered sharply despite M1 growth that normally would have been consistent with a much slower advance of nominal income (to the evident consternation of the Federal Reserve's critics), Goldfeld (1976) added to his earlier paper a postscript wondering where the "missing money" was. By the time the FOMC formally abandoned its new operating procedures, Judd and Scadding (1982) were already in print with a survey article citing more than eighty papers on the apparent demise of the money demand function and the ongoing effort to rescussitate it.

As Chart 3 shows, however, these events of the mid- to late-1970s, troublesome as they were at the time, now appear as mere blips compared to what has happened since. The reason, presumably, is the revolution in ways of effecting transactions that began with the introduction of NOW accounts (in New England only) and money

Chart 3
M1 to GDP Ratio



market mutual funds, assumed full force following the Depository Institutions Deregulation Act of 1980, and has since continued with the introduction of "debit cards."

Few people would have expected the demand for any transactions centered monetary aggregate to remain unaffected by these developments (the Federal Reserve redefined M1, together with the other standard aggregates, in 1980), but many failed to anticipate the full extent of the collapse of M1's relationship to both income and prices. For example, well after the Federal Reserve had publicly abandoned its close adherence to money growth targets, Milton Friedman (1984) argued that the short-run relationship of M1 to nominal income remained as reliable as before but had merely accelerated the time lag involved, and moreover that the longer-run relationship of M1 to prices also remained predictive. As Table 1 shows, however, there is no statistically significant relationship between M1 and nominal income in the post-1979 data. Table 3 shows the same for prices. Even the correlation between M1 growth and inflation, computed in the

way Friedman recommended to bring out the longer-run relationship (using two-year moving averages to smooth out transitory fluctuations, and a two-year lag to allow for sluggish price responses), dropped from .87 during 1959-78 to .10 during 1979-92.

Beginning in 1983, the FOMC not only widened the M1 target range it reported to Congress but also stated explicitly that it was placing less emphasis on M1 than on broader aggregates. In 1986 the Committee widened the M1 target range to five percentage points. In 1987 the Committee gave up reporting any M1 range at all.

Broad credit

In the late 1970s and early 1980s, I wrote a series of papers showing that the total outstanding debt of all nonfinancial U.S. obligors bore a relationship to nominal income comparable to that for any of the standard monetary aggregates (see again the 1960-79 column of Table 1).[7] At the most basic level, the motivation for this effort was the fact that skeletal macroeconomic models like those of Tobin (1969) or Brunner and Meltzer (1972) conveyed no a priori presumption that one side of any sector's balance sheet be more intimately related than the other side to its nonfinancial activity. Liabilities could be just as relevant as assets. At a more substantive level, many of the disparate strands of what has since come to be called the "credit view" of monetary policy at least had in common a focus on economic agents' ability to borrow.

Two aspects of this work were somewhat surprising, however, especially in the context of "credit view" thinking. First, the debt aggregate that bore a statistically significant relationship to income—that is, the aggregate whose fluctuations tended to anticipate future movements of income—included both the debt of private-sector borrowers and government debt (unlike the corresponding private-sector-only measure, a form of which had for some time been an element of the standard index of leading indicators). Second, in contrast to the usual "credit view" implication that there is something special about the debt of banks, or perhaps of banks together with other credit granting intermediaries, ***total*** credit consistently outperformed any bank-based measure in statistical tests of a relationship to

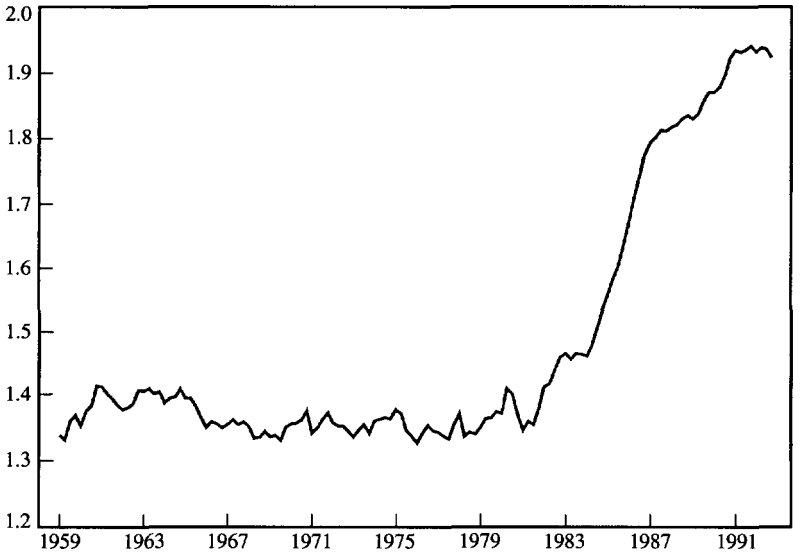
income. While these specifics raised some puzzles to be explained, that did not take away from the fact that at least one measure of the economy's liabilities was as closely related to nonfinancial economic activity as any measure of its assets that could be labeled "money."

When a central bank uses an explicit intermediate target as the focus of monetary policy, there can be only one such target.[8] But when the central bank uses variables like money as information variables, there is no reason to limit the procedure to just one. Given the roughly equivalent performance of total credit with any of the standard Ms in providing information about subsequent fluctuations of income, the conclusion I drew from these results was that if the FOMC were going to use a monetary aggregate to guide monetary policy it should ***also*** use total credit for this purpose. Not only were two sources of information likely to be better than one, but one monetary aggregate together with one credit aggregate also seemed preferable to using two different monetary aggregates in tandem (which some people at the time were suggesting). Using both a monetary aggregate and a credit aggregate would broaden the range of information thus brought to bear on the monetary policy process to encompass nonfinancial agents' liability-issuing behavior as well as their asset-holding behavior. In 1983 the FOMC began to include in its reports to Congress a monitoring range for total credit (which it calls "domestic nonfinancial debt"), and it has done so ever since.

As Table 1 shows, the collapse of the relationship between credit and nonfinancial economic activity has been just as dramatic as that for any measure of money. Chart 4 further illustrates the enormous break with prior debt-issuing patterns that began not long after the 1981-82 recession ended. Roughly one-third of the rise since then in total credit compared to income has reflected the federal government's by-now chronic fiscal imbalance. The dozen years since 1980 comprise the only sustained period since the founding of the Republic in which the U.S. Government's outstanding debt has risen faster than the national income. In 1980 the government's debt amounted to 26 cents for every dollar of U.S. gross domestic product. By 1993 it was 53 cents.

The other two-thirds of the increase in total debt in relation to

Chart 4
Credit to GDP Ratio



income reflects the borrowing of both businesses and households. While the government's rising debt is a matter of fiscal policy (at least in the first instance), the explosion of private-sector borrowing is very much the stuff of changing financial market structures and practices. The most dramatic changes in this regard have been in the business arena, where the wave of leveraged buyouts, debt-financed acquisitions, and stock repurchases that dominated corporate America during much of the 1980s clearly stands as an object of interest in its own right. So too does the development of the "junk" bond market, which made so many of these transactions possible. Between 1984 and 1989 U.S. nonfinancial corporations borrowed (net of repayments) over $1 trillion. Roughly $600 billion of that went into transactions that extinguished the equity either of the borrowing corporations themselves or of other companies they were acquiring.

Market structures and practices affecting household borrowing have changed as well. The most obvious and presumably the most important example here is the securitization of residential mortgages,

already discussed above. The markets have also securitized other household sector liabilities, however, including automobile loans ("CARS') and credit card obligations ("CARDS"). These changes have clearly increased households' ability to borrow. Examples of institutional change that have plausibly increased households' ***willingness*** to borrow include the relaxation of bankruptcy requirements in various states. (By contrast, changes in the tax code since 1980 have mostly reduced the attractiveness of borrowing by individuals.)

In light of these pervasive changes affecting government, business, and households, the collapse of the credit-to-income relationship documented in Table 1 and Chart 4 is hardly astonishing.

Broad money

To the extent that support exists today for the use of any of the conventional monetary aggregates as an intermediate target for monetary policy, the aggregate of choice seems to be the broad money stock (M2).[9] Within the Federal Reserve System, Feinman and Porter (1992) have argued on empirical grounds that M2 demand not only is more stable than the demand for other standard Ms but also that M2 outperforms potential new candidate measures (for example, what others have called "liquid M2," consisting of currency plus all deposits in M2 that can be redeemed at par on demand). Outside the Federal Reserve, Ramey (1993), and Feldstein and Stock (1993) have argued that different forms of error correction procedures render stable the ratio of M2 to money (or, in reciprocal form, the mis-named M2 "velocity"). In recent years the Federal Reserve's reports to Congress under the Humphrey-Hawkins legislation have also attached more importance to M2 than to other aggregates, at times suggesting that relationships based on M2 may now be settling into a new, more usefully exploitable stability after a period of disequilibrium due to changing market structures.

The performance of M2 during the most recent business cycle has been anything but reassuring, however. As Chart 5 shows, M2 growth peaked in late 1986 and by yearend 1987 had slowed to rates that would normally represent a strong prediction of recession. Growth of M2 revived in 1988, faltered again in early 1989, but then revived

even more strongly beginning in mid-1989 onward, so that by the time the recession began at midyear 1990, M2 was giving the opposite signal. Throughout this period M2 gave false signals broadly similar to those given by other familiar business cycle indicators like the federal funds rate, the slope of the yield curve, and the spread between the commercial paper rate and the Treasury bill rate. As is evident in Chart 5, however, the difficulty with M2 has also persisted well into the recovery, with slow M2 growth more suggestive of renewed economic downturn than of even the modest recovery that has taken place.

Chart 6, updated from Feinman and Porter (1992), makes the M2 growth puzzle more specific by plotting M2 "velocity" against the Federal Reserve's standard measure of the opportunity cost of holding M2—that is, the difference between the weighted-average return paid on the various components of M2 and a weighted-average return on short-term market instruments not included in M2. Clearly something has changed since 1988. Feinman and Porter showed that expanding the set of market instruments considered to be alternatives to M2 (and, importantly, choosing weights on those instruments' returns that ***retrospectively*** maximized their explanatory power) reduced the magnitude of the recent discrepancy but did not eliminate it.

Put in the simplest way, the point of Feinman and Porter's suggested improvement in the analysis of M2 demand is that depositors may consider not just short-term money market instruments but bonds too, and perhaps even equities, as potential alternatives to the deposit components of M2. The conceptual point is hardly new,[10] but there is reason to believe that market conditions as well as the institutional response to those conditions has given it new practical relevance within just the past few years.

As Chart 7 shows, the spread between long-term and short-term interest rates has been extraordinarily wide during the latest recession and recovery episode. Holders of maturing certificates of deposit therefore face a large gap between the rates at which they can renew their deposits and the current yields on bonds. (Whether those current yields correspond to plausible expectations of the relevant expected holding returns is more difficult to say.) At the same time that M2 has

Chart 5
M2 Growth
(Annual Rate)

Two-Quarter Moving Average, on Same Period a Year Earlier

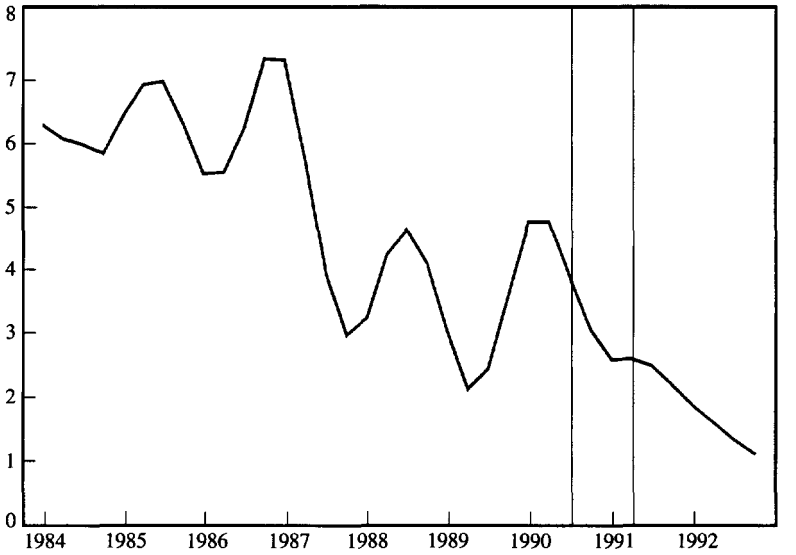


Chart 6
M2 Velocity and Opportunity Cost

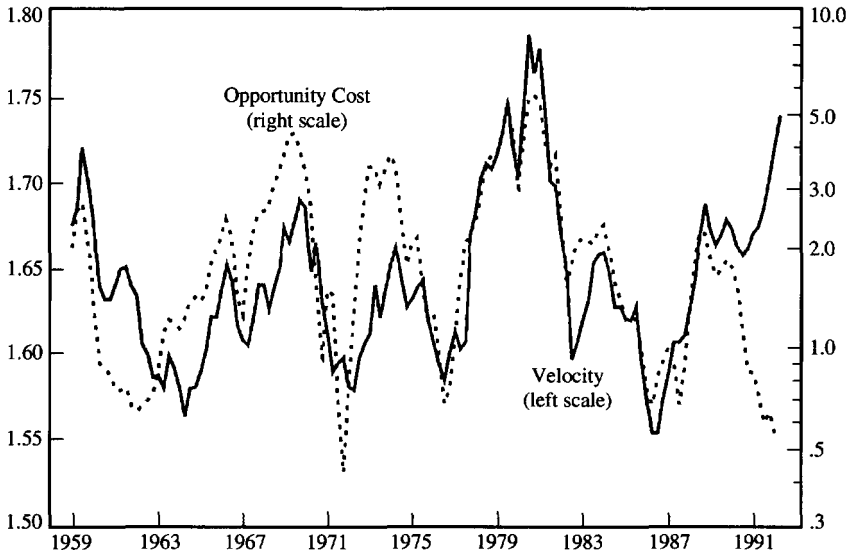
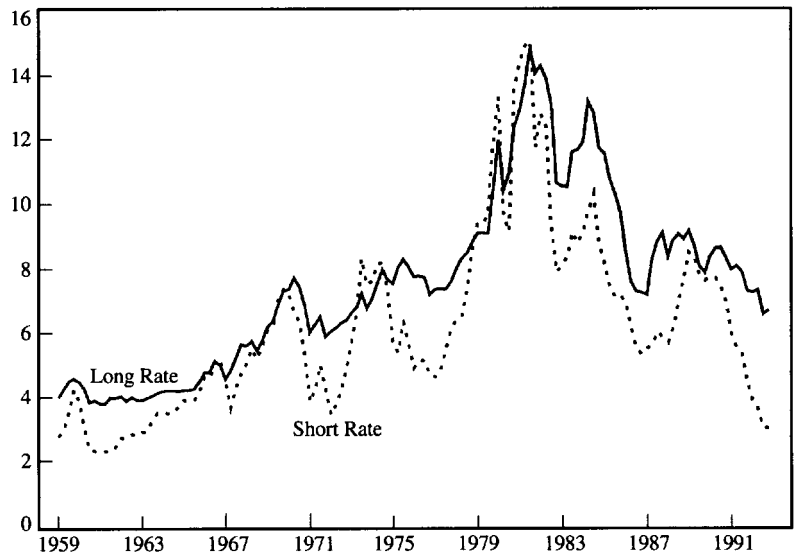


Chart 7
Long and Short Interest Rates



been puzzlingly weak, flows of household funds into bonds and stocks, and especially into bond and stock mutual funds, have been unusually large. Net purchases of bonds and other debt instruments by mutual funds totaled $90 billion in 1991 and $132 billion in 1992, compared to $33 billion per year on average during the previous decade. Net purchases of equities by mutual funds were $45 billion in 1991 and $67 billion in 1992 versus a previous annual average of just $8 billion.[11] The increasing globalization of financial markets may also have been an influence in this regard, in that sales of mutual funds investing in foreign bonds and stocks have grown particularly rapidly (albeit from a small base).

Not surprisingly, banks have responded to this competition by joining it. A Federal Reserve survey of fifty-six large banks in March 1993 indicated that fifty-two of them offered mutual fund products to their customers, presumably as a way of at least keeping the depositor if not the deposit. Roughly one-third of these banks had begun retail sales of mutual funds just since 1990. Three-fourths of the banks

marketing mutual funds as of March 1993 had sales representatives located on site at their branches; before 1990 half of these had no sales personnel available on a daily basis. The median percentage of branches with available sales personnel has gone from 20 percent in 1990 to 90 percent in 1993. Among those banks that could estimate the sources of mutual fund purchases, one-third to two-thirds apparently came directly from their own deposits.[12]

In addition to disrupting whatever relationships between M2 and nonfinancial economic activity may previously have existed (which in itself would be damaging enough), these latest changes in market structure and practice have two implications that are especially subversive of any attempt by the FOMC to use M2 as an intermediate target for monetary policy. First, the existence of an active, quantitatively substantial margin of substitution between any measure of "money" and long-term assets greatly complicates the Committee's task of controlling that aggregate. Indeed, as long as the aggregate in question consists mostly of short-term interest bearing instruments, it could even ***change the direction*** of the aggregate's response to open market operations.

Suppose, for example, that the Open Market Committee seeks to increase the rate of M2 growth (perhaps because, as in recent experience, actual growth has fallen below the targeted range). The presumptive action by the trading desk is to buy securities, thereby adding to nonborrowed reserves and lowering the federal funds rate and, via the market's response, other short-term interest rates. The conventional expectation, based on the assumption of sluggish or even fixed deposit rates in contrast to quick-moving market rates, is an ***increase*** in money demand. But if deposit rates decline roughly in step with short-term market rates, and if substitution between deposits and longer-term assets is quantitatively important, the demand for money may actually ***decline*** unless (or until) the fall in short-term rates induces a matching fall in expected returns on the relevant long-term assets.

As the Appendix to this section shows more formally, using the illustration of a simple model of money demand, money supply, income determination, and the term structure of interest rates, whether

"expansionary" open market operations (that is, open market purchases) actually expand M2 or shrink it depends on relationships among parameters, importantly including interest elasticities, the estimation of which lies well beyond the scope of this paper. How sharply the FOMC's staff has estimated those parameters (and their variance-covariance structure) is an interesting matter about which to speculate. I conjecture that in the currently prevailing circumstances the Committee does not know with confidence even the ***sign,*** not to mention the magnitude, of the short-run response of M2 to open market operations.

The other seriously damaging implication of the new substitutability between M2 and equity and bond mutual funds is that flows into or out of M2 may in the future assume the volatility that in the past has been more characteristic of securities markets. In the case of bond funds in particular, no one knows whether the individuals who have cashed in their certificates of deposit to buy these funds have done so with a full appreciation of the risk properties of these longer-term assets. Most open-end mutual funds are essentially as ***liquid*** as deposits, in that holders can cash in their shares on notice. But liquidity is not the same as risk, and depending on the specific assets in the fund, the ***risk*** properties may differ sharply from guaranteed redemption at par. If at some point the new holders of bond funds suddenly discover that their shares are subject to downward price variation, redemptions triggered by a rise in long-term interest rates could easily lead to a "noise" surge in M2 demand sufficient to overwhelm any "signal" the FOMC would hope to exploit by using M2 as an intermediate target.

In its mid-year report to Congress under the Humphrey-Hawkins procedure, in July 1993, the Federal Reserve "downgraded the role of M2 in the monetary policymaking process, acknowledging that "relationships between money and income, and between money and the price level have largely broken down."[13]

Implications for the conduct of monetary policy

The main lesson to be drawn from this survey of changing relationships between familiar financial,aggregates and income and prices is that there is little basis for expecting the FOMC (or anyone else, for

that matter) to identify any time soon a new, stable relationship that can command the degree of confidence that was once optimistically attached to any of a variety of such aggregates, and that is required to place that relationship at the center of the monetary policymaking process. The point is not just the now-familiar finding that statistical exercises devoid of behavioral content show a breakdown in prior relationships. It is that this breakdown, in one case after another, has plausibly had its origin in changing financial market structures and practices and in the response to those changes on the part of households and business.

To be sure, *if* the financial markets stopped changing, then in time relationships of the kind that monetary policymakers can perhaps use to devise intermediate targets might well emerge. But why expect that to happen? A decade ago, when attention in this context mostly focused on M1, it was perhaps plausible to attribute changing money-to-income relationships primarily to changes in government regulation, and from that assumption to infer that these relationships would again stabilize as the abrupt regulatory changes of the early 1980s receded into the past. But the point of the discussion above of credit and M2 is that further change, on about as great a scale, took place again in the mid- to late 1980s (in the case of credit) and again in the late 1980s to early 1990s (in the case of M2).

Moreover, even if the financial markets did stop changing, and one or more newly stable relationships of this kind were to emerge, how long would it then take to identify those relationships ***both qualitatively and quantitatively?*** As the literature of the subject over the past two decades has amply demonstrated, figuring out which definition of "money" (in other words, which collection of inherently quite different instruments) bears the most reliable relationship to income or prices is already hard enough. But for such a relationship to be genuinely useful for policy purposes, the FOMC also needs to know, at least to some reasonable approximation, its quantitative dimensions: Does this aggregate grow in proportion to income, or more so or less so? How sensitive is it to interest rates? (And which interest rates?) How different are the comovements that occur over six months from those that prevail over two years? For the foreseeable future, such difficult but absolutely essential quantitative description is just

not in the offing, at least not with any serious level of confidence.

What, then, is the FOMC to do? One possibility, of course, is simply to fall back on whatever the Committee knows about the connections to income and prices of the instrument the trading desk sets directly—nonborrowed reserves or the federal funds rate—and make policy decisions on the basis of those ultimate relationships without drawing on any other direct inputs to the policy process. But because the lags between Federal Reserve actions and their ultimate economic consequences are fairly long (at least according to most estimates), such a bare-bones framework is inherently unsatisfying. Simply to wait it out until the full effects of any change in the funds rate have worked their way through to nonfinancial activity, before determining whether the new level is appropriate or not, is likely to be tantamount, in too many instances, to letting the damage accumulate.

The FOMC's central need in this situation is information: information about the economy's current state and its future direction, as well as about the effects of the Federal Reserve's own actions. And in an economic and financial environment so dominated by ongoing change, that information is harder to come by than ever. One implication of this basic description of the problem is that the monetary policymaking process needs to incorporate information ***inclusively,*** rather than focusing narrowly on any one variable (which would amount to discarding information from other sources). A parallel implication is that the policymaking process needs to exploit information ***intensively,*** through frequent re-examinations of just what the information provided by any one source is saying.

More specifically, the inclusive use of information presumably means using as information variables (in the sense of the first section above) not just several financial aggregates rather than only one but a broader, and potentially much broader, range of measures with potential predictive context. For example, several Federal Reserve researchers have analyzed the predictive properties of the slope of the yield curve (that is, the term structure of interest rates) with respect to real economic activity,[14] and Mishkin (1990) has documented at least modest predictive capacity of some parts of the yield curve with respect to prices. Similarly, Kuttner and I have shown that the spread

between the commercial paper rate and the Treasury bill rate contains substantial information about subsequent movements of real activity, albeit not about prices.[15] Indeed, the paper-bill spread typically remains highly significant in equations for real income even when other variables like money and credit are introduced, and those other variables usually lose their significance altogether in the presence of the paper-bill spread.

No one would suggest using the yield curve slope or the paper-bill spread as an *intermediate target* of monetary policy. But once the policymaking procedure is framed in terms of *information variables,* rather than an intermediate target, there is no reason why interest rate relationships are any less suitable for this purpose than monetary aggregates. Just as with a monetary aggregate, the FOMC can think through in advance how the yield curve and the paper-bill spread are likely to move over the coming months if its policy actions are having the intended effect and if nonfinancial activity is developing as expected. And just as with a monetary aggregate, a sufficiently large unanticipated movement of the yield curve or the paper-bill spread could be the occasion for questioning whether economic activity, either as affected by monetary policy or in other regards, is in fact developing according to plan. That, in short, is what the information variable procedure for monetary policy is all about.

There is also no *analytical* reason to restrict the Committee's set of formally exploited information variables to quantities or prices drawn exclusively from the financial world. Many of the observable actions that are intermediate between what monetary policy does and what it hopes ultimately to achieve take place in the sphere of real activity. Conventional leading indicator indexes have always exploited the fact that goods orders, building permits, ground breakings and the like typically precede the corresponding final sales and production that account for much of an economy's output and income (although less so as the share of services in total output rises). In contrast to the unstructured use of such variables as mere leading indicators, however, for purposes of monetary policy the relevant question is also what information they contain about how effects attributable to Federal Reserve actions themselves are spreading through the economy. As is true in the case of financial quantities and prices, therefore, there

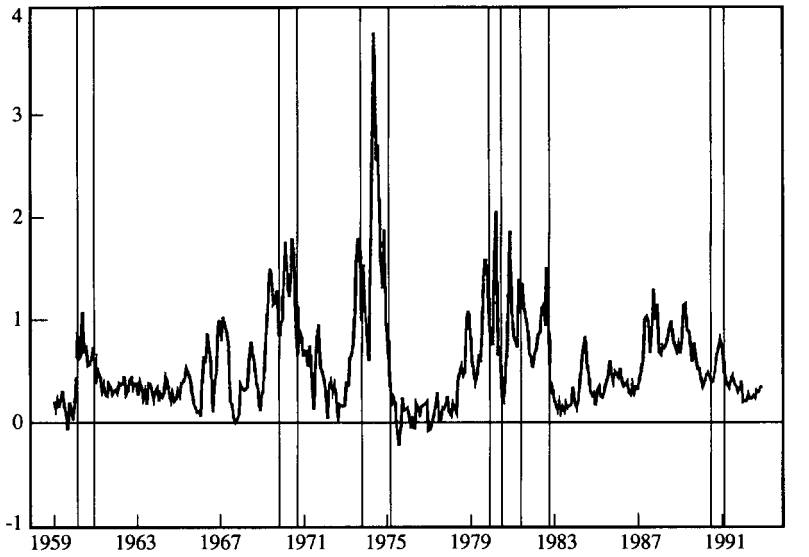
is room—indeed, there is need—to choose such variables in part according to how they fit into the Committee's conception of how monetary policy affects economic activity.

As a practical matter, however, it is likely that much of the substantive advantage to be gained from exploiting specific nonfinancial variables as formal information variables for monetary policy is already implicit in the FOMC's existing economic forecasting apparatus. If durable goods orders, or housing starts, or container shipments move in ways seriously at odds with the Committee's expectations for overall activity consistent with its policy stance, under current procedures that fact is unlikely to escape attention and, if warranted, close analysis. As a result, much of the concrete advantage of an explicit information variable procedure probably lies in a more inclusive exploitation of financial quantities and prices.

It is important to emphasize, however, that broadening the array of financial quantities and prices used as information variables does not guarantee superior ex post policy actions and outcomes. As Charts 8 and 9 show, for example, in the period leading up to the 1990-91 recession, both the paper-bill spread and the yield curve slope gave false signals similar to those documented for M2 in Chart 5. The paper-bill spread fluctuated at levels normally predictive of a recession from mid-1987 to mid-1989, then narrowed sufficiently to eliminate any indication of recession by the beginning of 1990 and did not widen again until after the recession had begun. The yield curve was a somewhat better predictor in this episode, flattening in 1988 and throughout 1989, but by early 1990 it had begun to steepen again while the recession was still half a year away. (A widening paper-bill spread typically precedes recessions, as does a flattening yield curve.)

One interpretation of these events is simply that the paper-bill spread and the yield curve slope are, not surprisingly, imperfect as predictors of future economic activity.[16] An alternative indication, suggested by the work of a variety of recent researchers, is that these variables (like M2, perhaps) are not so much predictors of economic activity as indicators of the stance of monetary policy, and that what their movements in this latest episode reveal is that the 1990-91 recession was due to causes other than monetary policy (for example,

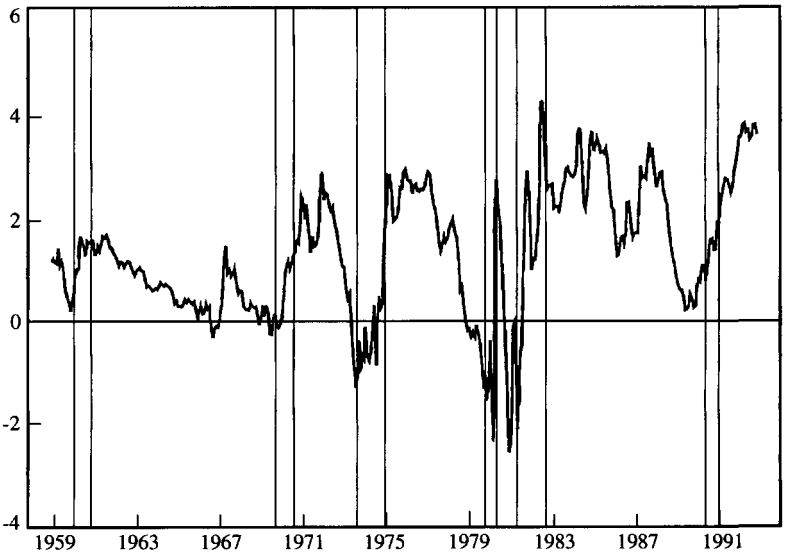
Chart 8
Paper-Bill Spread



the widely discussed "capital crunch" at banks and other lending institutions[17]). Much useful research remains to be done in order to establish, both for variables like these spreads and for more conventional variables like M2, in which of these differing lights to construe them. The distinction is central to their appropriate use in formulating and carrying out monetary policy.

Regardless of the outcome of that investigation, however, the demonstrable fallibility of variables like the paper-bill spread and the yield curve as predictors of economic activity illustrates in yet another context the advantage of using any such measures as information variables, not intermediate targets. Unlike as with an intermediate target, an unexpected movement of an information variable does not automatically trigger a change in policy in the sense of a new federal funds rate or altered growth of nonborrowed reserves. It instead creates the presumption that there is an issue to be addressed. There remains, always, the need for a judgment. This central role of case-by-case discretion in responding to the pertinent information that arises does not mean, of course, that the FOMC should ignore the

Chart 9
Long-Short Spread



longer-run consequences of its actions.[18] It does mean, however, that in carrying out whatever its appropriate long-run strategy may be, the Committee needs to make judgments about whether or not the movements of specific observed variables imply that it has gone off course and needs to take corrective action.

In principle, one could perhaps imagine a policy rule, based on some sufficiently complex form of intermediate target, that would internally embody just these kinds of judgments. After all, unless the FOMC acts in a purely random way, its monetary policy decisions do systematically reflect the Committee's economic objectives and its understanding of how any specific action that it may take or not will affect the economic behavior to which those objectives relate. For practical purposes, however—as Tobin (1983) and others have emphasized—"rules" in this context inevitably mean simple rules, not elaborate interrelationships involving large numbers of variables and multiple contingencies. Given the complexity of the relationships involved, a "rule" that fully reflected the Committee's decisionmak-

ing process would probably be impossible to write down. By contrast, for practical purposes of monetary policy a "rule" is not a rule unless it can be written down in one paragraph and readily explained to audiences consisting of business executives and Congressmen. Hence the need for case-by-case judgments, as new information emerges, is real.

Finally, it should also be clear that those judgments are best made frequently. Even the most reliable information variable can begin to give false signals, and changing financial market structures and practices can distort (compared to prior experience) the content of even those signals that continue to be informative. The experience of the last decade or so, as documented at some length and in some detail in the second and third sections above, provides ample evidence of just this phenomenon. Is it possible to *know* in advance that any chosen variable will necessarily provide misleading information? Of course not. But that does not constitute grounds for proceeding under a strict presumption that it will not, as is inherent either in an intermediate target procedure or in any procedure calling for automatic responses to unexpected movements of selected information variables. The presumption, instead, is that there are questions to be raised and responses to be undertaken or not in light of the best available answers. Precisely because the financial market structures and practices that matter in this regard are as subject to change as they have been in this latest period, assuming that yesterday's answer is still right today is at best an invitation to error.

More fundamental issues

Finally, even if the FOMC devises a successful system for formulating monetary policy, based on a more inclusive explicit use of financial price and quantity variables and a more intensive procedure for responding to the information that these variables contain, the ongoing evolution of the U.S. financial markets as discussed in the second section nonetheless raises a broader—indeed, a more fundamental—issue for monetary policymaking.

The most straightforward way to frame that issue is simply to ask why what the Federal Reserve System does matters in the first place.

More specifically, in a $6 trillion economy with more than $25 trillion of financial claims outstanding in highly liquid markets where many of those claims change ownership not just easily but frequently, why should it matter whether the Federal Reserve buys $1 billion worth of securities or $10 billion worth in the course of an entire year? How can such a small difference matter even for the pricing of government securities, of which there are nearly $5 trillion outstanding, or, all the more so, for the pricing of marketable debt securities more generally, of which there are more than $12 trillion? How especially can such a small difference in Federal Reserve transactions exert a meaningful influence on such matters as how much people choose to work or spend, or how many houses people build, or how many factories firms put up, or how much businesses produce and how they price it?

The answer, of course, is that the Federal Reserve is a monopolist. It and it alone can create the reserves that, by law, banks and other depository institutions must hold. Its purchases of securities do just that. And relative to the existing amount of bank reserves ($57 billion at midyear 1993), $1 billion versus $10 billion growth in a year is a major difference.

But being a monopolist matters only if the item over which the monopoly applies is itself important. What if banks (and other depository institutions) can just as easily carry out their activities—extending credit and taking deposits—without incremental reserves? And even if they can't, what if there are other institutions, like finance companies that issue credit and money market mutual funds that take deposits, to do so in their place?

Questions like these have been the stuff of monetary policy economics virtually since the subject's inception. The traditionally accepted answers have been that, at least at some margin, banks cannot extend credit and take deposits without incremental reserves on the same terms that they would otherwise establish, and that, for at least some would-be borrowers and/or depositors, other institutions cannot perform these functions on the same terms that would otherwise be available from banks.[19] Within that prevailing understanding, the ongoing debate has then focused on such subsidiary questions as whether it is the credit side of the story or the deposit side that

primarily matters, whether monetary policy actions (through whatever mechanism) affect prices alone or real economic activity as well, and which specific institutions and instruments and aspects of nonfinancial activity are more central to the process than others.

By contrast, if having reserves or not is no longer important to banks, or if other lending and deposit creating institutions can readily take their place, then the Federal Reserve's monopoly over bank reserves no longer matters. And once it does not, no one can plausibly expect even an institution with a $350 billion portfolio (as of June 1993) to govern the evolution of prices and quantities in a $26 trillion market, much less to exert a meaningful impact on nonfinancial economic activity.

In the United States over the last decade or so, the value of the Federal Reserve System's monopoly has apparently eroded in two senses. One, noted in the third section, is that because the current system of reserve requirements dates to the era (actually not so long ago) when advocates thought close control over M1 was the key to a successful monetary policy, the majority of liabilities issued by banks and other depository intermediaries are exempt from reserves. In the absence of incremental reserves, banks can and regularly do fund incremental credit creation by issuing certificates of deposit or other non-reserve-bearing instruments. This situation is readily correctable, at least in principle, although as a practical matter difficult questions of definition among forms of obligations (direct versus holding company, onshore versus offshore, insured versus uninsured, senior versus subordinated, and so on) would inevitably arise. So too would problems of the competitiveness of the depository intermediary industry as a whole.

The harder problem is the one discussed in the second section.[20] The role of depository institutions collectively is shrinking in relation to the broader job being done by the financial markets overall. Without substantial empirical research that lies well beyond the scope of this paper, it is impossible to say just how small the depository institution sector can become, relative to economywide wealth holding or credit creation or saving and investment, before the Federal Reserve's monopoly even over reserves that might be imposed against

the complete liability side of the entire sector's balance sheet would lose its force in a broader market context. Still less is it possible to say how the Federal Reserve should then seek to expand its powers—"reserves" in some form for financial institutions other than depository intermediaries? centralized coordination of capital requirements for all lenders?—in order to re-establish its ability to influence marketwide financial and, ultimately, nonfinancial outcomes. But the direction of the trends shown in Chart 1 and especially Chart 2 is clear, and if they continue, then at some point more fundamental questions like these will inevitably move to the forefront.

Author's Note: I am grateful to Ben Broadbent for research assistance; to Ernest Furgurson for assistance in identifying the quotation from Clausewitz; to Robert Hall, Donald Kohn, Reiner Konig, Kenneth Kuttner, Allan Meltzer, Richard Porter, and David Wilcox for helpful discussions and comments on an earlier draft; and to the G.E. Foundation and the Harvard Program for Financial Research for research support.

Appendix: The Response of M2 to Open Market Operations

The question at issue is whether an expansionary open market operation—that is, an increase in nonborrowed reserves--causes M2 to increase or decrease. As a simple illustration, consider the following compact, nondynamic model of money, interest rates, and nonfinancial economic activity:

(A1) money demand: $Mt = \alpha_o + \alpha_1 Yt + \alpha_2 r_{St} - \alpha_3 r_{Lt}$

(A2) money supply: $M_t = \beta_o + \beta_1 R_t + \beta_2 r_{St}$

(A3) term structure: $r_{Lt} = \gamma_o + \gamma_1 r_{St} + \gamma_2 \sum_i r^e_{S,\, t+i}$

(A4) aggregate demand: $Y_t = \delta_o - \delta_1 r_{St} - \delta_2 r_{Lt}$

where M is the money stock, Y is nominal income, R is the quantity of nonborrowed reserves, and r_S and r_L are short- and long-term interest rates, respectively. (In the term structure equation, $r^e_{S,\, t+i}$ indicates the expectation of short-term interest rates in the future.) All coefficients are assumed to be positive.

If the impact on the short-term interest rate is seen as temporary, the effect on money of achange in nonborrowed reserves in this model is given by

$$\text{(A5)} \quad \frac{dM}{dR} = \frac{\beta_1 Z}{\beta_2 + Z}$$

where

$$\text{(A6)} \quad Z = \alpha_1 \delta_1 + \gamma_1 (\alpha_3 + \alpha_1 \delta_2) - \alpha_2$$

If the impact on the short-term rate is seen as permanent, the effect on money is

$$(A7)\quad \frac{dM}{dR} = \frac{\beta_1 Z^*}{\beta_2 + Z^*}$$

where

$$(A8)\quad Z^* = \alpha_1\delta_1 + (\gamma_1 + \gamma_2)(\alpha_3 + \alpha_1\delta_2) - \alpha_2.$$

In traditional models of money demand, in which money is assumed to bear a fixed (perhaps zero) return and both r_S and r_L represent competing returns on non-money market assets, α_2 would have the opposite sign (that is, α_2 as written would be negative), and so $\frac{dM}{dR} > 0$ unambiguously in either (A5) or (A7). But for the current situation of M2, r_S is more plausibly the own return. In that case $\frac{dM}{dR} \gtrless 0$ as $\alpha_1\delta_1 + \gamma_1(\alpha_3 + \alpha_1\delta_2) \gtrless a_2$ in the case of the temporary effect on short-term rates (A5, A6) or, analogously, $\frac{dM}{dR} \gtrless 0$ as $\alpha_1\delta_1 + (\gamma_1 + \gamma_2)(a_3 + \alpha_1\delta_2) \gtrless a_2$ in the case of the permanent effect (A7, A8).

This ambiguity prevails even in a short run sufficiently short that open market operations do not yet affect nonfinancial economic activity, so that Y is effectively predetermined with respect to M. Replacing (A4) above by

$$(A4')\quad \text{aggregate demand: } Y_t = \delta_o - \delta_1 r_{S,t-1} - \delta_2 r_{L,t-1}$$

simplifies (A6) and (A8) to

$$(A6')\quad Z = \gamma_1\alpha_3 - \alpha_2$$

$$(A8')\quad Z^* = (\gamma_1 + \gamma_2)\alpha_3 - \alpha_2.$$

Here, $\frac{dM}{dR} \gtrless 0$ as $\gamma_1\alpha_3 \gtrless a_2$ or as $(\gamma_1 + \gamma_2)a_3 \gtrless \alpha_2$, respectively.

Needless to say, moving beyond this simple model, either by making these four equations dynamic or by adding further equations, makes the sign condition on $\frac{dM}{dR}$ more complicated rather than simpler.

Endnotes

[1]In light of the long-standing debate over whether or not money "causes" income, a key feature of such an information variable procedure is that it involves no presumption of causality. All that is necessary is a lead in timing, whether causal or not. See Tobin (1970) for an early and concise discussion of this distinction.

[2]See, for example, Simpson (1984). See also the paper by Franklin Edwards in this volume.

[3]See Friedman and Kuttner (1992, 1993b) for further details of the estimation and for the results of alternative specifications.

[4]It is useful to recall, however, that the connection between money and prices itself rests on "ad hoc" assumptions about the existence of money and its role in the economy, so that the familiar contrast to models involving "ad hoc" impediments to Walrasian equilibrium is, in reality, less than usually represented.

[5]See, for example, the exchange between Stock and Watson (1989) and Friedman and Kuttner (1993a). Earlier on, see, for example, Sims (1980) and Eichenbaum and Singleton (1986).

[6]See *Federal Reserve Bulletin 64* (July 1978), pp. 605-10. The basic idea, however, was not new then. The Commission on Money and Credit, for example, made a similar proposal in its 1961 report. A key motivation underlying this proposed change was to put non-member institutions of the Federal Reserve System on an equal competitive footing with Federal Reserve members.

[7]See, for example, Friedman (1983).

[8]The target can of course be an average, perhaps with unequal weights, of other variables. (Divisia aggregates, with optimally selected weights, are an obvious example.) Even a single money growth target is, after all, an average of growth targets for the composite elements of whatever is defined as "money." with weights on those elements in proportion to their size.

[9]McCallum (1987, 1988) and others have advocated policy rules centered on the monetary base; but since the base is subject to direct Federal Reserve control (and that is a large part of McCallum's point), under such a procedure it would be the instrument of monetary policy, not an intermediate target.

[10]Early examples of arguments that bond and/or equity returns in principle affect money demand include Friedman (1956). Meltzer (1963), and Brainard and Tobin (1968). See also Friedman (1977) and Hamburger (1977).

[11]Data are from the Flow-of-Funds accounts.

[12]See Reid (1993).

[13]Alan Greenspan, testimony before the U.S. House of Representatives, Committee on Banking, Housing and Urban Affairs, Subcommittee on Economic Growth and Credit Formation, July 20. 1993, pp. 9-10.

[14]See, for example, Laurent (1988), Strongin (1990). and Estrella and Hardouvelis (1991).

[15]See again Friedman and Kuttner (1992, 1993b).

[16]For example, Friedman and Kuttner (1993b) found that movements in the relative outstanding supplies of commercial paper and Treasury bills exert a highly significant effect on the paper-bill spread, as is to be expected if investors regard paper and bills as imperfect substitutes in their portfolios. Depending upon the estimate of the elasticity of substitution, either a small or a large part of the movement of the paper-bill spread that was not predictive of real output during 1987-90 can be attributed to the fact that the Treasury sharply cut back its issuance of bills beginning in early 1987 and then resumed rapid bill issuance in late 1989.

[17]See, for example, Syron (1991).

[18]That is sometimes the meaning attached to "discretionary" monetary policy in the economic literature. See, for example, Barro and Gordon (1983).

[19]In the absence of reserve requirements, banks would presumably hold reserve balances anyway as a means of clearing transactions. If a private transfer agent provided an alternative clearing system not ultimately resting on reserves transfers, however, the question of the central bank's potential ability to affect banks' behavior via open market operations would again arise. The crucial point is that the central bank maintains a monopoly over some necessary aspect of the banking system's activity.

[20]Also see again the paper by Franklin Edwards in this volume. For a more fundamental perspective on the role of banks in relation to other intermediaries, and on bank lending in relation to credit provided via open market securities, see Fama (1980, 1985) and Bernanke and Gertler (1989).

References

Andersen, Leonall C., and Jerry L. Jordan. "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization." Federal Reserve Bank of St. Louis Review, 50 (November 1968), pp. 11-24.

Barro, Robert J., and David B. Gordon. "Rules, Discretion, and Reputation In A Model of Monetary Policy," Journal of Monetary Economics 12 (July 1983), pp. 101-21.

Bemanke, Ben S., and Mark Gertler. "Agency Costs, Net Worth, and Business Fluctuations." American Economic Review 79 (March 1989). pp. 14-31.

Brainard, William C., and James Tobin. "Pitfalls in Financial Model Building," American Economic Review 57 (May 1968), pp. 99-122.

Brunner, Karl, and Allan H. Meltzer. "Money, Debt, and Economic Activity," Journal of Political Economy 80 (September-October 1972), pp. 951-77.

Eichenbaum, Martin, and Kenneth J. Singleton. "Do Equilibrium Real Business Cycle Theories Explain Postwar Business Cycles?" in Fischer, ed., NBER Macroeconomics Annual. Cambridge: MIT Press, 1986.

Estrella, Arturo. and Gikas A. Hardouvelis. "The Term Structure as a Predictor of Real Economic Activity," Journal of Finance 46 (June 1991), pp. 555-76.

Fama, Eugene F. "Banking In A Theory of Finance," *Journal of Monetary* Economics 6 (January 1980), pp. 39-57.

_____. "What's Different About Banks?" *Journal* of Monetary Economics 15 (January 1985), pp. 29-39.

Feinman, Joshua N., and Richard D. Porter. "The Continuing Weakness of M2." Federal Reserve Board. mimeo. 1992.

Feldstein, Martin, and James H. Stock. "The Use of A Monetary Aggregate to Target Nominal GDP." National Bureau of Economic Research, mimeo. 1993.

Friedman, Benjamin M. 'The Roles of Money and Credit in Macroeconomic Analysis," in James Tobin, ed., Macroeconomics, Prices and Quantities: Essays in Memory *of Arthur* M. *Okun.* Washington: The Brookings Institution (1983).

_____, and Kenneth N. Kuttner. "Money, Income, Prices and Interest Rates," American Economic Review 82 (June 1992), pp. 472-92.

_____, and _____. "Another Look at the Evidence on Money-Income Causality," Journal of Econometrics 57 (May/June 1993a), pp. 189-203.

_____, and _____. "Why Does the Paper-Bill Spread Predict Real Economic Activity?'in Stock and Watson, eds., New Research on Business Cycle Indicators and Forecasting. Chicago: University of Chicago Press, 1993b.

Friedman, Milton. "The Quantity Theory of Money—A Restatement." in Friedman, ed., Studies in the Quantity Theory of Money. Chicago: University of Chicago Press, 1956.

_____. "Time Perspective in the Demand for Money," *Scandinavian* Journal of Economics 79 (1977). pp. 397-416.

_____. "Lessons from the 1979-82 Monetary Policy Experiment." American Economic Review 74 (May 1984), pp. 397-400.

_____, and Anna J. Schwartz. A Monetary History of the United States *1867-1960.* Princeton: Princeton University Press, 1963.

Goldfeld, Stephen M. "The Demand for Money Revisited," Brookings Papers on Economic Activity (No. 3, 1973). pp. 577-638.

_____. "The Case of the Missing Money," Brookings Papers on Economic Activity (No. 3, 1976), pp. 683-730.

Hamburger, Michael J. "Behavior of the Money Stock: Is There a Puzzle?" *Journal* of Monetary Economics 3 (July 1977), pp. 265-88.

Judd, John J., and John L. Scadding. "The Search for a Stable Money Demand Function: A Survey of the Post-1973 Literature," Journal *of* Economic Literature 20 (September 1982), pp. 993-1023.

McCallum, Bennett T. "The Case for Rules in the Conduct of Monetary Policy: A Concrete Example," Federal Reserve Bank of Richmond, Economic Review (September/October

1987), pp. 10-18.

_____. "Robustness Properties of a Rule for Monetary Policy," *Carnegie-Rochester Conference Series on Public Policy* 29 (Autumn 1988), pp. 173-204.

Meltzer, Allan H. "The Demand for Money: The Evidence from the Time Series," *Journal of Political Economy* 71 (June 1963), pp. 219-46.

Mishkin, Frederic S. "Information in the Longer-Maturity Term Structure About Future Inflation," *Quarterly Journal of Economics* 55 (August 1990). pp. 815-28.

Ramey, Valerie. "How Important Is the Credit Channel in the Transmission of Monetary Policy?" *Carnegie-Rochester Conference Series on Public Policy,* 1993, forthcoming.

Reid, Brian. "Senior Financial Officer Survey on Retail Mutual Funds." Federal Reserve Board, mimeo, 1993.

Simpson, Thomas D. "Changes in the Financial System: Implications for Monetary Policy," *Brookings Papers on Economic Activity,* (No. 1, 1984). pp. 249-65.

Sims, Christopher A. "A Comparison of Interwar and Postwar Business Cycles: Monetarism Reconsidered," *American Economic Review* 70 (May 1980), pp. 250-247.

Stock, James H., and Mark W. Watson. "Interpreting the Evidence on Money-Income Causality," *Journal of Econometrics* 40 (January 1989), pp. 161-82.

Syron, Richard F. "Are We Experiencing a Credit Crunch?" Federal Reserve Bank of Boston, *New England Economic Review* (July/August 1991), pp. 3-10.

Tobin, James. "A General Equilibrium Approach to Monetary Theory," *Journal of Money, Credit and Banking, 1* (February 1969), pp. 15-29.

_____. "Money and Income: Post Hoc Ergo Propter Hoc," *Quarterly Journal of Economics* 84 (May 1970). pp. 301-17.

_____. "Monetary Policy: Rules, Targets, and Shocks," *Journal of Money, Credit and Banking* 15 (November 1983), pp. 506-18.

Commentary: The Role of Judgment and Discretion in the Conduct of Monetary Policy

Donald L. Kohn

Making monetary policy is about forecasting. Given costs of adjustment, sluggishly adapting expectations, and other factors, the actions of the central bank in the reserve market have their effects over a considerable period.

The intermediate target/indicator discussion is a subset of this forecasting exercise. The potential value of such indicators or targets is particularly high when the central bank is using short-term interest rates as a proximate target. The difficult question of when to change short-term rates and by how much is complicated by the attention focused on the central bank's target rate—in financial markets and in the body politic. Intermediate indicators help the central bank check on its forecast and signal the potential need to adjust interest rates; they can discipline the policy process, working against tendencies toward inertia; and, statements about their likely behavior can communicate the central bank's strategy and intentions to the public, reinforcing credibility.

Ben Friedman has given us an interesting and thoughtful essay on the properties and use of intermediate targets and indicators, the effects on them of recent developments in the U.S. financial system, and the implications of those effects for techniques of making monetary policy.

Ben draws two main conclusions for intermediate targets and indicators, and I find I am in broad agreement with them both. First, he notes that the biggest effects seem to have been on those old standby indicators involving the growth of money and credit. Financial change has widened the array of instruments available to savers and borrowers, modified the character of existing instruments, and reduced transaction costs of shifting among financial instruments. In this environment, demands for particular sets of instruments—labeled, for example, M2 or bank credit—become much more difficult to specify, have much higher interest elasticities (as do their supplies), are more subject to changes in tastes and technology, and therefore have considerably looser and evolving connections to spending.

His second main point is that as a consequence of the process of change, the Federal Reserve must look at all types of incoming information—and must re-examine and reassess this information frequently. This certainly has been the practice of the Federal Reserve for most of its history, including since the fall of 1982. Throughout this most recent period, monetary aggregates, including M2, have played a role in policy, but as information variables rather than as targets. And that role has been reduced as atypical velocity behavior called into question the information content of first one aggregate and then another. Quite frankly, I don't see an alternative to the current inclusive, intensive procedure, as Ben has labeled it.

Although I agree with the underlying thrust of Ben's paper, I believe some cautions are in order. These are not intended as criticisms but are more on the order of ruminations the paper has provoked.

The first such caution concerns the difficulty of separating underlying changes in the financial system that are likely to persist from the temporary products of the current, peculiar, business cycle. Ben notes this point in assessing the possible future usefulness of the commercial paper-bill rate spread, but it has more general applicability. The current cycle has been marked by an abnormal pattern in monetary policy, which began to ease well before the cyclical peak, by an unusually moderate recovery in which persistent expectations of rising interest rates and higher inflation reflected in extraordinarily steep yield curves have been repeatedly proven wrong, and by mas-

sive and unprecedented balance sheet restructuring by borrowers and lenders—including the demise of a huge number of depository institutions, with new regulatory and cost burdens placed on the survivors. Moreover, atypical business cycle patterns have not been confined to the United States. It would be extraordinary if such developments had not affected both the response of the economy to policy and the signaling content of traditional indicators, including those involving interest rate relationships as well as money and credit aggregates.

Unless we expect future business cycles to look like this one, we need to exercise caution in interpreting the financial and real developments of the last few years as necessarily being the result of longer-term trends. I don't expect the imminent resurrection of P-star or a reliable credit aggregate, but we should pause before discarding a good deal of history on the basis of an unusual business cycle.

Ben suggests that with the increasing unreliability of money and credit aggregates, central banks should pay more attention to interest rate relationships. And some have read Chairman Greenspan's discussion of real interest rates in his recent testimony as pointing in a similar direction. My second set of cautions concerns this topic.

Interest rates and other price-type variables in financial markets are natural alternatives to money and credit as intermediate indicators. Indeed, there is a body of analysis in support of such an emphasis when, as now, uncertainties about money demand are heightened. Moreover, interest rates are attractive indicators because they are clearly along the transmission mechanism. As a consequence, they have a more forward-looking flavor than many other variables, such as recent data on prices or output.

There are, however, pitfalls involved in very heavy reliance on interest rate indicators. One problem is that innovations in capital markets likely have affected the relationship of these indicators, as well as money and credit, to spending. The demise of Regulation Q and usury ceilings clearly have had an impact, but other changes, for example, involving new markets and instruments and freer international flows of capital, may also be affecting interest rate-spending relationships in more subtle ways. Even the cyclical behavior of rate

spreads, such as the yield curve or paper-bill, may be modified as financial markets evolve, if their previous patterns had reflected in part the costs of shifting among instruments or the lack of available alternatives for lenders or borrowers.

As a more fundamental problem, interest rates or spreads do not, by themselves, have unambiguous implications for spending or inflation. A given paper-bill spread, though it may have some indicator value for real activity, could be consistent with any inflation rate; and, the slope of the yield curve, while suggestive of the direction of market inflation expectations, by itself says little about the level of such expectations or of actual inflation now or in the future. The problems with targeting nominal rate levels themselves are well recognized. A particular short-term nominal rate can be consistent with ever increasing or ever decreasing output gaps and accelerating or decelerating inflation. Interest rate targets and indicators need to be accompanied by attention to variables that anchor the system in nominal terms, perhaps even the price level or the inflation rate themselves.

Some focus on real interest rates can help to an extent—possibly reducing the odds on some of the most egregious policy errors—but it is no panacea. Like other rate variables, real rates do not tie down prices. Unless set equal to its equilibrium or natural levels, a given set of real. rates will not even avoid increasing or decreasing inflation rates, and there is no unique inflation rate associated with real rates at their natural level. Measurements of actual and estimates of natural real rates are complicated by the absence of information on inflation expectations. This problem is especially acute because the most relevant rates for spending are those at intermediate and longer maturities, where uncertainties about expectations are highest. At these maturities, the influence of the Federal Reserve also is attenuated, working through actual and expected paths of real short-term rates, which are under the control of the central bank because inflation expectations adjust slowly.

Finally, equilibrium real rates, so crucial for the evaluation of the implications of actual real rates, may vary quite a bit over relevant policy horizons. Real rates are determined in the very long run mainly by tastes and technology, but factors affecting the supply and demand

for goods and services over shorter periods, such as fiscal policy or financial frictions, can have important effects on actual and equilibrium real rates. The monetary authorities need to take account of these effects if they are to avoid exacerbating rather than damping swings in output and prices.

Although difficulties in using real rates are formidable, in theory as well as in practice, there is a potential significant place for them in policy—not as a target of policy but as an information variable. For all the problems, policymakers can still get a notion of a rough range for actual and equilibrium real rates. Large deviations of actual from equilibrium rates will show through the uncertainties, alerting the central bank to the nature of risks going forward. This gives policymakers important and useful information concerning longer run tendencies in the economy against which they can evaluate other information bearing on whether the current policy stance is appropriate.

That issue—timely decisions on whether the current stance is appropriate—is at the heart of monetary policy, and it is the third topic I want to address. The Federal Reserve was using an intensive, inclusive methodology in the 1970s too, and probably in the early 1930s as well. The historical hallmark of discretionary policy focused on interest rates was too little too late, with the result that the central bank has on occasion increased rather than decreased the amplitude of business cycles. When you look at everything, there always seems to be some piece of information that counsels against a policy change, or it is tempting to await the next bit of data, which may cinch the case for change. Moreover, the bias against acting tended to be greater on the side of raising rates than lowering them, giving policy an inflationary cast.

There are no easy solutions to this problem. Just recognizing it may be the most important step; even central bankers may be capable of learning from the past. Certainly, complaints about the inflationary bias in U.S. monetary policy have been scarce in the last fourteen years. Arms-length relationships between central banks and day-to-day political pressures are important, along with central bankers willing to exploit that scope for action. Another key element surely is

the overall framework for policy, in terms of its ultimate objectives. Many countries have been adopting explicit inflation or price stability objectives. In the United States, where the legislative mandate is somewhat ambiguous, the Federal Reserve has emphasized that it believes its contribution to the longer-run growth of the country comes in seeking and achieving price stability. By measuring themselves against this objective, policymakers have added an element of discipline to discretionary decisions based on inclusive, intensive examination of new information.

Finally, we come to Ben's "more fundamental issue" —the potential impotence of the Federal Reserve. His concerns have two aspects: One, that depository institutions will make do without reservable liabilities, and two, that the economy will make do without depository institutions. The second seems more serious than the first. The central bank sets the overnight rate, as Ben points out, by controlling the supply of a unique instrument, one with no effective substitutes—that is, deposits on its balance sheet. In the United States there are no effective substitutes because the Federal Reserve insists that depositories hold reserves against transaction deposits. But this is not necessary for control over short-term interest rates sufficient for policy purposes. Clearing balances at the central bank could work about as well. Clearing through the central bank may be required, as in Canada, but even without that requirement, reasonably predictable demands for central bank balances may arise owing to the attractiveness to banks and their customers of riskless clearing through an institution that can create liquidity in a pinch. Countries without reserve requirements seem to be able to achieve short-term interest rate objectives, even with low average clearing balances. So long as commercial banks clear through the central bank, that institution, by manipulating its balance sheet, can force banks to obtain central bank deposits through discount or open market repurchase facilities at predetermined rates that form a basis for other interest rates.

The effects of a shrinking banking system are more difficult to analyze. One can conceive of a situation in which the Federal Reserve set an overnight rate for depositories, but these institutions were so small, and had such limited capital, that their efforts to adjust their portfolios to take account of actual and expected overnight rates had

little effect on other interest rates. The question is whether this is a realistic possibility. I suspect it is not, at least in our lifetimes. First, I would harken back to my first point—it is probably not legitimate to extend the slope of the recent downward trend for depository intermediation. Underlying trends of demands for the services depositories deliver--especially services that require them to issue liabilities and hold assets—are not likely to be as unfavorable. Even with securitization of bank assets, on the liability side there is likely always to be a substantial demand by households and businesses for the liquidity and safety of bank deposits. And, those deposits will have to be put to work. Demands for deposits and the effect of bank arbitrage activities should be enhanced by the continued role of commercial banks and the Federal Reserve at the center of the payment system. I do ***not*** want to sound complacent about these interesting questions; we need more research and thought--especially on the implications of an evolving payment system. Running monetary policy off of the demand for currency alone may be a possible alternative should Federal Reserve deposit accounts fall into disuse, but would be tricky at best. To date at least, the Federal Reserve has not noticed any degeneration in the fairly predictable response of other short-term rates when we change our stance in reserve markets—though it has been nearly a year since we tried.

Author's Note: These comments are the views of the author and do not necessarily represent the views of the Federal Reserve Board or its other staff.

Commentary: The Role of Judgment and Discretion in the Conduct of Monetary Policy

Reiner Konig

Friedman's skepticism with regard to the use of monetary aggregates as intermediate targets of monetary policy derives mainly from U.S. experience, the upheavals in the financial system there, and the consequent instability of the money demand function. To this extent, the quest for new approaches is quite understandable and, indeed, necessary. However, the conclusions presented in his paper cannot necessarily be applied to other countries where the financial sector has been subject to less pronounced changes. I should like to illustrate this point, using Germany as an example.

The Bundesbank was one of the first central banks to set itself a formal monetary target; this policy has now been pursued for almost twenty years without the strategy as such having been fundamentally called into question by the academic advisers of the policymakers in Germany or by the public at large. Not that I am oblivious to the technical difficulties we have been having with our monetary targeting for the past three years or so. Quite a number of special factors have been affecting the growth of the money stock and have disrupted, at least in the short run, its indicator quality and its manageability —for instance: German reunification, the introduction of a tax on interest income early in **1993,** the prolonged inverse interest rate pattern, or the speculative inflows of foreign funds. Despite the short-term disruptions, however, the underlying relationships among the money stock, interest rates, prices, and incomes have remained intact. Our econometric

computations suggest, by and large, that the money demand function has remained stable—a finding which has just been impressively confirmed by the Bank for International Settlements (BIS) in its latest annual report. The forecast values obtained with econometric estimations diverge sharply from the actual values in only a few quarters—a result that came as a surprise to many observers, including the BIS.

The reason for the stability of the money demand function in Germany is the great continuity of the institutional framework, compared with that in other countries. The financial markets were almost completely liberalized—both externally and internally—at an early date, namely in the late 1950s and early 1960s. Interest rate formation was left to the markets, without the government or central bank having any possibility of intervening directly. There were no quantitative controls on lending. The universal banking system ensured that a wide range of competitive products was available. Financial innovations tended to evolve naturally, rather than in abrupt surges, even if this also owed something to a certain innate conservatism of the banks and their customers. The lasting availability of a relatively stable currency was of particular significance in this connection. At all events, innovative hedging strategies, with all their adverse effects on the stability of macroeconomic structural relationships, could largely be dispensed with. Despite occasional—and in part still persisting—disturbances, there was, all in all, no reason to depart from the strategy of monetary targeting, with annual targets announced in advance, which in German eyes has stood the test of time.

Friedman makes a clear-cut distinction between intermediate targets and information variables. In intellectual terms it is no doubt important to distinguish these two concepts. In the day-to-day implementation of monetary policy, however, the dividing lines are blurred. Friedman explicitly draws attention to the temporal aspect of the reviewing of monetary targets. The shorter the review period is, the more the intermediate target and the information variable tend to coincide. Quite apart from this, in practice the monetary policy approach is not simply a matter of "rules *versus* discretion," but rather a matter of the meaningful linking of rules *and* discretion. To this extent, I think that Friedman's definition of the intermediate target is too strict. No central bank has ever and will ever interpret an interme-

diate target so stringently that monetary policy is therefore pursued "as if its objective were not to influence nonfinancial economic activity but to achieve a designated rate of monetary growth." Failures to meet intermediate targets do not normally lead to "automatic responses" in Friedman's sense. Even if a monetary target is set, monetary policy is not a mechanical deployment of technical instruments, but remains a political operation with the inclusion of all the available information. "Judgment" will never be superseded by mechanical rules.

In the very derivation of the intermediate target, there is considerable discretionary latitude. For instance, the starting point of monetary policy must be analyzed carefully before a monetary target is set. One of the key questions involved is whether, if the final target is missed, abrupt, shock-like adjustments are to be made or, rather, gradual adjustments. Moreover, the level of the envisaged monetary target depends on the responses to supply-side shocks and the estimation of money demand. The parameters of the econometric models merely offer initial indications of that. Any remaining uncertainties can likewise be countered by means of a target corridor. Ultimately, the intermediate target also owes a great deal to political decisions, which, however, must be subjected to economic consistency tests.

Whereas, strictly speaking, intermediate targets are nothing but statements of intent on the part of central banks, the deployment of the monetary policy instruments constitutes definite action in the central bank's field of operations proper, namely the money market. The money stock — irrespective of its definition — cannot be regulated directly. Instead, the central bank must gauge conditions in the money market in such a way that the target can actually be attained. Hard and fast rules cannot be laid down for this; indeed, I think there is no alternative to a process of trial and error. The instruments of interest rate and liquidity policy must continually be coordinated with one another. Exogenous influences on money market rates must be recognized as such and counteracted, where necessary. Furthermore, the short-term operational targets constantly have to be reviewed to ensure that they are still consistent with the intermediate target (and the final target).

Monetary policy calls for incessant observation of the market in three respects. First, it cannot disregard macroeconomic developments. The Bundesbank, too, constantly analyzes all relevant economic indicators in order to be informed about the current state of the economy. Second, the future disruption potential that might arise in the domestic financial markets as a result of innovations and structural changes has to be estimated. Third, external economic trends have to be monitored carefully—in particular, from the German standpoint, exchange rate movements in the European Monetary System and vis-à-vis the U.S. dollar.

In such a comprehensive information system, although the central bank looks "at everything," it does not attach equal importance to all data. In the German case, it is the monetary indicators which merit particular attention. The Bundesbank's monetary target is a reflection of the historical experience that inflationary processes are always accompanied by an expansion of the money stock. However, this does not imply a reduction of monetary policy to monocausal analysis or inflexible operating instructions. The Bundesbank has always permitted shorter-term deviations from the target path of monetary growth and, in particular, has responded flexibly to changes in macroeconomic conditions. This is reflected, for instance, in the fact that a downturn in interest rates was initiated as early as autumn 1992, even though there were already signs of the monetary target being overshot. The Bank acted in this way in anticipation of envisaged trends, that is to say, of a future slowdown in the pace of monetary growth on account of the sluggishness of business activity, and of an easing of inflationary pressures due to the appreciation of the deutsche mark.

But flexibility and pragmatism need to be oriented toward suitable "guidelines." Central banks have no particular advantage with respect to the information on the transmission mechanism and on the structure of the economic and financial system. In practice, their actions, too, are marked by uncertainty and an incomplete information base—despite all their sophisticated methods of analysis. In particular, distinguishing between ephemeral and permanent shocks is not possible until a fairly long period has elapsed; when such shocks occur, it is not usually possible to recognize their nature. A hyperactive monetary policy that tried to head for the final target directly by means of

feedback rules would be bound to come up against barriers quickly, especially since the final target is affected by numerous influences which are outside the reach of central banks. Additional difficulties might arise in the event of disagreements about, the final target to be pursued. Friedman refrains from giving a clear definition of this target in his paper; he juxtaposes, with equal priority, "income" and "prices." But if the indicators that are to be analyzed are chosen unduly pragmatically, there is a risk that, where monetary policy is concerned, factors of demand management will push their way into the foreground relative to the goal of price stability. A published intermediate target would make it clear which final target the central bank is in fact pursuing.

Information variables need supplementing by normative ideas on certain indicators which are regarded as particularly important for the transmission mechanism. Failing this, there would be a danger—particularly in a volatile political environment—f monetary policy becoming disoriented and ultimately reinforcing the fluctuations of economic activity by means of a stop-and-go policy, rather than exercising a stabilizing influence. This is the underlying rationale of formalized intermediate targets. They are intended to make the central bank's actions transparent by making manifest the intermediate stops on the road from the deployment of the instruments to the final target. In addition, they enable responsibilities to be assigned unambiguously in the field of stabilization policy. Even if, as Friedman sees it, monetary policy is based solely on information variables, central banks must necessarily elaborate ideas as to whether the course of the evaluated information variables is appropriate, and how to respond to undesirable movements. The road from such implicit assessments to explicit target variables announced in advance is not so very far. But that has not shed any light on the more difficult problem of what the intermediate target should look like in detail.

In view of the instability of money demand in many countries, in the indicator and intermediate target debate, attention is increasingly being focused on interest rates, the level of which should be steered by the central bank in such a way that the final target proper can be attained. While short-term interest rates are largely under the control of central banks, long-term rates, which are far more important (at

least for the German economy) mostly elude central bank control. Fluctuations in economic activity, public sector budget deficits, inflation expectations or interdependent global interest rates are superimposed upon, and sometimes counteract, monetary policy effects. Hence interest rate changes may give rise to wrong signals. For instance, an increase in long-term interest rates owing to higher inflation expectations can hardly be seen as a tightening of monetary policy. As it is not possible here to separate the endogenous factors of the economic process from the exogenous factors of monetary policy, the level of interest rates or the change in that level would seem to be unsuitable for use as a monetary policy indicator and thus likewise as an intermediate target.

In order to circumvent these difficulties, greater attention has been paid of late (in Germany as well) to the interest rate pattern. It is a fact that the "spread" between short-term and long-term interest rates provides a comparatively good forecast quality of economic activity. Even so, the Bundesbank has not taken up the idea of using the yield curve as the main indicator of monetary policy. First, the measurement of the interest rate pattern is not unambiguous. In Germany the interest rate pattern for a long time looked quite different, depending on whether one used the rate for three-month funds in the money market or the yield on federal bonds with a residual maturity of one year as the reference rate for short-term interest rates. In the first case, the interest rate pattern in mid-1993 was slightly inverse; in the second, it was ascending normally. Second, the interest rate pattern should not be considered independently of the interest rate level. For instance, if short-term interest rates are deliberately left unchanged in the light of monetary policy requirements, long-term interest rates may fall because of heavy inflows of capital from abroad—a situation with which Germany has been faced at times, particularly in the past few years. The associated broadening of a negative "spread cannot be regarded as a tightening of monetary policy; if anything, the decline in long-term interest rates signals an easing, which is tolerated by monetary policy. Third, inflation expectations, particularly if they fluctuate markedly, may distort the indicator quality of the interest rate pattern. Even so, the Bundesbank has always analyzed the interest rate pattern carefully and commented on it in its publications. Thus, "the slope of the yield curve" serves as an information variable in

Friedman's sense. However, the interest rate pattern does not appear—in Friedman's view, too—to be suitable for use as an intermediate target and key monetary policy indicator, even if its information content is quite substantial.

I see greater difficulties with regard to the informative value of the "spread" between the interest rates for Treasury bills and those for commercial paper (which is likewise mentioned by Friedman). In German eyes, at least a number of question marks are called for here.

—The impact of monetary policy on the paper-bill spread is but relatively small. Hence this interest rate differential is of only limited value as an indicator for monetary policy.

—The paper-bill spread is ultimately a matter of harnessing a further source of information for monetary policy. To the extent that this was merely a matter of adding an additional indicator to the already well-stocked arsenal of central bank analytic instruments, nobody could object to that. But if a particularly prominent role in monetary policy is envisaged for the new indicator, the question arises of how a central bank is to respond to an increase in the spread and a consequent deterioration in the economic outlook. Is it to lower interest rates in order to stabilize real output, irrespective of the movement of prices (about which the spread admittedly says nothing)? And what role does the spread play in the stabilization of prices? Conversely, in the event of a narrowing of the spread and consequently an expected improvement in business activity, are central bank rates to be raised? Is it possible to use the spread at all as a basis for such rules of conduct?

—If too much emphasis is placed on the spread, the central bank runs the risk of becoming a prisoner of the markets and their sharply fluctuating expectations. The central bank would presumably move away from an orientation toward medium-term stabilization to one toward the short-run fine-tuning of economic activity. It would thus be assuming a responsibility which—given its present range of instruments—it is not equipped to bear.

Furthermore, the paper-bill spread is based on specific financial prerequisites which are not satisfied in all countries. In Germany, for instance, the public sector does not issue any short-term paper at all to finance its budget deficits; it confines itself to issuing medium- and long-term securities. It is only in the very recent past that commercial paper has become more widespread; currently the market is not particularly liquid, and there are comparatively few market players. If a paper-bill spread could be calculated at all, given the underlying scale of operations, it would be fairly insignificant.

This goes to show yet again that monetary policy, and the strategies underlying it, must not be considered in isolation from the institutional framework in which it is embedded. The implementation of monetary policy in every country is based on a particular financial system and particular modes of conduct on the part of banks and nonbanks. In the debate on the instruments and targets of monetary policy, the varying experiences of individual countries therefore inevitably result in different answers, although this does not rule out the possibility and desirability of national central banks learning from comprehensive exchanges of views on their respective problems, and on recent academic approaches to their solution.

Commentary: The Role of Judgment and Discretion in the Conduct of Monetary Policy

Allan H. Meltzer

When the organizers of this conference invited me to discuss Benjamin Friedman's paper, they anticipated that we would not agree about the costs and benefits of adherence to precornmitted policy programs, or rules. I will not disappoint them. But I would like to begin by commending Ben for defining discretion, outlining some of the procedures for implementing a discretionary policy, and arguing for its virtues. In a time when efficient markets, rational expectations, neutral money, and time consistency have changed academic discussion, it has become hard to find an academic economist who defends discretionary monetary policy.

Earlier generations of economists rarely defined or defended discretion. They were content to criticize rules that fixed the rate of money growth once-and-for-all. Using real or hypothetical examples, they showed that there were costs of neglecting new information, as required by Milton Friedman's rule for constant money growth. Generally, these discussions avoided the difficult issue about whether discretionary judgments would, on average, do better—whether the gains from discretionary action were less than the costs of errors.

Ben's main arguments are:

(1) monetary aggregates are no longer related to output and prices;

(2) the monopoly power of the Federal Reserve "withers in its importance";

(3) even if the Federal Reserve wanted to control monetary aggregates, shifting patterns of intermediation have greatly complicated the task;

(4) other variables that have been proposed--the term structure of interest rates, the spread between various short-term market rates, or the ratio of nonfinancial debt to GDP—are also subject to (substantial)errors and at times have been misleading about the direction of change in economic activity; and

(5) it has not been possible for economists or central bankers to find regularities of "sufficient centrality and robustness to provide the . . . basis for sound policymaking."

Ben concludes that policymakers must make discretionary judgments based on a wide range of information variables. These judgments and interpretations of particular events must shift frequently. In Ben's words, "assuming that yesterday's answer is still right today is an invitation to error."

I agree that the problem is dynamic not static--change is always with us. That the pace of change has accelerated is a more doubtful proposition. Even if it is true, change and the uncertainties that change brings do not make the case for discretion. Changes can be misinterpreted by policymakers. They may react in a way that destabilizes the economy or that has long-run costs in excess of any short-term benefit. Information available to central bankers is rarely better than information available to market professionals. Each must decide whether changes are persistent or transitory, real or nominal and, given that revisions are often large relative to announced changes, whether the event actually occurred. These uncertainties open the possibility of large errors from the use of "information variables."

The case against discretion

I begin with the case against discretion. Ben starts by quoting von

Clausewitz on rules for war and comparing monetary policy to war. The analogy overlooks a critical difference between war and economic policy. An objective in war is to confuse or mislead the enemy about your strategy, so rules or predictable behavior are undesirable. Objectives of economic policy such as stable growth and low inflation are more readily achieved if the public understands what the policymaker is doing and believes that past and prospective actions are related to the objectives. Generals want their enemies to be fooled; wise economic policymakers seek credibility by following predictable policies.

Two issues are not in dispute. First, research has not uncovered any single indicator or predictor that always correctly foreshadows future output and prices. No magic ratios have been found, and none is likely to be found. Second, many of the short-term relations between monetary aggregates (or other variables) and nominal output or prices change when there are changes in policy or technical changes in payments or financial systems.

These conclusions are neither new nor devastating for stabilizing monetary policy or for policy rules. We have no reason to expect a constant ratio of some monetary or debt aggregate to GDP. Economic theory implies that these ratios change with interest rates and possibly other variables as well as with financial innovation. The ratio of money to income should not be the same at interest rates of 20 percent in 1981 and 3 percent in 1993. Discretionary monetary policy decisions would be easier to make if monetary velocity were like the gravitational constant, or if the current and equilibrium real rates of interest were observable, or if large scale econometric models provided reliable forecasts, or if there was any way economists could consistently forecast the future with small errors. None of these is true, and none is likely to become true.

A main issue on which I disagree with Ben is whether the difficulties posed by the size of forecast errors and the changes in relations between economic variables imply that discretion will deliver better policy outcomes than an adaptive rule. An adaptive rule uses new information as it accrues but, need not, and I believe should not, rely on forecasts. It differs from a fixed growth rule that ignores new

information. There would be much less reason for an adaptive rule, or any rule, if the relations in the economy were fixed, unchanging, and subject to relatively small errors. One of the benefits of a known policy rule—predictable central bank behavior—is that it provides the public with more information about the future path of policy. In an uncertain world, knowing the conditional responses of policymakers removes some of the uncertainty faced by households and firms that plan ahead. Since this is particularly true for long-term plans, unchanging adaptive rules are beneficial. Rules contribute to credibility and formation of correct market anticipations, two subjects that are never mentioned in Ben's paper. Some research shows that a credible rule lowers the cost of achieving zero inflation.

The main purpose of policy rules is to guard against major policy errors. There may be, as I argue below, benefits from reducing the size of modest fluctuations by avoiding errors and reducing uncertainty about policy. The potential gains from this source, though real, are smaller than the gains from avoiding large policy errors. The Great Depression of the 1930s and the Great Inflation of the 1970s were costly results of such errors.[1] These errors were not the result of decisions by malign individuals determined to do harm. They were the result of decisions by well-intentioned individuals making discretionary policy decisions based on their beliefs, judgments, and interpretations.

It is too easy to dismiss these errors as past or even long past events. Would any central bank or government repeat these mistakes?

Recent experience gives no reason for comfort. Japanese policymakers in the second half of the 1980s changed from a credible policy of maintaining low inflation to an exchange rate target at a time of deregulation. The new policy financed the so-called bubble economy. The monetary base increased at a compound rate of 11.5 percent for the three years 1986-89. This was nearly double the growth rate of the previous three years. The stock of base money increased more than 38 percent in these three years.[2] By 1991, monetary base growth had fallen below 1 percent. Much of the excessive money growth went into asset markets in anticipation of higher inflation. When money growth fell, anticipations changed to disinflation or deflation, and

asset prices collapsed.

More recently, policymakers have repeated one of the costly mistakes of the 1930s. Member states of the European Community (EC) maintained an obviously misaligned exchange rate system despite unemployment rates above 10 percent in the United Kingdom, 11 percent in France and Italy, and 16 percent in Spain. Fortunately, speculators forced governments to accept the realignments that policymakers were unwilling to make.

The errors by European policymakers were mainly the result of mistaken beliefs and interpretations. Some of the errors repeat earlier mistakes—the unwillingness to abandon or adjust the gold standard in the 1930s or the Bretton Woods System in the 1960s and early 1970s. Misinterpretation of interest rates also played a role in at least two of these experiences—the depression and the collapse of Bretton Woods.

Typically, discretionary policy relies on forecasts. A study of forecast errors for real GNP growth in the principal developed economies shows that on average forecasters—using any of the currently available methods—cannot reliably distinguish a boom or recession one quarter or one year ahead. (Meltzer, 1987). Forecast errors for the widely used one-year-ahead economic growth forecasts made by the Congressional Budget Office (CBO) from 1977 to 1991 have a standard deviation equal to 44 percent of the average rate of growth. CBO publishes forecasts of consumer price inflation two years ahead. The standard error of forecast for this horizon is 26 percent of the average rate of inflation. Errors in administration forecasts for inflation at the two-year horizon for the same period are 29 percent of the average inflation rate and 57 percent for the average growth of real GDP.

The reported errors are not atypical, but they are large relative to the demands of discretionary policy. Even the comparatively low error for CBO's one-year-ahead forecast implies that it is difficult to distinguish between rapid growth and near recession one year ahead. For inflation two years ahead, the result is qualitatively similar. The best forecasters cannot reliably distinguish between rising and falling

inflation. The size of forecast errors provides a reason for large policy errors when policy is based on forecasts. Recall that discretionary policy in the United Kingdom during its recent deep recession was based on forecasts of a recovery that did not come until after the policy changed. That recession, and more certainly its depth and duration, was avoidable. These costs must be charged to the account of the policymakers.

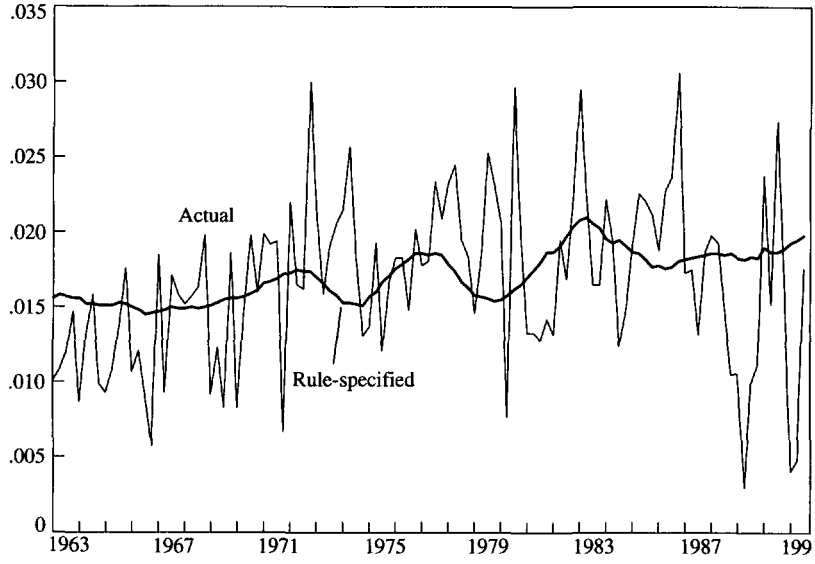
In favor of rules

The case for a monetary rule does not rest solely on the difficulties inherent in discretionary policy. It is always possible that a rule would do worse. Recent work suggests this is not the case.

There are many possible rules, and much experimentation is needed to learn more about the properties of different rules. The particular rule I have chosen for illustration is a version of the adaptive rule I proposed at these meetings almost ten years ago. (Meltzer, 1984). The proposed rule maintains a zero average rate of inflation by setting the current quarterly growth rate of the St. Louis monetary base equal to the 12-quarter moving average of real GDP minus the 12-quarter moving average of base velocity. The first term adjusts for past changes in real growth, so it adjusts gradually for changes in the sustained changes in productivity growth and for recessions or rapid expansions. The second term adjusts gradually for changes in money holding, changes in payments systems and patterns of intermediation such as those discussed by Ben Friedman.

To show how a rule of this kind would have worked in an inflationary environment, I have to adjust for the inflation and disinflation that occurred. I regressed changes in the two moving averages, lagged one quarter, on the current growth rate of the base and used the estimated weights to compute the rule-specified value of base growth. These values are shown by the heavy line in Chart 1. The rule-specified values increase gradually over time and fluctuate within a narrow range as growth and base velocity change.

Chart 1
Base Growth Rule
Quarterly 1963 - 1990



Actual values below the line mean that monetary policy was "tight" relative to the rule, and values above the line mean that policy was easier than specified by the rule. I note that monetary policy was tight before the recessions of 1969-70, 1981-82, and 1989-90 and that policy remained tight during parts of these recessions. Policy was exceptionally easy or inflationary in 1967-68, during most of the 1970s, and in 1985-86. These periods were followed by higher inflation.

Chart 1 suggests that the rule identifies periods of overly expansive and overly contractive policy. In earlier work, McCallum (1990) shows that this was true also during the Great Depression of the 1930s. His rule differs from mine, but the differences are not great. Both adapt gradually to changes in the economy. Either rule would have prevented the Great Inflation and avoided the costly disinflation. If other major central banks adopted similar rules, the rule would provide a benefit for small countries and would reduce exchange rate variability.

Ben Friedman's paper comments repeatedly about the breakdown in the relation of money growth to nominal GDP growth. I have learned to be skeptical about results based on vector autoregressions. There are many competing results in the literature, and they seem to be sensitive to changes in specification.

Chart 2 tells a different story. The chart was prepared for the September 1992 meeting of the Shadow Open Market Committee. It makes a simple comparison between the annual growth rate of the domestic monetary base (the St. Louis monetary base minus estimates of foreign holding of domestic currency by the Board of Governors staff) and the annualized growth rate of nominal GDP (spending). The lag is longer than the one Ben used. The growth rate of the base is advanced six quarters to represent a six-quarter lag of nominal GDP growth behind domestic base growth. Three quarters have passed since the chart was drawn. The additional observations are shown by the broken line that extends the path for spending.

Chart 2
Growth Rate of Spending and Domestic Monetary Base (GDP)

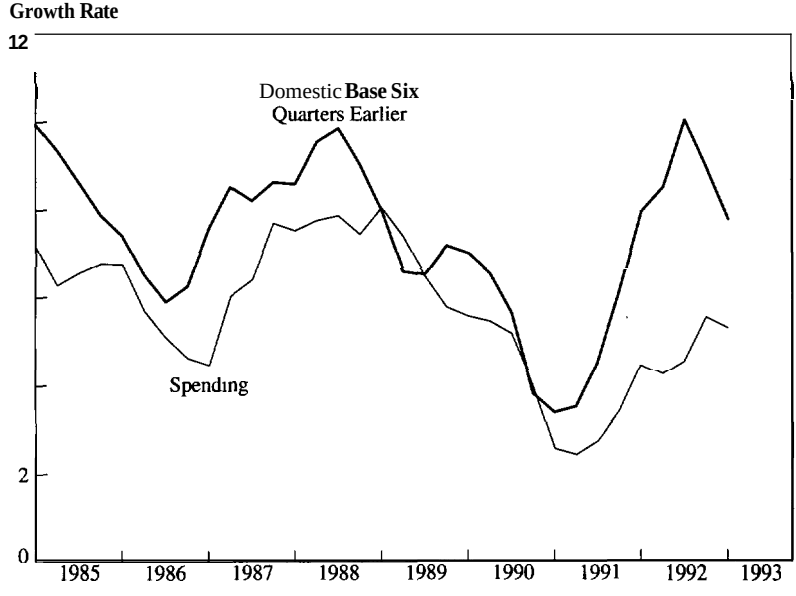


Chart 2 suggests that the growth of the domestic base has forecast turning points in nominal GDP since 1985 relatively well. I don't want to overstate the result. Simple relations of this kind are subject to change. This relation is not an adaptive rule. The lag in the relation has not been constant through the 1970s and earlier in the 1980s. The chart suggests, however, that since 1985 turning points in nominal GDP have followed turning points in the base with a six-quarter lag.[3] The chart denies a main claim in Ben Friedman's paper; the relation between growth of money and growth of nominal GDP has not disappeared.

Did the Federal Reserve follow a rule?

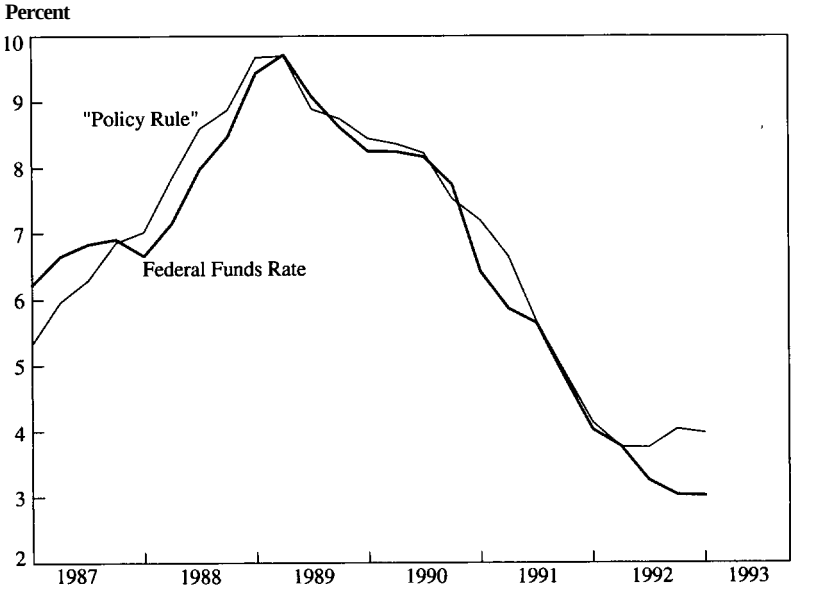
Advocacy of discretion is a throwback to an earlier era. For the past fifteen years, most academic discussion has recognized that the choice facing policymakers is not between rules and discretion but between different types of rules. See Kydland and Prescott (1977). The literature on policy credibility builds on this foundation.

Rules may be complex or simple. They may or may not rely on forecasts. To oppose rules is to favor unpredictable changes that cause the public to misperceive what policymakers do.

In a recent paper, John Taylor (1993) showed that a relatively simple rule described most of the Federal Reserve's actions to change the federal funds rate from 1987 to 1992. Taylor assumed that during these years, the Federal Reserve adjusted the federal funds rate in response to deviations of real GDP and inflation from the Fed's targets. He used 2 percent as the inflation target and the 1984-1992 trend of real GDP as the GDP target. Taylor weighted deviations of inflation and real output from target equally, although he recognized that this was an arbitrary choice.[4]

Chart 3 shows the actual federal funds rate and the rate given by the hypothetical rule. The Fed appears to have followed a consistent policy in this period; they behaved as if they followed a simple adaptive rule of the type suggested in some recent literature. The rule was not followed mechanically and the Fed appears to have changed weights or other behavior in 1992 by lowering the federal funds rate

Chart 3
The Federal Reserve's Policy Rule



Source: Taylor (1993)

more than prescribed by the quasi rule. They have not returned to the rule in 1993.

Chart 3 makes clear that the recent abandonment of the M2 target is of little practical consequence. The Fed has rarely adjusted policy so as to achieve any of its announced monetary targets. As in earlier periods, the federal funds rate has been the principal instrument that the Federal Reserve used to set policy. (Brunner and Meltzer, 1964). Since the federal funds rate moved with output and inflation in a rule-like way, the policy outcomes of this period—rising inflation followed by recession—are attributable to that rule.

Chart I shows that monetary policy was too expansive from 1985 to 1987 and too restrictive from mid-1988 to the end of 1989. The St. Louis base rose at an average annual rate of 9.5 percent from second quarter 1985 to second quarter 1987 and by 4.2 percent from second quarter 1988 to the end of 1989. The rate given by the adaptive base rule for this period was between 6 and 7 percent. The excessive growth

in the earlier period contributed to rising inflation two years later, in 1987-89. The restrictive policy of 1988-89 contributed to the recession and slow growth of 1990-91. Since early 1990, base growth has been excessive again according to the rule summarized in Chart 1.

Conclusion

Benjamin Friedman's argument for discretionary policy based on information variables is, I believe, a long step backward. The announced change in any variable is a mixture of known or anticipated and unanticipated movements. Policymakers like the rest of us, do not know what is news and what was anticipated, which movements will persist and which are transitory. Usually, we cannot separate permanent and transitory changes in real and nominal variables or real and nominal changes in prices, wages, interest rates, and many other variables. Information is subject to change when data are revised.

The Federal Reserve's recent decision to rely on real interest rates is subject to all of these problems. It is difficult, even after the event, to separate one-time price changes from persistent changes in the rate of price change, or to distinguish real and nominal effects on market interest rates, or to disentangle permanent and transitory changes in real interest rates. Basing policy decisions on movements of real interest rates will be no more successful than past attempts to use nominal interest rates as a guide.

A rule is nothing more than a systematic decision process that uses information in a consistent and predictable way. Several central banks have recognized what the academic research of the last twenty years has formalized. Some have adopted medium-term strategies to control inflation sometimes, as in Germany, using a monetary aggregate as an indicator. New Zealand has gone further toward an explicit rule for price stability with sanctions on the central bank governor to encourage successful implementation. Canada is perhaps somewhere between the two.

It is often said that monetary policy must choose between stable prices and stable exchange rates. For the past twenty years, we have had neither. If central banks are serious about protecting their curren-

cies from the inflationists in legislatures and governments, and seek to avoid the destabilizing shifts from excessive expansion to excessive contraction that contributed so much to the variability of, prices, exchange rates, and output in the 1970s and 1980s, more of them in the future will choose and announce an operational rule. They may choose one of the adaptive rules that have been proposed or a better rule that has not yet been devised. But they will move toward rule-like behavior, toward cooperation with markets instead of attempts to fool them.

The rule I proposed if adopted by major countries would provide reasonable price stability and enhanced exchange rate stability. It would offer smaller countries an opportunity to fix their exchange rates, if they choose, and import reasonable price stability. These public goods cannot be obtained by discretionary policy.

I will close with some remarks about the theme of this conference. It is an ancient theme, with antecedents as old as monetary economics. In the past thirty years, we have revisited the theme many times. Monetary policy was said to be undermined by intermediation, by growth of Euro-currency markets, by the "cashless" society, by credit cards, by deregulation, and now by securitization and by international capital flows. The list could be expanded.

None of these predictions came true. As long as there is a demand for base money and the central bank has a monopoly on production of base money, monetary policy will continue to affect output and prices. Short-term relations between money and other variables change, however. This is the message of the famous Lucas critique. Since we have little firm knowledge of these relationships, the fact that they change with innovations gives another reason for taking a longer-term focus, reducing the influence of short-term changes, and pursuing predictable medium-term strategies expressed as a rule. Surely this is better than pretending that policymakers have information or insight that they do not have and that neither they, nor we academics, can provide.

Endnotes

[1]McCallum (1990) provides evidence on the gain from the use of an adaptive rule in the United States in the depression. The gain would have been greater if the same rule had been followed by many countries as proposed in Meltzer (1984, 1987).

[2]Data are for Reserve Money from IMF data base as reported in ***International Economic Conditions,*** Federal Reserve Bank of St. Louis, July 1992.

[3]Turning points in the growth rate of the base are not affected by subtracting foreign holdings of U.S. currency. The base growth rate is higher before adjustment.

[4]The rule is $r = p + .5y + .5(p\text{-}2) + 2$ where p and y are respectively the rate of inflation over the past four quarters and the percent deviation of real GDP from its trend over 1984 to 1992. See Taylor (1993).

References

Brunner, K., and A.H. Meltzer. "The Federal Reserve's Attachment to the Free Reserves Concept," U.S. Congress, House of Representatives, Subcommittee on Domestic Finance. 88 Congress, May 7, 1964. Reprinted in K. Brunner and A. Meltzer, eds., ***Monetary Economics.*** Oxford: Blackwell, (1989), pp. 21-96.

Kydland, F., and E.C. Prescott. "Rules Rather than Discretion: The Inconsistency of Optimal Plans," ***Journal of Political Economy,*** vol. 85 (1977). pp. 473-92.

McCallum, B. "Could a Monetary Base Rule Have Prevented the Great Depression?' ***Journal of Monetary Economics,*** vol. 26 (1990), pp. 3-26.

_____. "Robusmess Properties of a Rule for Monetary Policy," ***Carnegie-Rochester Conference Series on Public Policy,*** vol. 29 (1988), pp. 173-204.

Meltzer, A.H. "Overview," in ***Price Stability and Public Policy,*** papers and proceedings of a symposium sponsored by the Federal Reserve Bank of Kansas City, August 2-3, 1984, pp. 209-22.

_____. "Limits of Short-Run Stabilization Policy," ***Economic Inquiry,*** vol. 25, (1987), pp. 1-14.

Taylor, J. "Discretion Versus Policy Rules in Practice," ***Carnegie-Rochester Conference Series on Public Policy,*** vol. 39, (1993), forthcoming.

Financial Markets in 2020

Charles S.** Sanford, **Jr.

Introduction

At Bankers Trust, we spend a lot of time anticipating trends in the financial markets, not only those affecting short-term price movements but also those that are responsible for the long-term evolution of the system itself.

Anticipating the longer term is especially compelling today considering the speed at which the financial system is changing. Even our inherent romanticism doesn't let us forget that we are straddling the twentieth and twenty-first centuries, a period when more than ever the future seems just around the comer.

But there's the future and the future. For the purpose of this paper, let's impose a stop-loss on our observations. I like the year *2020.* For one thing, it is the year when the Jet Propulsion Laboratory predicts that Voyager will stop transmitting data back to Earth—a forecast that for some reason I find exciting. Twenty-seven years also is far enough away to allow trends to develop, yet near enough to be useful for long-range planning. And it doesn't hurt to know that *20120* stands for perfect vision. Maybe that alone will improve the odds of my being correct.

Thus this paper will focus on the period between now and the year *2020,* contemplating how the financial functions will evolve over that period and how quickly change will come.

Anyone who deals in the financial markets knows that anticipating trends is difficult at best. But he or she also realizes that not to try is tantamount to accepting the most unlikely scenario of all: no change.

So I will plunge ahead.

Constants and change

Heraclitus said it best: "All is flux, nothing stays still. Nothing endures but change." That is true. Nonetheless, between now and 2020 two phenomena will remain constant. First, human nature will not change. Second, the basic financial functions, as I will define them, will not change, although how we perform these functions will change.

First for human nature. A very basic element of that nature is a hunger for security—law and order, job security, retirement security, decent and affordable health care, and financial security. For a variety of reasons, people have begun to feel that organizations, especially governments, designed to provide their basic security no longer can be relied on.

This societal change is having a profound impact on financial institutions' relationships with their clients and employees, who once automatically accepted an institution's promise that "We know what is best for you."

By necessity, not by preference, people are becoming more involved in creating their own security by doing their own homework and making their own decisions. "One-way broadcasting" and "command and control" styles are no longer acceptable. This pervasive sense of vulnerability is putting risk management at the top of the agenda for many people and organizations. To the degree that financial institutions can better help their clients deal with risk, the clients are very ready for change. In any event, gaining their trust will be an essential challenge for financial institutions.

In addition to the sense of individual vulnerability, two other facets of human nature will affect the pace of change: people's inherent thirst

for knowledge and their frequent aversion to change. The first is the motivator behind financial innovation and the second is the greatest barrier to it.

That barrier is deeply entrenched, as evidenced by a report from an observer at the Digital World Conference, which was held in Los Angeles in July 1993: "Given that this was a conference on digital technology for industry insiders, I saw very few laptop computer note takers; 99 percent used paper and pen. Very few had mobile telephones with them, and consequently the lines at the pay phones were lengthy."

We see that even technologists have trouble adjusting to the new environment. I have no doubts, though, that their children, steeped in today's technology, will be far less likely to be lining up for pay phones by the time they dominate the work force—well before 2020. It won't be long before the impact of the "computer games" generation is strongly felt at the policymaking level.

Countering any inertia that works against change is the human drive for knowledge. And this thirst has been whetted by rapid advances in financial theory, as exciting and as portentous as the twentieth century's major developments in physics and biology. A substantial portion of this paper will deal with those developments.

Let me emphasize, however, that this paper looks only at the future impact of ***currently*** available technology. It does not delve into Buck Rogers speculation about new inventions (or Star Trek, depending on your age and frame of reference). And it does not talk about couch potatoes with virtual reality helmets operating out of hermit huts. It recognizes that an ocean of new technologies is available to today's markets, but that the process toward implementation of these technologies has hardly begun.

Some may believe that the predictions in this paper are too bold, but I believe that if anything, change will be faster and more far-reaching.

The basic financial functions

As the existing technologies come onstream, they will affect how the basic financial functions will be performed. These functions are (1) financing, (2) risk management, **(3)** trading and positioning, (4) advising, and (5) transaction processing. This paper will avoid many standard financial terms of twentieth century thought. Although financial functions will be the same, they will be looked at differently in the twenty-first century. Thus we will not refer to "loans," "borrowings," or "securities," but to "claims on wealth" or "financial claims." We will avoid the term "banks" because banks, certainly as we know them, will not exist.

Financing

Financing facilitates the movement of funds from suppliers to users. Usually it starts with the identification of users and suppliers by a financial institution and ends with the creation of products to satisfy both.

Successful products created by a financial intermediary enable each party to meet its needs for timing and location of cash flows and for the amounts of money to be supplied or used. The intermediary also helps clients assess the merits of alternative products, seeking to find the least costly source of money for users and getting the best possible return for suppliers, taking into consideration their appetites for risk.

Risk management

Risk management is the process of moving clients closer to their desired risk profiles by helping them shed unwanted risks or acquire new risks that suit their portfolios. At times, this can be done simply by matching a client who wants to shed a risk with one who wants to acquire that risk. More often, it involves unbundling, transforming, and repackaging risks into bundles tailored to fit the particular needs of various clients.

Trading and positioning

Trading and positioning is the buying and selling of claims on wealth. It provides liquidity to clients so they can more easily alter their portfolios or raise cash. It also moves market prices of financial claims closer to their fair values and makes market prices more visible and reliable.

Advising

Advising is making decisions on behalf of clients or giving them information and advice that help them make better decisions for themselves.

Transaction processing

Transaction processing is the storing, safeguarding, verifying, reporting, and transferring of claims on wealth.

As noted, some of these functions are taking on new forms and are becoming more sophisticated, but they will be needed as much in **2020** as they are today.

Technical and market environment in 2020

Again, technology is driving these changes. Information technology already is helping us execute these financial functions better and faster by providing improved data collection, calculation, communications, and risk control. By **2020,** those tools will be much cheaper and far more powerful. As indications of this trend: A transistor, once costing $5, costs less than a staple today; entire reference libraries are now stored on one five-inch compact disc, and computer users have become accustomed to increasing their processing power by a factor of ten every five to seven years at no additional cost. And the progress is geometric because each element—computation, availability of data, communications, and algorithms—feeds on the others.

This revolution in information technology is enabling the financial world to operate on a much more complex level than before.

At times the speed and power at which computation and communications tasks can be accomplished is so much greater than in the past that it brings qualitative change, not just quantitative change. For example, the options business could not operate as it does today without high-speed computers to track its intricacies, including the monitoring of risk profiles and valuations. Computer technology has made it possible to disaggregate risk on a broad scale and redistribute it efficiently, enabling management to maintain greater risk control while giving employees more freedom to use their own judgment. In other words, information technology allows a financial organization to decentralize while improving control.

The ability to program computers to digest ever-larger amounts of information more and more quickly enables us to apply sophisticated automated logic—what we call "automated analytics"—to many problems, such as performing elemental arbitrage tasks. Eventually these programs will be embedded on computer chips, which will be able to solve progressively more complex problems—and on a global basis.

Indeed, by 2020, a true global marketplace will be established, with everyone—individuals, companies, investors, organizations, and governments—linked through telephone lines, cables, and radio-wave technology. With the touch of a button, people will have access to other individuals and vast databases around the world. Such access will be readily available through phones, interactive television, workstations, or hand-held "personal digital assistants" that combine all these functions.

Organizations will be "fully wired" so that their computers will capture incoming and internally generated data, analyze the information, and make it instantly available to any authorized person, wherever he or she may be. Armies of clerks and administrators no longer will be needed to serve as messengers, translators, reconcilers, or summarizers of information. As discussed below, this will change how firms are managed.

To further increase the system's efficiency, all financial claims (including claims on volatility) will be in book entry form, and

ownership of all these claims will be transferable instantly anywhere around the globe via 24-hour multicurrency payment systems. Settlement risk will be eliminated and with it a major bottleneck to transaction flows. This has enormous implications for releasing capital and lowering transaction costs.

"Wealth accounts"

A key to the system will be "wealth accounts," in which companies and individuals will hold their assets and liabilities. These accounts will contain today's relatively illiquid assets such as buildings and vehicles as well as what we know today as stocks, bonds, other securities, and new types of financial claims. These accounts would also contain all forms of liabilities.

Computers will continuously keep track of these items in the wealth accounts and will constantly mark both assets and liabilities to market, making these items effectively liquid. Within an individual wealth account, the arithmetic sum of the items will be the net worth. Yesterday's income and today's wealth will always be known with a high degree of confidence.

The wealth accounts will be the focal point for financial processing and reporting. The integrity of these accounts will be validated by institutions, much the same as checking accounts or mutual funds are today. Wealth accounts will be instantly tapped via "wealth cards." For example, this will allow you to pay for your sports car by instantly drawing on part of the wealth inherent in your vacation house.

Wealth accounts will simplify the provision of credit. In the ultimate extension of today's home-equity lines, instant credit will be available to companies and individuals secured with the current value of their wealth accounts. Leverage constraints will be established by investors and perhaps central banks. Some investors will continue to extend unsecured credit on the basis of an individual's expected income stream, but this would violate this writer's strongly held view that one should never extend unsecured credit to anything that eats.

Owners of wealth accounts will use automated analytics to help

them determine their risk/reward appetites and suggest appropriate actions to achieve those targets. If the owner approves, the wealth account would proceed to automatically implement the program. Of course, some people will prefer the advice of a human on more complex or large transactions, for both expert judgment and psychological comfort.

Automated analytics will also provide customized investment management, making the wealth accounts far superior to today's mutual funds. In effect, individuals will have the option to manage their own mutual fund.

All seekers of financial claims will understand that to get full access to the financial markets they will be legally responsible for keeping their wealth accounts up to date. These accounts will be electronically accessible to any authorized user, directly or through computerized analytics programs. Privacy will be maintained as with today's checking accounts.

Global electronic bulletin boards will be the principal medium through which buyers and sellers will post their needs and execute transactions. Many financial claims (including what are known today as loans and securities) will bypass middlemen (commercial and investment banks) and will be bought and sold by electronic auction through these global bulletin boards, with minimal transaction costs.

Today we have only a few recognized rating agencies. In 2020 we will have hundreds — perhaps thousands — of specialized providers of news, data, and analysis that will provide interactive electronic bulletins, on demand, real-time, and tailored to each subscriber's particular notion of risk.

There will be no special need for retail financial branches because everyone will have direct access to his or her financial suppliers through interactive TV and personal digital assistants. True interstate banking will have arrived at last! Or more accurately, true "global banking" will have arrived, as every household will be a "branch."

A key feature of 2020 is that nearly everything could be tailored to

a client's needs or wishes at a reasonable price, including highly personalized service from financial companies. Firms will be selling to market segments of one.

In addition to the bulletin boards that will be open to anyone who pays a nominal fee, users and suppliers of financial claims will be networked to each other to exchange real-time data and documents (computer-to-computer), to automatically execute most day-to-day transactions, and maybe to confer via virtual reality electronic meetings. On any given deal, firms may compete not only with their natural competitors but with their nominal clients as well. In effect, supplying financial assistance will be a free-for-all. It will not be limited to those calling themselves "financial institutions" because any organization or individual will be able to reply to needs posted on the bulletin boards. That means an organization that specializes in financial matters may, at times, find itself competing directly with its clients.

Other elements of the financial world of 2020 are especially hard to predict. What form will robbery and fraud take? As we said, human nature will not change and dishonesty will be around in 2020 as it is today. Voice recognition, DNA fingerprinting, and secure data encryption will instantly verify transactions, preventing today's scams. But new forms of "information crime" will appear.

Geography will be less of a constraint. Many employees could be geographically dispersed, such as those engaged in processing (for cost advantages), in sales and marketing (to be close to the customer), and in handling local problems that require local solutions. But the people responsible for creating products and overall strategy will still have to be in major cities. These people need the creative stimulation that is found primarily in cities, where they will thrive on face-to-face contact with people from different backgrounds and cultures and from different disciplines — artists, scientists, businesspeople and lawyers.

"Particle finance"

In fact, a convergence is taking place among these disciplines as finance becomes more like science and the arts. Financial theory is becoming increasingly important and tremendously useful as theo-

retical advances have emerged in the last few years. These include portfolio theories, asset pricing theories, option pricing theories, and market efficiency theories.

Many of the financial world's most creative people are devoting their time to these theories and are radically improving our comprehension and management of risk. They deal with variables as straightforward as interest rates and as complex as the weather—all of which have an enormous impact on the markets.

This path-breaking work is providing a solid platform for innovation in practice as well as in theory. The rapidly growing acceptance of derivative-based financial solutions is one very important example of this.

At this point, however, the science of markets is at an extraordinarily early stage of development. We are still in a "Newtonian" era of "classical finance," in which we tend to look at financial instruments—such as stocks, bonds, and loans—in static, highly aggregated terms.

Models based on classical finance analyze risk at the level of "securities" (or options on these securities) and usually assume that the volatilities of the securities are constant over time and can be estimated with statistical averages of past price data—a stationary world where there is no progress, no structural change, no evolution. But in reality, a security's volatility is based on a highly aggregated bundle of many complex underlying risks that are unlikely to be stationary and that usually interact with one another. Classical finance also assumes that human beings are rational economic decisionmakers—an assumption that frequently appears to be violated.

Most classical finance models looking at Bankers Trust would concentrate on the "beta" of its stock—the stock's volatility relative to the market. These models would have great difficulty dealing with the multitude of underlying critical risk factors that produce beta, such as changes in financial market volatility, changes in global product, the volumes of our transaction processing, an earthquake in Japan, changes in consumer confidence in the United Kingdom, or a change

in our corporate strategy. We describe these critical factors as "financial attributes." Beta ignores them or grossly summarizes them as homogeneous packets of white noise.

Theoreticians, however, are not ignoring them. Researchers have begun to look for a theory—what we call "The Theory of Particle Finance"—that will help us better understand an asset's financial attributes.

Finding such a theory is not just around the corner, but we are seeing interesting signs of progress, and by 2020 a much more powerful financial discipline will be in place. We are beginning from a Newtonian view, which operates at the level of tangible objects (summarized by dimension and mass), to a perspective more in line with the nonlinear and chaotic world of quantum physics and molecular biology.

Quantum physics, which operates at the level of subatomic particles, and which may eventually bridge subatomic and astronomical events, goes much deeper than Newtonian physics—beyond objects to molecules, to atoms and to subatomic particles.

Similarly, classical biology operated at the level of the organism and was preoccupied with taxonomy and anatomy. Biology advanced by probing deeper into the cells and genes, which are much closer to the fundamental building blocks of life. This made it possible to explain some of the critical interactions among cells, organisms, and the environment.

Like quantum physics and modem biology, particle finance is beginning to look beneath beta to identify an asset's financial attributes, including the attributes' individual and collective volatility. Efforts also are being made to integrate these attributes into the desired financial claims.

This work is creating order from apparent disorder, providing building blocks that will allow the more effective packaging and management of risk in an economy whose structure is constantly changing.

The purpose of this research is to reach the most efficient balance of risk and return—getting a higher expected return on the same risk or getting the same return with lower risk.

As noted earlier, the theory of particle finance is still in its infancy—but by 2020, it will be much further advanced, aided by an explosion in computing power and financial data. We can't say which of today's early attempts to advance the theory of particle finance will work, but already the developments are intriguing.

For example:

(1) Chaos theorists are attempting to find the underlying structure and pattern—if they exist--of the apparent randomness of changes in asset values. (The "Random Walk" may not be completely random after all.)

(2) Researchers are building neural networks that mimic certain complex properties of the human brain. When harnessed to massive computing power, it is hoped that these neural networks will find meaningful patterns in the "noise" of financial attributes and, learning from experience, will strip away some of the apparent randomness of financial events.

(3) "Fuzzy logic" is a mathematical way of drawing definite conclusions from approximate, vague, or subjective inputs. Because it attempts to embody certain kinds of human perception and decision-making skills, it may help us understand complex interactive systems that involve human intervention (like financial markets).

(4) Combinations of these and/or other new methods may produce the answer. For example, information gleaned from the neural networks might be used to define "fuzzy" relationships in the system and then to write "fuzzy" rules to control the processes or to predict the systems' behavior in new situations.

The 2020 technology environment promises much greater market efficiency through better information and lower transaction costs. However, as particle finance uncovers myriad risk variables, now

existing but "invisible," it also uncovers the inefficiencies associated with these variables. Also, the constants of human nature will still produce financial fads and bouts of irrational market euphoria and gloom (although we can hope that better information will dampen their intensity). The ideal of a perfectly efficient market will not be achieved by 2020, if ever.

Particle finance and more powerful technology will substantially reduce the amount of unwanted risk borne by individuals, institutions, and the system as a whole. We will find better ways to quantify, price, and manage today's familiar risks. We will also uncover, quantify, price, and manage risks that exist today but are hidden from view. The net benefits will be great--even granting that new and unforeseen risks could be created by this environment.

Applying particle finance

Meanwhile, progress is being made at the front lines as well as in the labs. Pioneers in the derivatives business are successfully identifying, extracting, and pricing some of the more fundamental risks that drive asset values, such as interest rates, currency values, and commodity prices. Even though today these early applications look crude and primitive, they have already created a new and powerful process for solving important and practical financial problems. These range from limiting an airline's exposure to fuel price increases to helping a company hedge the value of a pending acquisition.

And important new applications are already on the runway: credit derivatives and insurance derivatives, for example.

Long before 2020, credit risks will be disaggregated into discrete attributes that will be readily traded, unbundled, and rebundled. Intermediaries will manage a large book of diversified long and short positions in credit attributes. They will make markets in credit risk attributes and in bundles of attributes customized to suit the particular needs of their clients.

Such tailored products will permit each business to price and manage credit risk arising from its activities in a way that is best for

that business. Perhaps even residual credit risks left after this process will be covered by a third-party insurance policy.

As the discipline of particle finance evolves, the primary job of financial institutions will be to help clients put theory to practical use. Just as today's man on the street does not practice particle physics, he will not practice particle finance in 2020.

It may often be done for him or her through automated analytics. For example, particle finance and automated analytics would provide much better asset allocation advice than is available today—allocating positions across many financial attributes rather than just picking the stock-bond mix.

The more advanced automated analytics programs will be like today's sophisticated computer chess programs, which can beat most players, but not all. As a result of competition from automated analytics, experts will be challenged to move on to higher and higher levels of wisdom and creativity.

However, the financial professional who prices the risk attributes will continue to use a combination of automated analytics and judgment. He or she will be responsible for the validation of the logic and historical data used in the automated analytics. In addition, forecasts of prospective market conditions will continue to play a critical role in pricing risk attributes, especially where prospective events are influenced by nonlinear relationships or structural changes that are not evident in past data or experience. We would expect a combination of chaos theory, fuzzy logic, and other tools to assist with predictive problems.

While advances in financial theory and technology will give talented people more powerful tools to apply their human creativity, they will not be replaced with robots. The CAT scan did not replace skilled neurologists—it gave them a tool that allowed them to apply their judgment with more precision and power.

In addition, highly skilled and creative specialists will continue to be needed to define and solve problems that are particularly complex

and unique. These financial specialists will be the highest practitioners of particle finance, combining a creative grasp of financial possibilities with a psychoanalyst-like ability to help clients understand the true nature of their preferences for risk and return.

The role of central banks

The role of central banks will change as financial markets change. Two basic functions of central banks will be to protect us from systemic risk and to keep inflation in check.

The mechanisms by which central banks will deal with inflation in the world of 2020 are not clear. One method might be the use of margin requirements to control the amount of credit extended against wealth accounts. Clearly, capital controls and fixed exchange rates will be relics of an earlier age.

Another mission will be to avoid systemic collapse. We emphasize that this is ***not*** the same as dampening market volatility. Nor will regulators have to concern themselves with the fate of individual institutions, ending government-sponsored bailouts. Examiners will monitor the risk attributes of individual institutions to judge whether and how they contribute to the risk attributes of the system as a whole. (Everything else is random noise that cancels out at the portfolio level).

Central bankers will focus on the prospective behavior of the system as well as current values of key targets. They will operate in the alphabet of financial risk as many advanced professionals do today—"delta" risk, the change in the values of instruments that are derived from the values of other instruments; "gamma" risk, the impact of highly nonlinear price changes on the behavior of the portfolio; "vega" risk, the change in the behavior of the portfolio arising from changes in the implied volatilities of the underlying instruments; and "theta" risk, the change in the behavior of the portfolio arising from the passage of time.

To effectively operate in this environment, central bankers will have to thoroughly understand and use the new computer and communica-

tions technology. Human nature being constant, they will also need to understand the psychology of crowd behavior and its prospective impact on financial market stability.

Thus central banks will have tools to prevent systemic collapse in the world portfolio similar to the tools that financial institutions will use to manage the corporate systemic risk in their portfolios. These tools will include real-time data and automated analytics.

Insuring against systemic risk will require a globally coordinated effort, which could well be the biggest challenge to the central banks. Will governments be able to put aside their parochial nationalistic agendas?

A few implications for financial institutions arising from particle finance in 2020

Particle finance presents a cornucopia of new business opportunities for financial institutions. Myriad risks, perhaps inexhaustible risks, are yet to be uncovered, described in "probability of occurrence" terms and then rebundled to satisfy client needs. There will always be a need for new disciplines and technologies to measure and deal with these risk attributes. In addition, all of these attributes and bundled products must be stored, safeguarded, verified, reported, and transferred.

Financial professionals will constantly be re-educating themselves. We, for example, are creating a "Bankers Trust University," where our people will be encouraged to spend many of their working hours.

Obviously, in the era of the theory of particle finance, financial organizations will look very different from the way they do today and will require a new type of manager.

With >virtuallyno layers of management, financial organizations will attract an array of highly skilled and creative experts, including a wide array of people from science and mathematics.

Senior management will be like conductors of orchestras guiding their "artists" and "scientists" through example and influence rather

than by "command and control." One of the important jobs of top managers will be to get their technical experts and managers to play in the same key. They are temperamentally different from one another, but as finance, science, and the arts continue to gradually merge, the scientist, artist, and manager will become more alike. The leaders' most important functions will be to inspire by articulating a clear vision of the organization's values, strategies, and objectives and to know enough about the business to be the risk manager of risk managers.

Superior judgment will always be essential and will continue to be valued highly since it will not be embedded on silicon. Depth of talent will be critical to success, so recruiting and retaining people will remain management's most important job. Technology will never replace the subtlety of the human mind. People will be the most important factor in 2020, just as they are now. We must learn how to grow wise leaders from the ranks of specialists, a difficult task.

Conclusion

These concepts will not flourish unless society blesses them. A social critic may say they are nothing more than a financial engineering exercise designed to enrich a few at the expense of many—a zero-sum game.

Not true. For as risk management becomes ever more precise and customized, the amount of risk that we all have to bear will be greatly reduced, lowering the need for financial capital. This will have a tremendous social value because financial capital that had been required to cushion these risks will be available elsewhere in society to produce more wealth to address society's needs. In addition, this will liberate human capital by the greater leveraging of talent.

And these concepts will not flourish unless our clients bless them. As valuable as macro capital generation may be, it is not enough. On a micro basis, individuals and organizations must see value for themselves; clients must buy the service. Their trust must be earned by delivery of objective diagnostic help and solutions of value to them. We shall earn it.

The Integration of World Capital Markets

Michael Mussa
Morris Goldstein

Introduction

International capital markets, like their domestic counterparts, serve several key functions. They channel resources from units (households, firms, governments) that are savers to units that are dissavers, thereby loosening the constraints imposed by self-finance and enabling increases both in the overall productivity of investment and in the smoothing of consumption. They provide liquidity. They allocate and diversify risk. They may even help to "discipline" errant borrowers-either by subjecting them initially to a rising default premium and ultimately, to the threat of credit rationing, or by forcing adjustments in exchange rates. By permitting trade in financial assets to take place without regard to either national boundaries or the nationalities of market participants, there is a strong presumption that the efficiency, liquidity, risk-pooling, and disciplinary attributes of capital markets will be enhanced.

In some important respects, developments over the past two decades have been kind to the view that the benefits of open capital markets are being increasingly recognized and that integration of capital markets has already proceeded quite far, To begin with, there has been a progressive dismantling of capital and exchange controls among the major industrial countries, followed by a broader-based liberalization

and reform of their domestic financial sectors. A snapshot of those liberalization measures is shown in Table 1. Note that liberalization has spanned money, bond, and equity markets. Prior to the second half of the 1980s, it was the offshore markets and the banks that led the way, but since then it has been the reformed domestic markets and the securities markets that have provided much of the momentum.

Table 1

Highlights of Financial Liberalization in Major Industrial Countries

United States

1964 - Interest Equalization Tax introduced.
1971 - NASDAQ system introduced.
1972 - IMM opens, trading FX futures.
1975 - deregulation of securities firms' commissions;
- CBOT opens, trading interest rate futures.
1978 - International Banking Act.
1979 - Reg. K: subsidiaries of commercial banks can deal in and underwrite equity securities outside the U.S.
1980 - DIDMCA phases Reg. Q out by 1986.
1981 - International Banking Facilities.
1982 - Security Pacific is first bank to set up a securities firm subsidiary;
- currency options introduced.
1984 - 30 percent withholding tax on interest income paid to foreigners repealed.
1986 - NYSE, AMX, NASD allow foreign issuers if they comply with home country laws;
- Government Securities Act.
1987 - CBOT begins evening trading.
1988 - Primary Dealer Act requires reciprocity before foreign financial institutions can become dealers in U.S. government security markets.
1989 - CFTC approves GLOBEX.
1990 - Rule 144a exempts from registration privately-placed debt and equity offered to qualified institutional buyers.
1991 - Multi-jurisdictional disclosure system with Canada.
1992 - Reforms to government securities market include re-design of auction mles; after-hours trading on NASDAQ International.

Canada

1977 - Equity options introduced at TSE, MSE,
- Computer Assisted Trading Scheme (CATS) goes online at TSE.
1980 - Interest rate futures introduced at TSE.
1983 - Negotiable commissions at ME, TSE.
1984 - Toronto Futures Exchange (TFE) opens;
- Montreal and Boston exchanges establish automated trade routing system.
1986 - Blue Paper "New Directions for the Financial Sector" published;
- agenda includes integration of financial services industries by common ownership and extension of powers.
1987 - From June, all banks are allowed to own securities companies;
- Ontario allows restricted cross-border activity by foreign dealers;
- Ontario and B.C. allow foreign ownership of securities dealers incorporated in these provinces.
1989 - Bank Act eases restrictions on foreign share of Canadian banking activity.

1990 - Pension funds can increase foreign assets eventually to 20 percent in 1993.
1991 - Canadian and U.S. securities regulators recognize a multi-jurisdictional disclosure system;
- introduction of off-hours trading sessions.
1992 - Ontario allows foreign advisers to provide investment advice to sophisticated investors;
- deposit-taking and similar institutions given expanded securities trading and advisory powers.

France
1967 - Bank lending rates deregulated.
1984 - New Banking Law provides a unified regulatory structure;
- foreign exchange controls rescinded, money market opened up.
1985 - CP market opens, but only to nonbanks;
- capital market fees, taxes reduced, deregulated.
1986 - Computerized securities quotation and order system (CAC) introduced;
- MATIF opened;
- T-bills available to all investors;
- deregulation of banking commissions;
- interest rates on deposits longer than 3 months are liberalized;
- partial capital flows liberalization.
1987 - Reform of the government securities market: introduction of market makers;
- options introduced.
1988 - New Stock Exchange Law: banks and other financial institutions can own securities companies;
- strengthened prudential rules for stock exchange members;
- deregulation of commissions; OATs listed on the NYSE.
1990 - Virtually all exchange controls eliminated.
1991 - Reform of the market for negotiable credit securities;
- regional stock exchanges link to Paris.
1992 - Completion of the electronic payment and delivery service for securities;
- introduction of efficient payment and delivery system for ECU securities.

Germany
1981 - Temporary capital controls lifted.
1984 - Tax on foreign investors' income from German bonds eliminated.
1985 - Bundesbank allows issues of DM bonds with innovative features and allows foreign-owned banks in Germany to lead-manage foreign DM bond issues;
- DM FRNs, currency swaps, zero-coupon bonds introduced.
1987 - private use of ECU placed on same footing as that of other currencies;
- Federal Bond Consortium opened to foreign banks.
1988 - Foreign investors allowed to buy five-year Federal Bonds in the primary market.
1989 - Rules for foreign DM bonds eased.
1990 - DTB opens;
- FX-denominated bond, note issues permitted;
- primary market for Federal bonds changed to include auctions.
1991 - securities transfer tax abolished;
- nonresidents allowed to buy one to two-year Treasury Financing Paper;
- DM CP market starts up;
- Federal Treasury Notes introduced.
1992 - proposals for centralized supervision of securities trading;
- enforcement of insider trading and reporting regulations;
- money market mutual funds authorized;
- company and stamp taxes abolished;
- German branches of foreign banks can lead-manage DM bond issues and MTN and CP programs;
- regional exchanges to be integrated.

Italy
1984 - open-end investment funds introduced.
1985 - stock exchanges introduce continuous auction trading for listed shares;
- proposed securities market reforms include computerization and integration of systems for quoting, information dissemination, order routing, and execution, clearing, and settlement; concentration of all securities transactions in one market system; regulating the market for unlisted securities; regulation of securities firms;
- controls on capital inflows lifted, restrictions on residents' foreign assets relaxed.
1988 - creation of screen-based Government securities market based on a system of primary dealers;
- most remaining foreign exchange controls abolished.
1990 - Government securities market open to foreign investors;
- remaining foreign exchange controls abolished.
1991 - approval of comprehensive regulatory framework for securities business and reforms to organization and functioning of the markets, including futures and options;
- start of screen-based trading on the stock exchange.
1992 - completion of centralized share depository;
- MIF opens;
- tax exemption of interest payments from certain currency bonds is removed.

Japan
1970 - first Samurai bond.
1972 - Interbank FX trading begins in Tokyo.
1973 - six foreign stocks listed on TSE.
1974 - ban on issuance of Japanese corporate bonds overseas is lifted.
1978 - first issue of Euro-yen bonds by a nonresident.
1979 - first issue in Japan of unsecured yen-bonds by a foreign private company;
- foreign exchange controls relaxed;
- banks can issue short-term FX loans;
- Gensaki bonds offered to nonresidents;
- domestic CD market begins, open to nonresidents.
1980 - securities firms offer MT government bond funds;
- new Foreign Exchange and Foreign Trade Control Law;
- FX banks can make MT, LT FX loans.
1981 - Japanese bank subsidiaries can lend ST Euro-yen to finance trade with Japan.
1982 - Japanese banks can lend LT Euro-yen to borrower of their choice;
- new Bank Law and Securities and Exchange Law.
1983 - banks can sell newly issued, MT and LT govemment bonds OTC;
- JASDAQ introduced;
- Samurai bond regulations relaxed;
- postal insurance can buy foreign bonds.
1984 - securities f i s can sell FX CDs, CP in the domestic market;
- banks allowed to deal in govenunent bonds;
- non-Japanese banks can lend yen;
- FX trading no longer tied to commercial trade and hedging-swaps allowed;
- yen-FX conversion limits for foreign banks abolished.
1985 - introduction of govemment bond futures;
- bankers' acceptances introduced;
- nine foreign banks open trust subsidiaries;
- interest rate deregulation begins;
- Euro-yen FRNs, zero-coupon bonds, CDs, warrants introduced;
- withholding tax on Euro-yen bonds issued by Japanese residents removed,
- MT, LT Euro-yen loans liberalized;
- first Shogun bond issue; first Euro-yen straight bond issued;
- bond rating agencies set up.

1986 - TSE admits 6 foreign members;
- 12 Japanese banks make markets on SEAQI;
- Japan Offshore Banking Market opened;
- restrictions on Japanese purchases of foreign securities removed;
- insurance company and pension fund trust accounts can increase FX assets.

1987 - domestic and Euro-yen CP markets introduced;
- Japanese banks' overseas subsidiaries can deal in foreign CP;
- membership in government bond syndicate opened to foreign banks;
- Japanese financial institutions can trade in overseas futures markets;
- stock index futures traded on Osaka exchange;
- banks allowed to sell government bonds on the secondary market from date of issue;
- auction used in primary market for 20-year government bonds.

1988 - Financial Futures Trading Law;
- Four Japanese securities firms become primary dealers in the U.S. government securities market;
- restrictions on domestic and Euro-yen CP issues by nonresidents relaxed;
- postal savings system allowed to increase foreign assets;
- participation of residents in overseas financial Futures markets permitted;
- taxes on bond transactions reduced;

1989 - TIFFE opens;
- foreign securities firms appointed lead-managers in govenunent bond syndicate;
- relaxation of restrictions on the JOM;
- medium- and long-term Euro-yen loans to residents permitted;
- all financial institutions allowed to trade as brokers in overseas financial futures.

1990 - licenses given to foreign companies to enter the bank trust market;
- commissions for large transactions are lowered.

1991 - Report of Securities and Exchange Council on capital market reforms proposes that banks and other financial institutions be allowed to own securities subsidiaries;
- two Japanese branches of U.S. securities companies allowed to trade in foreign exchange;
- foreign securities companies' subsidiaries in Japan are given bank licenses.

1992 - legislation on financial sector reform passes the Diet;
- Securities and Exchange Surveillance Commission established;
- investment trust "Guidelines" revised to facilitate establishment of investment trust management companies by both domestic and foreign firms;
- securities houses allowed to offer money market funds.

United Kingdom

1979 - foreign exchange controls abolished.
1981 - first issue of ECU T-bills.
1982 - LIFFE opens.
1986 - "Big Bang": negotiable commissions; dual capacity securities firms; other financial institutions can own securities firms; computer trading system modeled on NASDAQ; SEAQ International; improved trading and settlement systems for government securities;
- Financial Services Act set up the SIB and SROs, RPBs which report to it; new investor protection rules;
- Central Gilts Office set up — provides book-entry transfer, rolling one-day settlement, and assured payments; market makers for Gilts;
- CP market introduced.

1987 - Banking Act formalizes B of E supervision.
1988 - Introduction of a comprehensive trade reporting system covering all markets in the U.K.

Other

1973 - floating exchange rates;

- ERM starts up;
- EC First Non-Life Insurance Directive allows insurers licensed in one member to open branches in other members.

1975 - Basle Concordat implements home country supervision.
1976 - first currency swap.
1979 - First Life Insurance Directive.
1981 - first interest rate swap;
- first ECU bond.

1983 - Basle Concordat revised to implement consolidated supervision.
1985 - EC Directive on UCITS;
- White Paper on completion of the single market.

1986 - Single European Act;
- EC First Directive on Capital Liberalization.

1988 - BIS capital standards agreed;
- EC Second Directive on Capital Liberalization.

1989 - OECD Code on Liberalization of Capital Movements agreed;
- EC Insider Trading Directive;
- EC Second Banking Coordination Directive agreed.

1992 - Investment Services Directive agreed.

Sources: Goldstein and others (1993), ISMA (1993), OECD (1991, 1993), Takeda and Turner (1992).

Beyond liberalization, international financial markets have responded to the same fundamental forces that have been shaping the entire financial services industry. Dramatic decreases in the costs of telecommunications and of information gathering and processing, the need to finance larger government deficits and external imbalances, the desire and opportunity to hedge against the high variability of asset prices and inflation rates, the ascent of both "securitization" and the "institutionalization" of saving and investment, and improvements in payments and settlement systems, have all played a role.

By now, liquid markets in central and local government securities, in equity, in corporate debt, in commercial paper, in bank certificates of deposit, in asset-backed securities, and in both exchange-traded and over-the-counter derivative instruments have become a prominent feature of the financial landscape in most major industrial countries.[1] The restructured bank debt of many developing countries has now been securitized and is regularly priced and traded in the secondary market. "Global" bonds and equities too are gaining a strong foothold.[2] Improved liquidity permits investors to move quickly in and out of domestic and international investment positions. Advances in the technology of financial transactions have reduced transactions

costs to the point where they less and less serve as an impediment to rearranging portfolios when expectations change. It is increasingly common, for example, to see investors switch between bond and equity funds when expected yields diverge. When transaction costs in the spot market are too expensive, the investor has the opportunity to take equivalent positions in the derivative markets (where daily trading volume has tripled since 1986). The increasing concentration of saving in institutional funds (that is, in mutual funds, pension funds, insurance companies, unit trusts, and hedge funds) also means that individual investors are increasingly turning to professional fund managers when choosing among the extensive menu of liquid securities on offer; see Table 2. U.S. and European fund managers alone now control over $8 trillion in assets.[3]

All this has induced an impressive growth in international portfolio investment among the major industrial countries. Total cross-border

Table 2
The Growth of Institutional Investors: Financial Assets as a Percentage of Household Financial Assets

	Pension Funds and Life Insurance Cos.			Collective Investment Institutions			Total		
Country	1980	1985	1990	1980	1985	1990	1980	1985	1990
United States	17.8	21.1	23.5	2.2	5.0	7.7	20.0	26.0	31.2
Japan	13.8	16.6	20.8	1.8	3.6	5.6	15.6	20.2	26.4
Germany	19.4	24.2	27.1	3.2	4.8	8.1	22.6	29.0	35.1
France	8.0	11.2	14.7	2.7	12.4	21.7	10.6	23.6	36.3
Italy[1,2]	1.6	0.9	3.2	n.a.	2.1	2.9	n.a.	2.9	6.1
United Kingdom[1]	39.9	49.9	53.7	1.6	3.1	4.9	41.5	53.1	58.6
Canada	19.4	23.3	26.7	1.0	1.6	3.0	20.4	24.9	29.7

[1]Total assets.
[2]At book value.
Source: Johnson, C. "New Players, New Rules—Financing the 1990s," Lafferty Publications.

equity holdings in the United States, Europe, and Japan increased from $800 billion in 1986 to $1.3 trillion in 1991, while total cross-border ownership of tradable securities is estimated to have risen to $2.5 trillion. A significant share of the government debt of all Organization for Economic Cooperation and Development (OECD) countries is now held by nonresidents.[4] Close to 50 percent of all trading in the equity of firms located in the European Community (EC) takes place outside the home country.[5] One out of every seven equity trades worldwide involves a foreigner as a counterparty.[6] More generally, the last two decades have witnessed an enormous expansion in the volume and range of international financial transactions. No matter whether the relevant yardstick is taken to be the average daily net turnover in the foreign exchange market, or the scale of gross capital flows in the major industrial countries, or the stock of Eurocurrency bank loans and bonds, or the share of foreign direct investment in total gross investment, there is little doubt that the international component of financial market activity has grown faster than either the domestic component or the value of world trade."

Yet in other respects, both the domain of international financial liberalization and the current degree of capital market integration emerge as more limited.

Nearly fifty years after Bretton Woods, it is noteworthy that less than one-fifth of the International Monetary Fund's (IMF) 168 member countries and territories voluntarily refrain from either restricting payments or using separate exchange rates for some or all capital account transactions.* For some larger Western European countries, capital controls were not fully removed until 1990, and some smaller Western European countries took such action only during the past year. In short, the establishment of capital account convertibility is still by no means a universal phenomenon.[9]

Nor have we reached the stage—even in the most developed financial markets—where the foreign-currency denominated investments of banks and of institutional investors are free of regulatory guidance and constraints. A summary of those measures for the larger industrial countries is shown in Table 3. Most G-10 countries exercise some guidance on net open forex positions for their banks, and mutual

funds, insurance companies, and pension funds are usually subject to some type of "prudence" rule on their foreign-currency denominated investments.

Once we move beyond the wholesale market in heavily traded, highly liquid, largely default free, financial assets to the broader categories of world saving and wealth, it is likewise apparent that the Walrasian auctioneer plays a more modest role. The largest component of wealth in almost all economies is ***human*** capital, an asset that is ***not*** traded either domestically or internationally. As originally highlighted by Feldstein and Horioka (1980), experience across a wide spectrum of countries reveals that the lion's share of domestic investment is still financed by domestic—and not by world—saving. Retained earnings still occupy an important role in financing business investment.[10] A nontrivial share of household financial assets in the major industrial countries continues to be held in nonintermediated form (for example, equity in self-owned business). As recently as 1984, three-fourths of families in the United States did not own any stock at all (Mankiw and Zeldes, 1991).

Net international capital flows (that is, current account imbalances) also tell a somewhat different story than gross flows. Although net capital flows for industrial countries grew markedly between the mid-1970s and the second half of the 1980s, they were still considerably smaller (relative to GDP) than during the pre-1914 gold standard era.[11] The United Kingdom ran an average current account surplus equivalent to roughly 4 1/2 percent of GNP from 1880 to 1913, and Australia, Canada, and the Scandinavian countries were able to maintain large average deficits over an extended period. Today, it is still unusual to see a major industrial country incur a current account imbalance equal to say, 3 percent of GNP for three or more years in a row. In fact, for G-7 countries over the 1970-93 period, this has happened on only five occasions (the United States, 1985-87; Japan, 1985-87; Germany, 1986-89; the United Kingdom, 1988-90; and Canada, 1989-93);[12] see Table 4. The average current account imbalance (relative to GDP and without regard to sign) for G-7 countries over the 1980s was 1.7 percent.

Moreover, while there is clearly a much greater diversity of

Table 3
Regulatory Constraints on Foreign-Currency-Denominated Investments by Major Financial Institutions in Selected Industrial Countries[1]

Country/ Region	Banks	Pension Funds	Insurance Companies	Mutual Funds
France	The net foreign exchange position is limited to 15 percent of own funds for each currency and 40 percent overall.		Investments are subject to the matching assets rule, the location rule, and the allocation of assets rule	Subject to disclosure and asset diversification rules. A fund may not hold more than 10 percent of any one category of securities of one issuer.
Germany	Net open foreign exchange positions (spot and forward combined) at the close of each business day must not exceed 30 percent of the liable capital	No more than 5 percent of assets can be invested in overseas bonds.	Investment must adhere to the principle of localization; the principle of congruence, which matches the asset side with the liability side of an insurance company's balance sheet to avoid currency risks.	
Italy	Currently no formal restrictions on foreign exchange position. New prudential provisions for foreign exchange exposure are to be introduced.		Investment is subject to the matching requirement, that is, commitments in a currency must be covered by assets denominated in the same currency.	May not invest more than 5 percent of their resources in securities issued by the same company if quoted or more than 10 percent if unquoted on a stock exchange, and may borrow up to 10 percent of their assets including borrowing in foreign currency.
Japan	Authorized foreign exchange banks are subject to individual ceilings on their overall (spot and forward combined) net positions in foreign currencies at the end of each working day.	Required to keep at least 30 percent of assets in guaranteed fixed-return domestic yen vehicles.	Holding of securities issued by nonresidents is limited to 30 percent of total assets; the same ratio applies to purchases of foreign-currency-denominated assets.	

Table 3 (continued)

United Kingdom	Net open dealing position in any one currency may not exceed 10 percent, and that of all currencies taken together may not exceed 15 percent, of the adjusted capital base. In practice, limits for most individual banks are set lower than these general maxima after taking into account each bank's experience and internal control system.	Not subject to any specific limitations in their holdings of foreign currency assets.	Subject to matching and localization rules, which require them roughly to balance. liabilities expressed in a particular currency with assets in that currency.	Collective investment schemes (unit trusts) are required to invest at least 90 percent of their assets in transferable securities in "approved markets," which includes markets in virtually all member countries of OECD.
United States	Foreign currency exposure of banks is not subject to any regulatory limitations, but it is monitored through weekly and monthly reports on spot and forward positions.	Regulated by a special federal law—Employee Retirement Income Security Act (ERISA). Permissible investments subject to the "prudent expert" rule, which includes a requirement to give consideration to diversification and liquidity factors. Otherwise no explicit restrictions on holding foreign securities, including foreign equities and foreign currency-denominated bonds.	U.S. state insurance regulations attempt "to prevent or correct undue concentration of investment by type and issue and unreasonably mismatching of maturities of assets and liabilities." These laws usually allow an unrestricted "basket" of investments for certain amount of assets, which can be allocated to foreign securities.	Primarily regulated by the SEC under federal laws. An open-ended fund may not hold more than 15 percent of its net assets in illiquid assets. Otherwise no explicit restrictions are imposed on investment in foreign securities.
European Community	Under the EC directive on capital adequacy, if a firm's overall net foreign exchange position exceeds 2 percent of its total own funds, it will multiply the excess by 8 percent to calculate its own funds requirements against foreign exchange risk.[2]	The EC Pension Fund Directive requires member states to abolish arbitrary investment requirements such as lists of permissible assets or minimum investment requirements. Member states cannot require funds to hold more than 80 percent of their assets in matching currencies and must take account of the effect of any currency hedging instruments held by the institution.	The EC life and non-life insurance directives intend to remove all legal barriers for the creation of a common market in insurance. They also set out provisions to harmonize rules on admissible investment.	The Undertakings for Collective Investment in Transferable Securities (UCITS) Directive introduced the principle of the single authorization requirement and aimed at coordinating the laws of member states. No guidelines are set out for restricting UCITS fund's cross-border investment.

[1] For the securities houses of these countries there are no explicit regulatory restrictions on foreign exchange positions and other cross-border investments.

[2] The same regulatory constraints apply to security houses.

Table 4
Current Account Balance/Gross Domestic Product, Major Industrial Countries, 1970-93 (in Percent)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
United States	0.23	-0.13	-0.48	0.53	0.13	1.14	024	-0.74	-0.68	-0.01	0.09	0.17
Japan	0.97	25 1	2.17	-0.03	-102	-0.14	0.66	1.58	1.70	-0.87	-1.01	0.41
Germany	0.7 1	0.45	0.47	1.46	2.77	1.04	0.83	0.78	1.39	-0.71	-1.71	-052
France	-0.27	0.08	-0.18	0.40	-1.71	0.57	-1.23	-0.30	1.47	0.86	-0.65	-0.91
Italy	0.83	1.72	1.49	-1.55	-436	-0.27	-1.34	1.01	2.06	1.46	-2.19	-226
United Kingdom	1.54	1.89	0.30	-1.37	-3.95	-1.49	-0.73	-0.09	057	-0.33	1.23	2.65
Canada	1.16	0.38	-0.26	0.24	-0.85	-2.70	-2.07	-1.98	-2.03	-1.76	-0.36	-1.72

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993[1]
United States	-0.36	-1.28	-2.62	-3.01	-3.46	-3.60	-258	-1.93	-1.64	-0.06	-1.05	-1.60
Japan	0.63	1.75	2.77	3.66	4.32	3.61	2.75	1.99	1.22	2.18	3.20	3.38
Germany	0.78	0.81	1.60	2.64	4.46	4.14	4.23	4.85	2.88	-1.18	-1.30	-1.42
France	-2.14	-0.79	-0.15	-0.20	0.12	-0.90	-050	-0.48	-0.81	-0.50	0.2 1	0.16
Italy	-1.54	0.37	-059	-0.87	0.40	-0.19	-0.68	-1.24	-1.34	-1.84	-2.06	-1.58
United Kingdom	1.67	1.24	0.55	0.78	0.02	-1.06	-3.43	4.22	-3.09	-1.12	-200	-2.84
Canada	0.75	0.76	0.61	-0.65	-2.25	-2.10	-256	-3.52	-3.85	4.34	-4.16	-3.34

[1] Estimated

Source: ***World Economic Outlook,*** International Monetary Fund, May 1993.

internationally-traded assets on offer today than during earlier periods, there has in general been less convergence of nominal and real interest rates across the larger industrial countries than during earlier regimes. Bordo (1993) finds that for nominal and real long-term interest rates, as well as for nominal short-term rates, convergence across the *G-7* countries was lower during the 1974-89 period than during either the classical gold standard (1881-1913) or Bretton Woods (1946-70); only for short-term real interest rates did the outcome go the other way. It could be that this difference in convergence of interest rates across monetary regimes reflects factors other than the degree of international capital mobility (such as a higher incidence of country-specific shocks and/or a higher divergence of inflation rates during the floating rate period), but that remains to be sorted out.

True, international diversification of assets has been increasing over the past decade. Nevertheless, empirical studies indicate that portfolios in major industrial countries continue to be subject to a strong "home bias," such that actual international diversification is significantly lower than that suggested by optimal portfolio considerations.[13] U.S. investors hold about 94 percent of their equity holdings in the form of U.S. securities; for Japan, the United Kingdom, and Germany, the corresponding percentages each exceed 85 percent.[14] The 300 largest pension funds in the world have only about 7 percent of their assets denominated in foreign-currency instruments.[15]

This paper discusses the extent to which national capital markets have become linked and identifies several of the more important consequences of that increased degree of integration. The organizational scheme is as follows. The second section examines various measures of the integration of world capital markets, including deviations from the law of one price, differences between actual and optimally diversified portfolios, correlations between domestic investment and domestic saving, and cross-country links in consumption behavior. We also review some of the methods that have been employed to gauge the degree of capital mobility in developing countries. In the third section, we analyze two recent episodes of large-scale international capital flows—namely, last fall's turmoil in the European Monetary System (EMS), and the surge of capital

inflows into Latin America during the last three years—for insights into the workings of today's global capital market. Finally, the fourth section offers some concluding remarks on the future evolution of international capital markets, on exchange rate management, on alternative approaches to living with larger and more influential financial markets, and on the financing of investment in the formerly centrally planned economies.

Anticipating our conclusions, we find that there are indeed important linkages between national capital markets and that the extent and strength of those international linkages have been increasing significantly over the past decade or so. Integration has proceeded farthest for those liquid, financial instruments widely traded in the major financial centers. That market is now large enough and integrated enough to place tighter constraints than before on the conduct of macroeconomic policies, especially under fixed exchange rate regimes. The massive capital flows that took place in the fall of 1992, and then again this past summer, to prompt adjustments in exchange rate parities and a widening of the bands in the Exchange Rate Mechanism (ERM) of the EMS, are indicative of the strength and agility of that major segment of today's capital market. Increasingly, more countries and a wider range of assets are being drawn into the more integrated portion of the market, as financial liberalization and innovation proceed, as the cost of acquiring information and of executing trades of financial assets falls, and as securitization and the role of institutional investors grow. We expect this increase in integration to continue. At the same time, it is premature to speak of a single, world capital market since large components of world saving and wealth are not traded, since a clear home bias in portfolio decisions persists, and since the threat of government intervention, currency risk, and the difficulties of dislodging established domestic firms in retail markets, all still operate to keep the bulk of national saving at home and to segment some national markets from others. While the discipline exercised by capital markets over government policies is neither infallible nor always applied smoothly and consistently, we find that markets have on the whole encouraged adjustments in policies that go in the right direction. There are legitimate concerns about the impact of increased international capital mobility on the effectiveness of macroeconomic policies and on the manage-

ment of systemic risk, but we doubt that either of those concerns will be allayed by efforts to thwart liberalization and globalization, or to make ex ante distinctions between productive and unproductive capital flows. A more promising approach is to attempt to improve the functioning of market discipline, to see that risk is appropriately priced, and to ensure, where possible, that liberalization is accompanied by a strengthening of supervision on a coordinated, international basis. Finally, experience teaches us that the hundreds of billions of dollars of new investment needed to help transform the formerly centrally planned economies of Europe and Asia into efficiently functioning market economies will come mainly from inceases in domestic saving. World capital markets will play an important, but not predominant, role.

Measuring the integration of capital markets

Consider the paradigm of a perfect and comprehensive capital market in which wealth holders can trade claims on literally every economically valuable asset (including human capital and state contingent securities) with free and complete information and with little or no transactions cost. No such perfect and comprehensive capital market exists at the international level or at the national level, even in the most financially advanced countries. Nevertheless, by considering various ways in which observable economic behavior might diverge from the implications of a perfect capital market, it is possible to derive various measures of the degree of international capital market integration. Since these various measures tend to focus on different functions that capital markets are expected to perform, they do not, unfortunately, always yield similar, or even directly comparable, conclusions concerning the degree of international capital market integration.

One approach is to note that under perfect international capital mobility, there would be no official barriers to international capital flows and, presumably, transactions costs for asset trades would not be much greater for trades across countries than for those within them. In the real world, of course, there are a host of barriers to cross-border capital flows, extending from differences in language and information, to official restrictions and policies that favor domestic asset trade

relative to foreign trade. A catalogue of these restrictions can provide useful information about barriers to international capital flows, but does not provide an easily interpreted measure of the economic importance of these bamers.

Another approach focuses on the idea of "the law of one price"—that is, that identical assets should trade at the same prices in different locations. This approach has spawned a large literature which is reviewed below. Closely related to this approach are a number of studies that focus either on the degree of substitutability across assets that might naturally be thought of as close or nearly perfect substitutes, or that examine the extent to which real interest rates tend to be equalized or tend to move together internationally. Along a different tack, several studies have explored whether portfolios of assets held by residents of different countries are internationally diversified to the (large) extent that would be consistent with perfectly integrated capital markets. Even more distinct in concept are two broad classes of studies that either investigate the extent to which correlations of national savings and national investment are consistent with perfect international integration of capital markets, or that explore whether correlations of consumption movements across countries are consistent with the risk sharing that would be expected with perfect integration.

Even though there is by now a burgeoning literature that addresses directly the measurement of international capital market integration, it has proven difficult to reach firm and clear conclusions about the degree—if not the trend--of integration. This ambiguity reflects the fact that no single method of measuring the degree of integration is completely free of conceptual and technical difficulties that cloud its interpretation.[16]

Capital markets can respond to a shock either through capital flows, or through a change in asset prices, or through some combination of the two. This means that integration cannot be gauged by looking at the scale of capital flows alone. Trading of some benchmark U.S. government securities, for example, takes place both inside and outside the United States. An unanticipated event (such as a change in the Federal Reserve's discount rate) can trigger an immediate

adjustment of these securities prices without any capital flows or even any transactions occurring. Divergencies from the law of one price (that is, yield differentials on supposedly identical assets) have to contend with the problems that observed yield differences could reflect characteristics of the assets (default risk, liquidity, existence of tied services, and so forth) that have little to do with unexploited opportunities for international arbitrage, and that there are different ways of modeling expected returns (so that tests for the law of one price are always joint tests of the degree of integration and of the model used to define expected returns). Also, law-of-one-price comparisons are typically restricted to a subset of assets that is much narrower than anything like national "capital." Departures of actual from optimal portfolios run into the thorny problem that there is no "world" economic agent who consumes the world consumption basket, so that investors from different countries bring different consumption perspectives to bear on their optimal portfolios. Correlations between domestic investment and domestic saving, while covering a wider range of assets than in law-of-one-price comparisons, can be spurious indicators of the degree of international capital mobility because (as detailed below) the observed correlations can be influenced by a gamut of "other" factors. Correlations of consumption behavior across countries are joint tests of the risk-pooling attributes of international capital markets and of some restrictive assumptions about both the available menu of assets on offer and the nature of shocks (common versus country-specific and transitory versus permanent) impinging on economies. And on and on.

In the remainder of this section, we attempt to give the flavor of these alternative approaches to the measurement of integration—along with a summary of the findings.

Law-of-one-price exercises

As suggested earlier, a basic characteristic of a perfectly integrated asset market is that the asset's price is the same everywhere in that market, that is, asset prices must obey the "law of one price." In comparisons of ***offshore and onshore*** yields, the typical practice is to look in the two financial centers at the cost of interbank funds denominated in the same currency (for example, the nominal interest

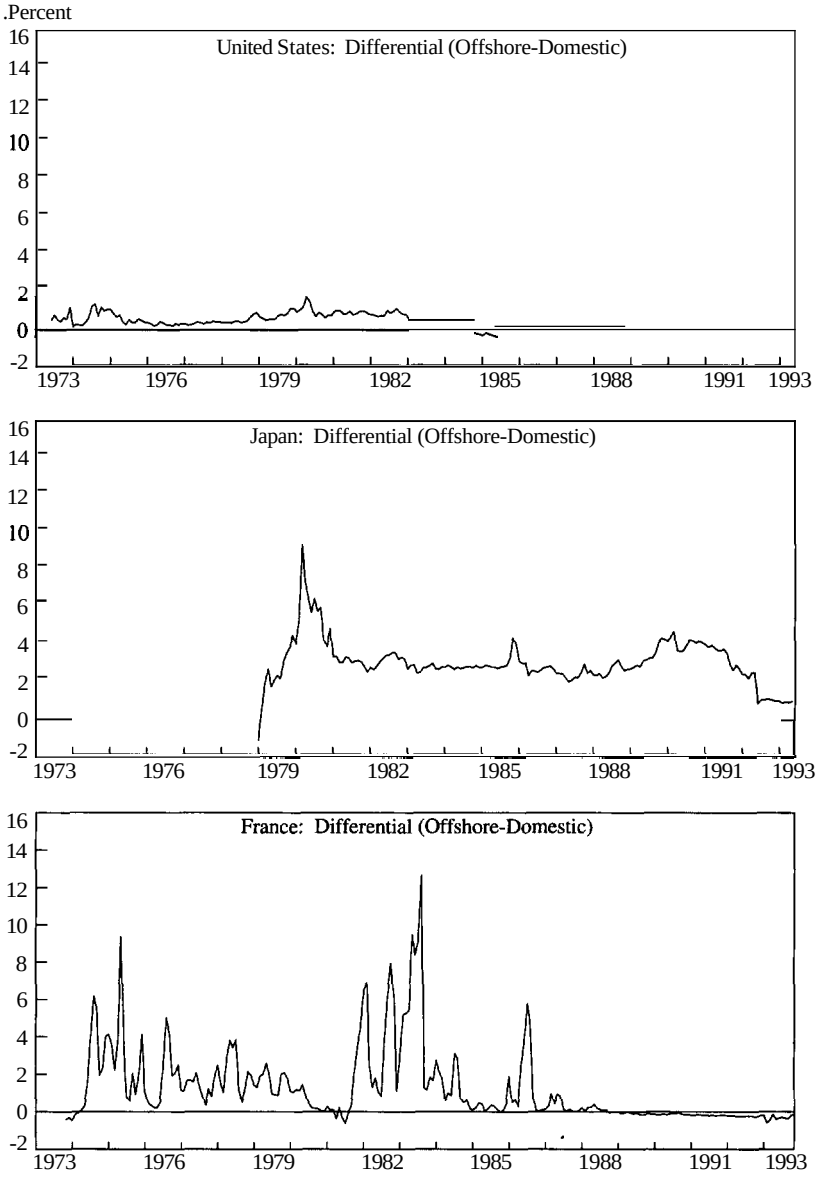
rate on a large, yen-denominated certificate of deposit in Tokyo versus that on a London, Euroyen deposit of the same maturity). Obviously, no currency risk is involved here but yields could diverge because of differences in transactions and information costs, the existence or threat of capital controls, differences in tax treatment, and perceived default risk.

Two main conclusions have emerged from such offshore/onshore comparisons. The first one is that these differentials have declined markedly during the 1980s. This suggests a move toward closer integration of capital markets, especially for those countries (like France and Japan) which have relaxed their capital controls during this period; see Chart 1.[17] The second conclusion is that during periods of turbulence, these differentials widen appreciably--as uncertainty increases and liquidity decreases.[18] When fixed exchange rates are under pressure, the widening of offshore/onshore differentials is frequently regarded as a signal that market participants are concerned that the (onshore) authorities may impose or tighten capital controls to defend the rate. These concerns go beyond garden-variety paranoia. Giavazzi and Giovaninni (1989), for example, have shown that in the early years of the EMS, capital controls employed by weak currency countries became more binding during speculative attacks. More recently, during last fall's turbulence, capital controls were tightened by three EMS countries (Portugal, Spain, and Ireland) in unsuccessful attempts to avoid forced realignments.

A close relative of the offshore/onshore tests are those of ***covered interest rate parity (CIP)***.[19] CIP is a basic arbitrage relationship that says that the difference in interest rates on instruments issued by comparable borrowers but denominated in different currencies should be just equal to cost of cover in the forward exchange market. CIP is usually tested by examining interest rates on Eurocurrency deposits. As with the offshore/onshore differentials, the presumption is that since exchange risk has been eliminated, any departure from CIP must owe to transactions costs and to "country" or "political" risk factors (capital controls and the like).

Even without doing any formal tests, there is a strong presumption from the practices of market participants that CIP should hold. Inter-

Chart 1
Domestic and Offshore Interest Rates: United States, Japan, and France, June 1973 - June 1993



Sources: Data Resources Incorporated; International Monetary Fund. *International Financial Statistics;* Organization for Economic Cooperation and Development; and Reuters.

views with large banks have repeatedly confirmed that the CIP condition is used to set the (forward) exchange rate spreads or the interest rate spreads (between domestic and foreign currency deposits) at which trading is actually conducted. Not surprisingly, empirical tests have found: (1) that CIP holds to a close approximation in most short-term markets in industrial countries; (2) that deviations from CIP are on average much smaller than they used to be—again suggesting a trend toward closer integration; and (3) that departures from CIP beyond what can be explained by normal levels of transactions costs are often related to actual or prospective capital controls.[20]

Some notion of the size of departures from CIP—and how they differ across groups of countries--can be obtained from Table 5, taken from Frankel (1991). A negative mean differential (in column 2) implies that to the extent that barriers to capital flows existed during the 1982-88 period, they operated to discourage capital from flowing out of the country; a positive differential carries a symmetric interpretation. Two things in Table 3 merit comment. First, drawing both on comparisons with earlier studies and estimation of time trends, departures from CIP were on average smaller during the 1980s than during the 1970s; this trend toward increasing integration was particularly marked for Portugal, Spain, France, New Zealand, Denmark, Australia, and Italy. Second, distinguishing between the trend and the level of integration, departures from CIP were generally smaller for industrial countries than for developing ones, albeit with some notable exceptions (for example, Hong Kong and Singapore had small deviations, while Denmark, Spain, and New Zealand had rather large ones); put in other words, capital markets in industrial countries are farther along in the integration process than those in the developing world.

These comparisons of offshore/onshore differentials and of departures from CIP, deal only with the short end of the financial market, usually employing data on three-month instruments. They are therefore mute on whether integration has progressed equally far for longer-term markets. Here, empirical studies are few and far between. This largely reflects the situation prior to the 1980s when the market for foreign exchange cover for maturities beyond say, two years, was rather limited. The tremendous expansion during the 1980s of the

Table 5

'Country Premia' or Covered Interest Differentials (local minus Eurodollar: 3-months rates); Interest Differential Less Forward Discount, September 1982 to April 1988

	Number of Observations (1)	Mean (2)	Standard Error of Mean (3)	Series Standard Deviation (4)	Root Mean Squared Error (5)
Group 1					
Canada	68	-.10	.03	.21	.24
Germany	68	.35	.03	.24	.42
Netherlands	68	.21	.02	.13	.25
Switzerland	68	.42	.03	.23	.48
United Kingdom	68	-.14	.02	.20	.25
Group	340	.14	.01	.21	.34
Group 2					
Hong Kong	68	.13	.03	.28	.31
Malaysia	63	-1.46	.16	1.28	1.95
Singapore	64	-.30	.04	.31	.43
Group	195	-.52	.05	.76	1.14
Group 3					
Bahrain	64	-2.15	.13	1.06	2.41
Greece	58	-9.39	.80	6.08	11.26
Mexico	43	-16.47	1.83	12.01	20.54
Portugal	61	-7.93	123	9.59	12.49
South Africa	67	-1.07	1.17	9.55	9.61
Group	293	-6.64	.48	8.23	11.82
Group 4					
Austria	65	.13	.05	.39	.41
Belgium	68	.12	.03	.26	.29
Denmark	68	-3.53	.19	1.57	3.89
France	68	-1.74	.32	2.68	3.20
Ireland	66	-.79	.51	4.17	4.24
Italy	68	-.40	.23	1.92	1.96
Norway	50	-1.03	.11	.76	1.29
Spain	67	-2.40	.45	3.66	4.39
Sweden	68	-.23	.06	.45	.51
Group	588	-1.10	.09	2.25	2.77
Group 5					
Australia	68	-.75	.23	1.94	2.08
Japan	68	.09	.03	.21	.23
New Zealand	68	-1.63	.29	2.42	2.92
Group	204	-.76	.12	1.78	2.06
All Countries	1,620	-1.73	.09	3.81	5.36

Taken from Frankel (1991).

market for currency and interest swaps has made it much easier to arrange cover for longer maturities, up to even seven, ten, or twenty years; in addition, the growth of the over-the-counter markets has meant that such cover can now be "custom-tailored to participants' needs to a larger extent than was the case when cover had to be purchased using the standard contracts available on the organized exchanges. This suggests that deviations from CIP at longer maturities are probably smaller today than they were say, ten years ago. Popper (1990), using swap-covered return differentials on 5- and 7-year government bonds, even finds that CIP departures are smaller for longer-term instruments than for for comparable shorter-term ones. It is not clear, however, how robust that finding will turn out to be with respect to other instruments and other markets. On the one side, governments may be 'more likely to impose controls on shorter-term rather than on long-term capital because assets with short maturities may be perceived as more speculative in nature; see Hamio and Jorion (1992). On the other side, the still more limited availability of long-term hedging instruments (relative to short-term ones) could make transactions costs higher at that end of the market; see Hilley and others (1981).

From time to time, efforts have also been made to extend the scope of integration inquiries to include equity price movements. One interesting new line of inquiry is to examine the premia observed in closed-end country mutual funds. Under perfect capital market integration, the share price of the country fund should equal its net asset value, computed from the price of foreign shares listed in the foreign market. Differences between the two can be ascribed to what a foreign investor would be willing to pay to circumvent legal restrictions on buying the shares directly.[21] Bonser-Neal and others (1990) found that a number of country funds showed a significant decrease in premia (over the 1981-89 period) either in anticipation or following announcements of investment liberalization measures—a finding which supports the aforementioned trend toward decreasing segmentation.

A second, more traditional approach is to look at correlations in stock price indexes across countries. Here, four findings are relevant:

(1) correlations of stock market movements across industrial countries are usually low to moderate in size ;[22]

(2) there is no significant increase in the size of these correlations over the past twenty years or so;[23]

(3) cross-country linkages are much tighter during periods of extreme turbulence, such as in October 1987, than during more tranquil times; and

(4) cross-country spillovers are asymmetric, with spillover from the U.S. market to others much stronger than in any other direction.[24] Note also that high correlation of ex post stock market returns between two countries does not necessarily imply close integration of these markets since expected returns could still differ.[25]

Next, suppose that market participants choose ***not*** to cover against currency risk. Then, to the extent that asset holders regard securities denominated in different currencies as less than perfect substitutes, a new source of market "segmentation" enters the picture. In theory, imperfect substitutability among assets denominated in different currencies does not necessarily imply any imperfection in the functioning of international capital markets—any more than different expected returns for assets with different risk characteristics in domestic capital markets implies an imperfection in these markets. In practice, however, evidence of a high degree of substitutability among assets denominated in different currencies would naturally be thought to be evidence of a higher degree of international capital market integration. By analogy with the theory of international trade, international price divergences resulting from transportation costs and other real barriers to trade do not imply any economic inefficiency. Nevertheless, goods markets are clearly more integrated internationally when transport costs are low, as well as when tariffs and other artificial barriers to trade are low. Moreover, in the case of international financial markets, there is the suspicion (at least in some quarters) that currency risk associated with widely fluctuating exchange rates is a largely artificial barrier to international capital market integration.

One way of assessing the degree of segmentation resulting from currency risk is by testing for its absence; that is, by testing whether the condition of ***uncovered interest parity (UIP)*** holds. If UIP holds, then markets are equilibrating the (known) nominal return on a domestic currency asset with the expected nominal yield, translated into domestic currency, on an uncovered position in a comparable foreign currency asset. UIP is equivalent to the combination of CIP with the assumption that exchange markets are driven at the margin by risk-neutral investors who equate the forward exchange rate with the expected future spot exchange rate.[26]

Tests of UIP have often involved assessments of whether the forward is a biased predictor of the expected future spot rate. To estimate the expected future spot rate, researchers have relied either on survey data of the expectations of exchange market participants or on the assumption that exchange rate expectations are formed rationally (which permits substitution of the actual exchange rate for the expected rate). By now, the evidence points pretty clearly to the following conclusions: (1) forward rates are biased (and even perverse) predictors of expected future spot rates;[27] (2) probably the main reason why forward rates are such lousy predictors of expected future spot rates is that "news" about the variables that matter for the determination of exchange rates (for example, future monetary policies) consistently reaches the market between the time the forward contract is entered into and the time that the contract expires;[28] and (3) the resulting "risk premium" varies over time but has proved difficult to relate to variables (like relative supplies of domestic and foreign assets) that theory suggests should influence it.[29] Other tests of UIP have concentrated on the mean value of deviations from UIP and on the degree of autocorrelation in those deviations.[30] The bottom line here too has been that UIP does ***not*** hold and that assets denominated in different currencies are viewed by the market as imperfect substitutes.[31] Given the relatively high degree of exchange rate variability that has characterized the floating rate period,[32] it is not surprising that Frankel (1991,1993) finds that most of the variation in (real) interest rate differentials across countries in the 1980s owes much more to "currency risk premia" than to "country risk prernia."

Thus far, we have talked about tests of the law of one price

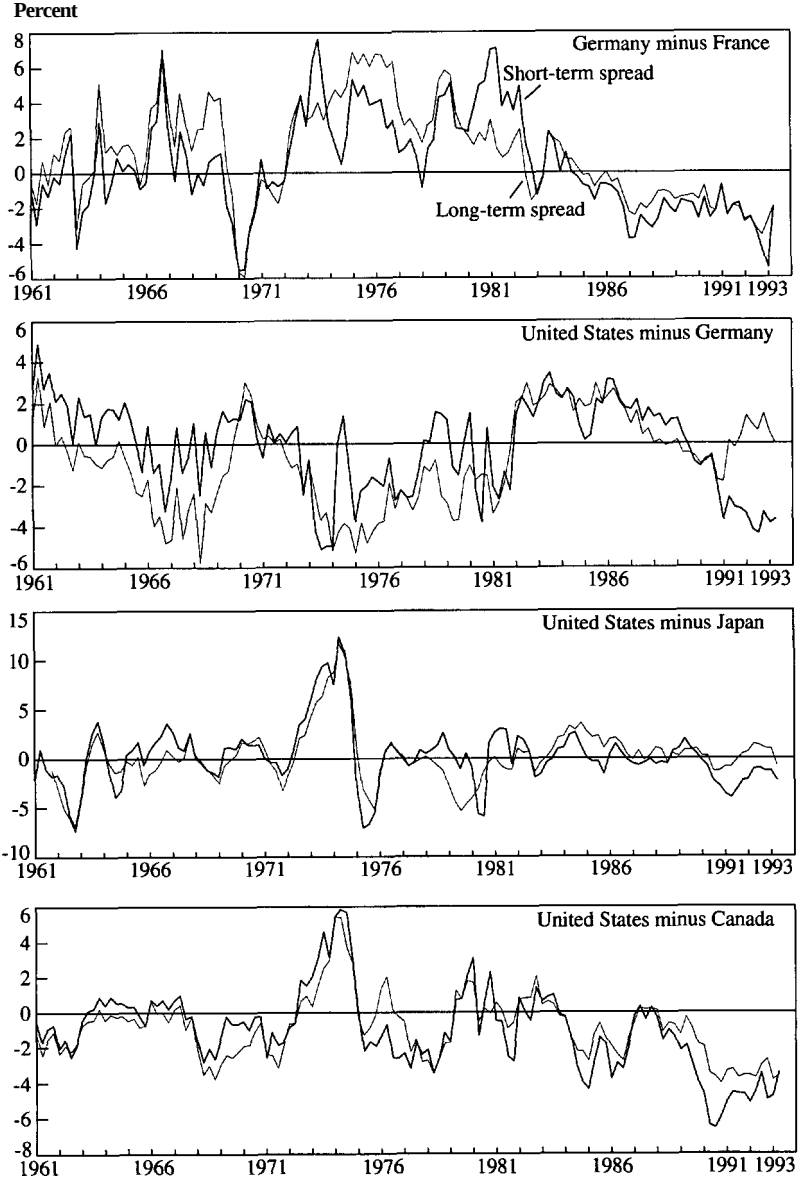
exclusively in nominal returns, and we have restricted our attention to wholesale markets. Integration of capital markets is considerably looser once we move to real returns, and when we consider cross-country linkages among retail markets.

The main reason why integration of ***real returns*** for assets denominated in different currencies is a more stringent condition than integration of nominal returns is that the former also implies close integration of goods markets. That is, equality of real returns requires not only that UIP hold but also that ex ante relative purchasing-power-parity (PPP) hold as well. This latter condition means that the expected change in the nominal exchange rate needs to be equal to the expected difference in inflation rates between the two countries involved (that is, the real exchange rate remains constant). It turns out that nominal exchange rate changes during the 1970s and 1980s departed widely from the predictions of relative PPP (Frenkel, 1981; Frankel, 1991), as real exchange rates showed pronounced swings, sometimes reaching as much as 50 percent. It is only either over very long time periods (spanning decades) or under conditions of hyperinflation, that PPP seems to provide a reliable explanation of exchange rate behavior.

Studies by Mishkin (1984), Cumby and Mishkin (1986), and others suggest that real interest rates in the industrial countries do show a tendency to move together but clearly not enough as to establish anything like equality of real returns. Real interest rate spreads across the major industrial countries have been significant over the past thirty years (see Chart 2)—as a combination of monetary and real shocks, of differences in macroeconomic policy stances and mixes, of changes in the credibility of exchange rate commitments (and differences in exchange rate polices), and of marked differences in cyclical positions, have each exerted an influence. These intercountry differences are also not uniform--either across pairs of industrial countries, or over time.

Although comparable data across countries on borrowing and lending rates for retail customers is much harder to come by than for wholesale transactions, there are strong hints that both the level and trend of integration is lower in retail financial markets than in whole-

Chart 2
Major Industrial Countries: Real Interest Rate Spreads, 1961 - Second Quarter 1993[1]



Source: World Economic Outlook Data Base.

[1] See endnote 58 at end of paper.

sale ones. Part of the story is that barriers to entry in banking for foreign institutions—ranging from national brand name loyalty, to large start-up costs for branch networks, to restrictions on ownership structures—are probably greater on the retail side. Part of it is that retail customers are more captive of local financial institutions and less knowledgeable about international options than are large triple-A corporations who can either fund themselves directly or borrow from foreign institutions. And part of it is that liberalization of interest rates on small savings accounts and of commissions on small equity trades has often been one of the last cars on the train of financial reform; see Table 1. In any case, evidence that Deutsche Bank and Bankers Trust can get the same rate of return on large certificates of deposit in Frankfurt and in New York does not necessarily mean that individuals with small saving accounts in eastern Germany earn the same real rate of return as individuals in Peoria, Illinois.

Departures from optimally diversified international portfolios

Yet another approach to gauging how "international" capital markets have become is to examine the extent to which actual national investment portfolios differ from those implied by optimal portfolio theory. Because returns on financial assets do not always move in tandem across countries, standard portfolio theory suggests that such international diversification can reduce overall portfolio risk; indeed, because many shocks are country specific, there is a presumption that benefits should be larger from international than from domestic diversification.

As suggested in the introduction, international diversification has been on the rise in major industrial countries, especially over the past decade. One rough measure of this diversification is provided by the ratio of cumulative international capital flows relative to new issues of all domestic assets. Such data are available on a standardized basis for twelve OECD countries; see Table 6. Averaging inflows and outflows, this ratio increased from about 12 percent in 1975-82 to almost 17 percent in 1983-90.[33]

But all this refers to the trend of international diversification. When we turn to judging the ***level*** of diversification, the message from

Table 6
Ratio of Inward and Outward Foreign Investment to New Issues of Domestic Assets, 1975-90

(cumulative flows, in percent)

	Share of OECD Financial Wealth[1]	1975-82		1983-90	
		Inward Foreign Investment/ Domestic Assets	Outward Foreign Investment/ Domestic Assets	Inward Foreign Investment/ Domestic Assets	Outward Foreign Investment/ Domestic Assets
		Total Assets			
United States	36.2	3.4	5.7	8.4	2.4
Japan	25.3	3.7	4.3	9.2	13.6
Germany	3.9	11.0	11.2	17.7	32.6
France	6.4	10.3	9.5	14.5	13.9
Italy	4.6	10.9	6.4	8.1	6.6
United Kingdom	6.8	29.7	33.5	26.6	24.0
Canada	3.0	13.7	8.0	14.4	6.4
Spain	2.2	8.2	3.5	10.5	8.5
Netherlands	1.2	. . .	. . .	22.7	32.8
Sweden	1.6	13.5	6.6	15.6	11.6
Belgium	1.2	31.2	25.9	33.5	34.7
Finland	0.8	13.6	9.1	18.7	12.2
Average[2]		13.6	11.2	16.7	16.6

Table 6 (continued)

	Share of OECD Financial Wealth[1]	1975-82 Inward Foreign Investment/ Domestic Assets	1975-82 Outward Foreign Investment/ Domestic Assets	1983-90 Inward Foreign Investment/ Domestic Assets	1983-90 Outward Foreign Investment/ Domestic Assets
		Bonds and Equities			
United States	45.1	11.5	3.2	12.8	2.3
Japan	17.3	8.1	. . .	11.0	. . .
Germany	3.4	4.4	14.6	32.5	46.8
France	7.3	16.9	13.6	18.1	14.4
Italy	6.0	2.1	3.7	3.5	7.0
United Kingdom	3.9	6.4	8.2	43.7	37.0
Canada	4.2	23.2	12.3	30.4	15.3
Spain	1.2	12.6	6.6	41.9	10.5
Netherlands	1.0	. . .	. . .	39.7	47.4
Sweden	1.5	12.9	4.1	22.4	23.8
Belgium	1.4	12.6	8.9	10.3	37.9
Finland	0.7	20.3	6.0	28.0	12.9
Average[2]		11.9	8.1	24.5	23.2

[1]Does not sum to 100 percent because of missing data for some small OECD countries. The latter share of asset issues was assumed to be proportional to their share of 1985 OECD GNP which was 7 percent.
[2]Unweighted.

Source: ***OECD Financial Statistics - Part 2; Financial Accounts of OECD Countries,*** Organization for Economic Cooperation and Development, various issues.

existing studies (Tesar and Werner, 1992 and French and Poterba, 1990) is that the existing degree of diversification is far short of what would be implied by optimal portfolio considerations;[34] moreover, this conclusion is quite robust to alternative methods of specifying the preferred portfolio strategy.[35] Another way of saying much the same thing is to ask what the pattern of expected returns across countries would need to be to make existing portfolio allocations "optimal." The answer is that investors would need to expect that returns on the domestic market are much higher than the world market portfolio suggests they truly would be. In the case of U.S. investors, Tesar and Werner (1992) calculate that the "home bias" is about 200 basis points; for German investors, the bias goes all the way up to 928 basis points.

Just what accounts for this home bias remains a puzzle. The list of possibles extends from transactions costs, to externally-imposed prudential limits on foreign assets, to uncertainties about expected returns, to higher (than warranted) risk perceptions about foreign assets due to relative unfamiliarity with those markets and institutions.[36] Our own preference leans heavily toward the last factor.[37] Indeed, we would suggest that there is not only a home bias but also a neighborhood or ***regional bias.*** Based on discussions with portfolio managers during the Fund's capital market missions, we conclude that there is a strong tendency even today for investors to be most knowledgeable and comfortable with investments in their own back yards, and to invest in regions where they have previously had other business relationships. Distance outpredicts anything else in explaining trade patterns; we suspect that it still has a role (as a proxy for familiarity) in investment flows as well. Over time, we would expect this home or neighborhood bias to decline, but we would be surprised if it goes away entirely during our lifetimes.

Saving and investment correlations

A third route to inferring the degree of integration or capital mobility among group of countries is to examine the relationship between domestic saving and domestic investment. This approach was pioneered in the early 1980s by Feldstein and Horioka (1980) and Feldstein (1983). The basic idea is that in a world of perfect mobility,

there should be practically no relationship between a country's domestic investment and its domestic saving: investment would be financed out of the pool of world saving, while savers would look to investment opportunities worldwide—not just in the domestic economy. Operationally, the test is to regress the ratio of investment to GDP, (I/Y), on the ratio of domestic saving to GDP, (SN): an estimated coefficient of one on the domestic saving rate means that all of the domestic saving is retained at home and is translated into higher domestic investment (zero capital mobility), while a coefficient of zero would imply complete international leakage of domestic saving (perfect capital mobility). When Feldstein and Horioka (1980) estimated this regression on a sample of 21 OECD countries over the 1960-74 period, they found that the estimated coefficient on domestic saving was very close to one (0.8 -0.9)—implying very *low* international capital mobility.

Since then, saving/investment correlations of the Feldstein/Horioka variety have been estimated again and again, employing a host of different time periods and country samples (including both cross-section and time-series tests, and covering both industrial and developing countries)—but the main finding that domestic investment is financed primarily by domestic saving has proved extremely robust.[38] Only two qualifications merit mention. One is that inclusion of data for the decade of the 1980s suggests this correlation is probably declining over time (that is, that capital mobility is increasing).[39] The second qualification is the (counter-intuitive) finding that saving/investment correlations are much lower for groups of developing countries than for groups of industrial ones.[40]

With less and less questioning of the facts, the real issue has turned on whether saving/investment correlations can tell us much about the degree of international capital mobility, and if not, why not. The answer to that question has spawned a sub-literature of its own, as much of the international economics profession has sought to find an explanation that would be consistent both with the high observed correlations and with their gut feeling that international capital mobility is actually high (not low). Proposed solutions to the puzzle fall into five categories: (1) imperfect goods market integration; (2) current account targeting; (3) missing variables common to domestic saving

and investment; *(5)* country size; and (6) imperfect substitutability between financial and real capital.

The first two explanations have already been hinted at. For domestic saving rates to have no effect on domestic investment rates, it would be necessary, inter alia, for ***real*** interest rate parity —not just nominal interest rate parity —to hold. But capital mobility can only equalize nominal rates of return and there is not enough substitutability in goods markets across countries to make PPP hold. Thus, the story here (Frenkel, 1991) is that high saving/investment correlations primarily reflect imperfect goods market integration —and not low international mobility of capital.

The second explanation is that countries have implicit or explicit current account targets that they pursue with their macroeconomic policy tools so as to prevent large, sustained net international capital flows; as noted earlier, sustained, large current account imbalances have been a relatively, infrequent event for large, industrial countries over the past two decades. If, for example, governments systematically adjusted the public sector's net saving/investment position to offset shifts in the private sector's imbalance, this would contribute to high observed saving/investment correlations--even if capital were free to exploit international arbitrage opportunities.[41]

A clue that there may well be something to these goods market and current-account- targeting explanations comes from some recent efforts to estimate Feldstein-Horioka regressions on regional data. An advantage of using regional data is that one can make the assumptions that goods market integration is likely to be higher within than across countries, and that regional authorities have no current account targets. As such, this could make it easier to isolate the degree of capital mobility.[42] In fact, regional savinglinvestment correlations for Canada (Bayoumi and Sterne, 1993), for the United Kindgom (Bayoumi and Rose, 1991), and for the United States (Sinn, 1992), all obtain results that are closer to the perfect capital mobility pole. Some authors have similarly investigated the behavior of savinglinvestment ratios for the gold standard era when tolerance for current account imbalances was apparently higher; in this case, however, the results have been inconsistent, with Bayoumi (1990) reporting low saving/in-

vestment correlations for that period and Obstfeld (1993a), using different data sources, reporting high ones.

Several questions remain. How can goods market integration explain the tendencies for saving/investment correlations to decline in the 1980s and for these correlations to be lower in developing countries (where protectionist trade barriers are presumably higher) than in industrial ones? In the absence of well-specified policy reaction functions for government fiscal positions, how can we disentangle the external constraint from a host of other influences (including political and historical factors)? Was the primary cause of the larger U.S. fiscal deficit in the mid-1980s and early 1990s a more benign attitude toward current account imbalances or was it political considerations that militated against both raising taxes and controlling government expenditure? The latter explanation seems closer to the mark.

A third class of explanations has involved a search for missing variables that could lie behind movements in both saving and investment. Since both saving and investment are known to behave pro-cyclically, there is a danger when using high-frequency time-series data that saving/investment correlations could be capturing such cyclical influences. It turns out, however, that when cyclically-adjusted variables are used, or when the observations cover averages of longer-term periods, or when estimation methods to guard against simultaneous equations bias are employed, the high correlations remain.[43] Population growth could be important because countries with high rates of population growth would be expected to have high investment rates (because of the investment needs of a rapidly growing labor pool) and high saving rates (because of the higher share of young people who are high savers relative to older dissavers). Summers (1988) illustrates how initial wealth can matter by citing the example of a country ravaged by war, where the desire to rebuild both the capital stock and household wealth holdings would generate an increase in both investment and saving. Because the life cycle theory of saving gives the growth rate of GDP (and labor's share of national income) a prominent role, and because the investment rate too is likely to be affected by income growth, one (Obstfeld, 1986) might likewise make the case that this is the missing variable. Again, however, what could be is not the same as what is. By and large, adding these

variables to the basic investment/saving equation still produces results similar to the original findings (Feldstein and Bacchetta, 1991), Summers, 1988). Finally, Tesar (1991) and Leiderman and Razin (1993) survey a group of real business cycle models where exogenous disturbances to either labor productivity (cum immobile labor) or the terms of trade leads both investment and saving to respond in the same direction. Simulation methods are then employed to show that, with reasonable parameter values and with shocks drawn from the historical record, these models can produce correlations of saving and investment that look similar to the correlations found by Feldstein and Horioka. The rub, here, however is that these results seem to be quite sensitive to small differences in the parameters of the model and in the stochastic properties of the shocks (transitory versus permanent, the degree of correlation across countries, and so forth);[44] this lack of robustness makes the simulation results less than convincing.

We do not have any strong nominees of our own to put forward for the "missing variable" Oscar, at least for the industrial countries. But we do find something strange in the aforementioned finding for developing countries that saving/investment correlations are very low—indeed, much lower than for industrial countries. It seems doubtful that capital mobility should be higher for developing countries than for industrial ones-even if capital controls are rather ineffective in developing countries (see below), and even though there have clearly been some periods of substantial capital flight. One would also expect that a considerable amount of investment in developing countries would be financed by the same individuals, families, and firms that do the saving.[45] The more of this Robinson Crusoe self-intermediation that goes on, the higher should be the correlation between saving and investment in developing countries.

Three other factors are also probably important. One is the nature of the macroeconomic policy regime. More specifically, the same policy environment (a relatively low and stable rate of inflation, a reasonable fiscal deficit, a competitive real exchange rate, and so forth) that makes it attractive to save in country x is also likely to make it attractive to invest in country x, for residents and nonresidents alike. Empirical studies of capital flight from developing countries, for example, have found that these same macroeconomic and exchange

Table 7
Saving and Investment: Fuel and Nonfuel Exporters

Regression: $(I/Y)_i = a + \beta (S/Y)_i + \varepsilon$

Estimates of β

Time Period	Fuel Exporting Countries	Nonfuel Exporting Countries
1971-92	0.18	0.61
	(0.13)	(0.07)
1971-81	0.12	0.63
	(0.13)	(0.08)
1982-92	0.26	0.59
	(0.12)	(0.06)
1971-73	0.21	0.72
	(0.19)	(0.10)
1974-76	0.07	0.60
	(0.09)	(0.08)
1977-79	0.22	0.59
	(0.14)	(0.07)
1980-82	0.06	0.43
	(0.14)	(0.07)
1983-85	0.34	0.66
	(0.13)	(0.08)
1986-88	0.27	0.52
	(0.13)	(0.06)
1989-92	0.37	0.62
	(0.13)	(0.06)

Notes: Countries where average ratio of fuel export to total exports in 1984-86 exceeded 50 percent are classified as "fuel-exporting" (17 countries); all others are classified as "nonfuel-exporting" (73 countries). $(I/Y)_i$ and $(S/Y)_i$ denote repsectively the average investment and saving ratio over the sample period.

rate policy variables are influential in explaining the time-series and cross-section behavior of capital flight (Dooley, 1988; Rojas-Suarez, 1991). This too should work in the direction of high correlations between domestic saving and investment.

A second potentially important factor is that some developing countries with less diversified production and export structures--oil

exporters are the classic example—will find it useful to invest much of their saving abroad, both because of the limited set of investment opportunities at home and because of traditional diversification motives. This would suggest that saving/investment correlations for say, fuel exporting developing countries, should be lower than those for other developing countries with more diversified economic structures. As shown in Table 7, such correlations do seem to be consistently lower for fuel exporters than for nonfuel exporters. As expected, the correlations are particularly low in those subperiods (1974-76 and 1980-82) following large increases in oil prices and in export earnings.

Third, one presumably also wants to take account of shocks that have different effects on certain subgroups of developing countries. For example, saving rates declined appreciably after 1981 in those developing countries with debt-servicing difficulties as a result of sharply higher interest payments on external debt and of a widening of fiscal imbalances; the debt overhang also acted to discourage investment in those economies. The reduction in the debt overhang and the implementation of effective stabilization measures have, since the mid-1980s, helped to reverse this decline; see IMF (1993a). In contrast, those developing countries without debt-service difficulties were able to maintain high saving rates throughout the 1980s and have recently increased them further. In any case, we think further empirical work to determine if, how, and why saving/investment correlations differ across groups of developing countries is warranted before one can give meaningful interpretation to the observed aggregate correlations.

This brings us to *country size.* It could matter for two reasons. First, small countries would be expected to have a less diversified economic structure than large countries and hence will depend more on capital inflows and outflows to offset domestic shocks. Second, a country that is large in world financial markets will be able to affect the world interest rate. For example, a dip in the large country's saving rate could raise the world interest rate and lead to a fall in both domestic and world investment. Both hypothesized effects of country size go in the same direction, namely, that small countries should have lower saving/investment correlations than large countries. This is an emi-

nently testable proposition. Again, the results have not been convincing. While some studies find that country size matters (Murphy, 1984), most find that it doesn't matter enough to alter the basic empirical regularities.[46]

The last suspect is weak substitutability within national economies between heavily (internationally) traded, highly liquid, largely default-free financial assets denominated in different currencies (for example, Treasury bills) and less (internationally) traded, less liquid, more risky, real assets (such as equities). As hinted at earlier, we believe there is something to this general point although we would readily admit that relatively little is understood about the mechanisms that would separate decisions about broad capital accumulation from those that involve access to world capital markets.[47] What we do know is that some assets (government securities) are much more highly traded and arbitraged than others (equity claims on small business) and that individuals don't take anywhere near full advantage of diversification (either national or international) in their daily lives. Clearly, more research is needed to sort out what assets get traded and when, and how arbitrage between nontraded and traded assets is frustrated.

Cross-country links in consumption

This is the newest branch in the empirical literature on international capital market integration. Its theme is that free trade in financial assets will allow countries to offset idiosyncratic risks and hence, to more easily smooth consumption. In fact, as Obstfeld (1993a) emphasizes, if the menu of traded, state-contingent assets were complete (so that all consumption risks were insurable), marginal utilities of consumption would be perfectly correlated across countries. Since those conditions are not satisfied in practice, one gets the weaker presumption that increases in capital mobility should be accompanied by increases in the strength of cross-country consumption links. A related proposition (Razin and Rose, 1993) is that countries with relatively open capital markets should display less volatility in consumption but greater volatility in investment than countries with less open capital markets (since greater access to the world capital market improves the diversification of country-specific shocks but also widens the set of investment opportunities).

Thus far, empirical support for the consumption-smoothing hypothesis has been mixed. Obstfeld (1993a, 1993b) finds: (1) that correlations of national consumption with world consumption, for both industrial and developing countries, are uniformly significantly below one (that is, below the value that should theoretically prevail if capital were perfectly mobile and if the menu of state-contingent assets were complete); (2) that the correlations are higher for industrial countries than for developing ones; and (3) that the correlations are on average higher for 1973-88 than for 1951-72—albeit with a fairly large number of individual-country exceptions. On the whole, these results are consistent with the view that the degree of capital market integration is increasing, although the increased coherence in the recent period would also be consistent with a constant degree of capital mobility cum a higher incidence of common shocks in the more recent period (Leiderman and Razin, 1993).[48] The related proposition that countries with more open capital markets should display smoother consumption and more volatile investment than those with less financial openness does not fare so well. Razin and Rose (1993) test this on a sample of 138 industrial and developing countries for the 1950-88 period. This is really a test of one implication of increased capital mobility—not a test of capital mobility itself, since the authors construct a measure of capital mobility for each country based on a factor analysis of capital account restrictions. In brief, they find that there is at best a weak relationship between capital mobility and consumption smoothing and no relationship at all between capital mobility and the volatility of investment. Rather than reject the theory, Razin and Rose (1993) argue that the explanation lies in the nature of shocks: since there are pervasive signs in their data both of persistence and commonality of shocks across countries, the lack of a link between capital market openness and volatility is not surprising.

Measuring capital market integration and mobility in developing countries

In addition to the difficulties already mentioned, estimating the degree of capital market integration faces some special obstacles when applied to developing countries. As noted earlier, the vast majority of developing countries maintain formal legal restrictions on international capital movements. Moreover, some of these countries

have also subjected (domestic) interest rates in the formal financial system to binding legal constraints; this makes application of standard "law of one price" tests problematic. To be sure, there are informal or "curb" markets in many of these "financially repressed" countries that might substitute for market rates, but data availability on those rates is severely limited. The fact that official capital flows to these countries, typically driven by other than relative yield considerations, loom large in total capital flows likewise raises further questions about the interpretation of Feldstein-Horioka saving/investment correlations.

All that being said, there is a growing body of empirical evidence—nicely summarized in Montiel (1993)—that suggests that useful tests of financial integration can be undertaken for these countries, and that the results lean in the direction of higher capital mobility than is often assumed.

One way around the absence of market-determined domestic interest rates is to conceive of the actual domestic interest rate as a weighted average of the external interest rate that would prevail under UIP, and of the domestic interest rate that would prevail in a financially closed economy (where the latter is a function of the observable excess demand for money). By so doing, one can estimate the weight of "external" relative to "domestic" factors in determining domestic interest rates (Edwards and Khan, 1985, and Haque and Montiel, 1990). The higher the weight of external factors, the larger is the country's degree of capital market integration with the rest of the world. In a similar spirit, one can also adjust the data used in tests of saving/investment correlations for nonmarket aid flows. These two methodologies can be supplemented by other indicators of integration, ranging from cross-country correlations of consumption behavior, to tests of UIP for those countries where domestic interest are less affected by legal constraints, to simple ratios of gross capital flows to GDP. Using a combination of all these techniques, Montiel (1993) is able to classify developing countries into three broad groups, corresponding to high, intermediate, and low degrees of capital market integration.

Only a few studies have explicitly tested for changes over time in the degree of capital market integration for developing countries.

Those that do however (Faruqee, 1991, and Frankel, 1986) find strong indications that capital mobility and integration have been increasing during the 1980s. Not all of that is attributable to the progressive dismantling of capital controls. Some of it also reflects the diminished effectiveness of those capital controls that are still in place. In this connection, Mathieson and Rojas-Suarez (1993) conclude that capital controls in developing countries were less effective in the 1980s than in earlier periods, as the incentives for moving funds across borders increased, while the costs of doing so fell.

Unfortunately, estimates of capital market integration—no matter what the methodology--cannotby themselves convey a full picture of the policy implications of those markets. For example, it is not necessary for expected returns to be fully equalized before large capital markets (relative to the stock of official international liquidity) can put major constraints, of both the helpful and unhelpful variety, over the short-term on the conduct of macroeconomic policies. Similarly, portfolios that have a relatively low degree of international diversification can—if they are large enough—generate large potential capital flows when expectations about relative yields change. For example, the roughly 5 percent foreign-asset share of U.S. pension funds is equivalent to about $125 billion. For this reason, we next turn to two recent episodes of large, international capital flows for additional insight into their implications for economic policy.

Two recent episodes of large international capital flows

In reviewing developments in international capital markets over the last few years, two episodes merit pride of place. One was the turmoil in European foreign exchange markets that reached its peak in the fall of 1992, and then reappeared in the summer of 1993. During the September 1992 turmoil, eight European currencies were devalued or allowed to float, two large members of the EMS suspended their participation in the mechanism, and central banks engaged in huge amounts of exchange market intervention (on the order of $150-200 billion) in an effort to hold existing parities against the tide of private capital flows. In the late summer of this year, that turmoil resurfaced and this time resulted in a widening of the ERM bands to plus or minus 15 percent around the bilateral central rates for all ERM currencies

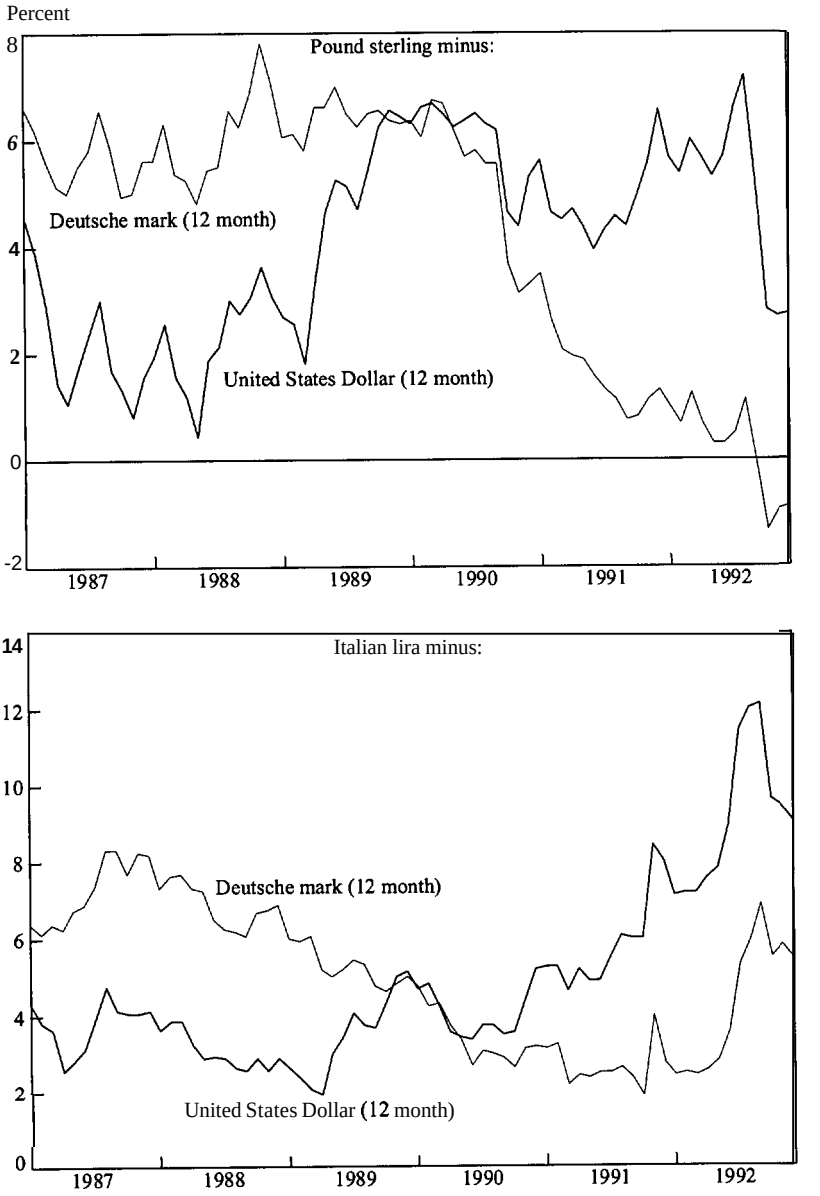
except the Dutch guilder (against the deutschemark).

The second episode is the revival of large-scale capital inflows to Latin America. After averaging about $8 billion a year in the second half of the 1980s, these inflows surged to $24 billion in 1990, to $40 billion in 1991, and to $53 billion last year. Mexico was easily the largest recipient of those flows but Argentina, Brazil, Chile, Colombia, and Venezuela also figured prominently. Accompanying these capital inflows in most of the host countries were real exchange rate appreciation, faster economic growth, an accumulation of international reserves, a boom in stock and real estate markets, and a strong upturn in secondary market prices for foreign loans.

The EMS crisis[49]

To appreciate why there was so much selling pressure against certain European currencies in the summer and fall of 1992, one has to go back about five years. During the 1987-91 period, there were large, cumulative inflows of capital into higher-yielding ERM currencies. An important motivating factor was the growing belief by international investors that the EMS countries were on an irreversible convergence path toward Economic and Monetary Union (EMU). This, in turn, implied that interest rate differentials in favor of high-yielding ERM currencies would more and more overestimate the actual risk of exchange rate depreciation. Why, therefore, settle for the yield on a deutsche mark bond when you could get the higher yield on a lira or peseta bond, absent the compensating currency risk? As seen in Chart 3, one-year lira yields were offering over the 1987-92 period an average spread of about 5 percent over the corresponding deutsche mark instrument (the yield differential over U.S. dollar instruments was also wide).[50] As the period since the last major realignment in the EMS lengthened (by the end of 1991, it had been almost five years), and as the political commitment to EMU strengthened—culminating with the signing of the Maastricht Treaty in December 1991—the "convergence play" seemed secure. Without pretending to any precision, total capital flows involved in such convergence plays could well have been in the neighborhood of $200-300 billion.

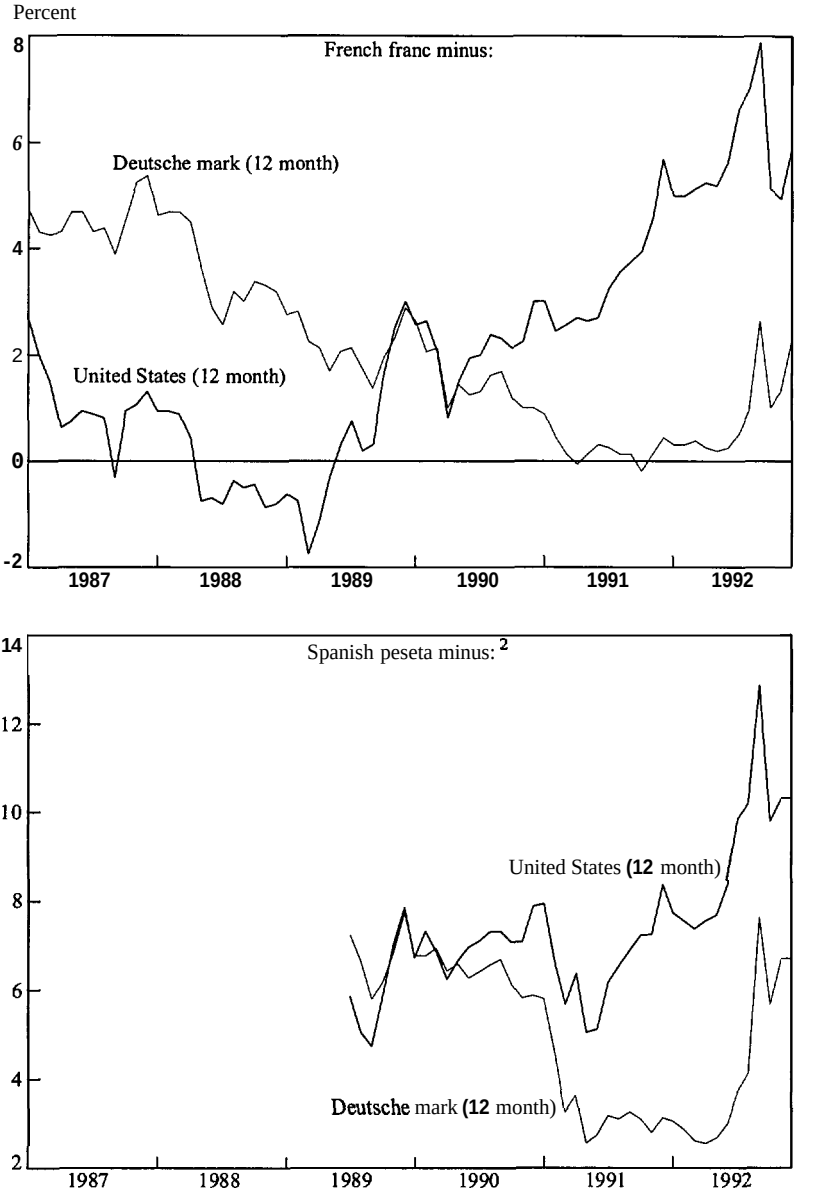
Chart 3
Interest Rate Differentials on Eurocurrency Deposits, 1987 - 1992[1]



Source: Dan Resources, Inc.

[1] Legend indicates maturity of both components of the differential

Chart 3 (cont.)
Interest Rate Differentials on Eurocurrency Deposits, 1987 - 1992[1]



Source: Data Resources, Inc.

[2] Daily data for the Spanish peseta are not available before July 1989.

The difficulty of course was that ***actual convergence*** among ERM countries—though significant—was not deep enough to justify the assumption of rigidly fixed exchange rates. Elements of vulnerability included: losses in competitiveness, large fiscal deficits, weaknesses in financial sectors, sharp cyclical differences, and divergent mixes of monetary and fiscal policy (in the wake of German unification). While predominantly a home-grown problem, the sluggish economic recovery in North America and, to a less extent, slow growth in Japan, also made the external environment inhospitable for those European countries attempting to recover from recessions. With the benefit of hindsight, it could be said either that the markets (like authorities) didn't pay enough attention during this period to the evolution of fundamentals, or that market participants believed that they could get out of long positions in overvalued currencies before the market correction took place. The negative outcome of the Danish referendum in June 1992 and the uncertainties associated with the outcome of the French referendum in September put into question both the certainty of the Maastricht Treaty ratification and the ability of some countries to achieve enough convergence to sustain existing parities. Seemingly, almost at once, the markets rediscovered currency risk and acted accordingly.

In addition to the potential for sharp shifts in sentiment, a second salient feature of the crisis (from the perspective of international capital markets) was the broad range of private market participants involved-encompassing banks, security houses, instititutional investors, hedge funds, and corporations. Indeed, that wide participation explains in part why the flows that flooded into central banks were so large. The roles played by different classes of participants varied: for the most part, it was plain defensive maneuvering to undo earlier exposures in certain currencies; for some, it was primarily an intermediary role as both a market maker and as a supplier of credit; for others, it was more a research and advisory role; and for yet others, it was heavy position-taking, leveraging to the hilt. The distinction between hedging and speculation becomes blurred when most market participants become convinced—rightly or wrongly—that a nontrivial change in exchange rates is coming, and that the change is likely to be in one direction. In that circumstance, everybody gets into the act.

Turning to the behavior of liquidity during the crisis, markets worked quite well. There were no major failures of financial firms, nor did we observe a persistent seizing up in any of the larger asset markets. This is not to say that there weren't strains. While forex markets operated continuously, spreads at times widened to five to ten times the norm in most of the ERM cross-rates. There were also periods when the size of trades declined. There were instances in some markets of a hesitation to quote forward rates because of the great volatility in short-term interest rates; similarly, OTC option markets suffered, because extremely high interest rate volatility increased the risk of quoting prices. Some firms with lower credit ratings temporarily lost access to their interbank markets and had to go to the derivative exchanges to hedge positions. The largest strains surfaced in the European currency unit (ECU) market, where the same political events that raised uncertainty about the future of EMU simultaneously created uncertainty about the value of the private ECU in terms of the official basket. Fortunately, the crisis remained localized in European currency markets and did not spread either to national debt and equity markets, or to the dollar or yen exchange markets. It also needs to be recognized that the liquidity situation might well have been different if central banks were not standing on the other side of the market and supplying it with such massive amounts of liquidity.

Last but by no means least, what did last fall's crisis—as well as its resumption this summer—tell us about the implications of international capital markets for the policy options of the authorities? Here, we would draw five main observations.

First, the crisis demonstrated that existing international capital markets can mobilize very large amounts of financial resources, and that the pressures against an exchange rate parity can quickly become enormous. In the 1970s, the possibility that a central bank could be faced with a run on its currency that could amount to say, $100-200 billion within the space of a few weeks was remote. It no longer is. This implies, in turn, that even massive exchange market intervention will almost certainly not be effective when it tries to stabilize exchange rates that are out of line with fundamentals and when it is not flanked by other policy measures. Sterilized intervention can still be helpful when its mandate is framed more modestly and closer to its

capabilities; that is, it may be helpful in countering disorderly market conditions in the short term, in sending a signal about future monetary policy intentions, and in providing a short—and we emphasize short—breathing space while fundamental policy changes are being made. Because the resources of the private sector are considerably larger than those of even G-10 central banks, the quality of intervention—particularly as a signal of joint monetary policy cooperation and of joint commitment to an agreed parity—is likely to be at least as important as the quantity.

Second, the stability of a pegged exchange rate system today—given the size, profit orientation, and technical capacity of international capital markets—depends importantly on whether a high degree of convergence in the economic performance and domestic policy needs of participating countries can be rapidly achieved and maintained. In particular, there can only be ***one monetary policy*** for a group of countries that seek to keep their bilateral exchange rates fully fixed. This could be the monetary policy of the dominant country to which other members of the group passively adjust, or it could be the monetary policy that is agreed by some common mechanism. But it cannot be separate policies for different members of the group. Moreover, since forex markets react not only to today's monetary polices but also to how monetary policy is expected to evolve in the future, the mechanisms and incentives that assure the subordinationof national monetary policy independence to the requirements of a fixed exchange rate regime must be perceived as credible.

Third, in looking at the consistency of exchange rates with fundamentals, it is necessary to look beyond measures of long-term competitiveness; one also needs to include in the list of fundamentals the gap between the internal and external requirements of monetary policy. In addition, the internal requirements for monetary policy cannot be defined solely with respect to inflation. Cyclical conditions, the prospective path of unemployment, and the health of the banking system, matter as well, and will inevitably form part of the market's assessment of whether a given monetary policy stance is compatible with given exchange rate commitments. Whatever the desirability and prowess of aggressive interest rate action to defend fixed rates in countries with healthy fundamentals and in situations where the gap

between the internal and external requirements for monetary policy is not particularly wide, such tactics are more limited when those conditions are not satisfied. During the 1992 crisis, Germany was not willing to reduce interest rates significantly before it had more assurance that inflationary pressures were under better control, and Italy, the United Kingdom, and Sweden each decided in the end that the costs of keeping interest rates well above what would otherwise be required on domestic grounds were too high to tolerate. In this past summer's recurrence of the crisis, there was again a decision that it would be too costly on domestic grounds (for both Germany and other members of the ERM) to implement a pattern of interest rates that would have been necessary to sustain existing parities; instead, a widening of exchangerate bands was viewed as the lesser of two evils. In both crises, it is hard to argue that in countries already in deep recession and with inflation in abeyance, higher interest rates would have been either credible or desirable. The capital flows that took place during these crises clearly paid attention to this situation. When you are in the midst of a deep recession and can't lower interest rates much to assist the recovery, this is a fundamental—as much as a loss in competitiveness, or a deterioration in the fiscal position.

Fourth, what was damaging about the EMS crisis was not that exchange rate adjustments occurred but rather the disorderly way in which they occurred (and the consequent damage done to authorities' credibility). The challenge for authorities is either to convince the markets that existing rates are consistent with fundamentals and sustainable, or to make timely adjustments in an orderly way. In situations when a number of rates do get out of line, the crisis would seem to suggest that an early, generalized realignment—if it can be mutually agreed—is preferable to a sequential, disorderly, series of forced adjustments. This in turn raises two challenges. One is to find a way to "depoliticize" exchange rate decisions, so that adjustments can be made before they offer speculators the prospects of large, profitable, one-way bets. The second one is how to maintain the momentum toward convergence of inflation rates and interest rates when less reliance than before can be placed on the fixity of the nominal exchange rate as an anchor. Countries with flexible exchange arrangements have greater room to maneuver because exchange rate pressures can be absorbed more by changes in the nominal exchange

rate, but once movements go beyond what is regarded by the authorities as appropriate, they too face the same type of dilemma.

Fifth, all three countries that imposed capital controls or tightened existing restrictions during the crisis removed them by the end of the year. In addition, in none of these three cases was the recourse to such controls successful in avoiding a realignment of the exchange rate. The burden of proof that such measures can be effective in dealing with capital market pressures on exchange rates must therefore rest with the proponents of such policies.

Surges of capital inflows into Latin America

The stylized facts about recent capital inflows into Latin America have been summarized by Calvo and others (1993a, 1993b): (1) about half of that inflow reflected an increase in the current account deficit; the other half shows up as an increase in official reserves; (2) part of the increased capital inflow represents repatriation of earlier capital flight, but part of it also reflects the presence of new investors; (3) while portfolio investment and foreign direct investment also increased, most of the inflows was accounted for by increased borrowing by the private sector from foreign private banks: (4) for some countries in the region (for example, Chile and Mexico), an important part of the inflow has financed increases in private investment, yet in some other countries in the region (for example, Argentina and Brazil), there has been a marked rise in private consumption (for the region as a whole, increased consumption dominates); and (5) the vast majority of countries in the region (Brazil is a notable exception) have experienced a sizable appreciation in their real exchange rates.[51]

There are three interesting questions about these inflows into Latin America. What motivated them? Are they a good thing? And what do they tell us about the functioning of today's international capital markets?

The usual explanation for the surge of capital inflows is the economic and political reforms (including privatization) carried out by the recipient countries, cum the signficant restructuring of their external debts. This has clearly operated to improve investment prospects

in these countries, as reflected, inter alia, in increasing secondary-market prices for bank claims on these countries. Yet, as Calvo and others (1993a) point out, the "internal" explanation cannot be the whole story. After all, capital also flowed into some countries in Latin America that did not undertake significant reforms, and it only flowed into reforming countries well after (post 1990) those reforms were put in place. For this reason, Calvo and others (1993a) come to the conclusion that "external" factors too played a significant role. Specifically, they conclude that economic developments in the United States—namely, falling interest rates and the recession-encouraged investors to shift resources to Latin America.[52] This was the "push" factor that complemented the "pull" of renewed investment opportunities and increased solvency within the host countries. In support of their case, they employ principal component analysis and vector autoregressions to test the influence of U.S. (financial yield and real activity) variables on both the change in reserves and the degree of real exchange rate appreciation in Latin America over the 1988-91 period. In short, "foreign" factors turn out to be important—particularly in those Latin American countries where there were no major changes in domestic policies during this period.

In principle, the surge of capital inflows to Latin America offers significant potential advantages to the recipients: it can help countries with low domestic saving rates to invest more, and thereby assist the transition to a higher growth path; it can help countries reduce the cost of adjusting to internal and external shocks; and it can help sustain the policy reform process (including the reorientation of trade policies from import substitution to export promotion).

In practice, however, the outcome depends very much on how the foreign capital inflows are utilized. In this connection, it is worthwhile to keep in mind three observations: (1) over the past two decades, the developing countries that relied most on foreign saving--defined as the top one-third of countries ranked by the ratio of all capital flows to GNP—tended to have higher inflation, higher fiscal deficits, lower investment, and lower growth than those that relied less on foreign saving;[53] (2) the relationship between changes in debt/GDP ratios and changes in investment rates in developing countries has varied sharply over time—with a significant positive relationship emerging in the

1968-78 period, no relationship characterizing the 1979-83 period, and a weak positive relationship reasserting itself during the 1983-89 period; and (3) for every group of success stories with commericial borrowing (for example, Korea, Indonesia, and Malaysia), there are also individual-country cases (for example, several Latin American countries in the 1976-81 period and the Phillipines throughout much of the 1980s) where cornrnericial borrowing had less salutory effects. Where countries can consistently follow policies (macroeconomic stability, a firm reliance on market forces, competitive exchange rates, and an outward-looking trade strategy) that allow them to earn a higher rate of return on investments than the cost of borrowing, foreign saving can be a valuable supplement to domestic saving. But when foreign saving is used on an extended basis to finance consumption, or to delay needed policy reforms, the result is likely to be disappointing.

In addition to the longer-term challenge of using foreign resources productively, surges of capital inflows also raise some more immediate concerns in at least three areas (Calvo and others, 1993a). First, there is the worry that the real exchange appreciation linked with these capital inflows could adversely affect the export sector, thereby endangering a cornerstone of growth, creditworthiness, and technological advancement. Second, the sustainability of these flows at recent levels is open to question. Specifically, if some are them are of the "hot money" variety, then a rapid reversal could lead to the discontinuation of efficient investment projects and perhaps, even to domestic financial strains. And third, there is some uneasiness about the proper intermediation of these imported funds—particularly in an environment where the inflows are used to make highly speculative investments under the expectation that the authorities will bail out speculators when the bubble bursts.

These concerns have in turn confronted policy authorities in Latin America with some difficult policy choices. Sterilized intervention can insulate the domestic money stock from the capital inflows. But sterilized intervention can induce a rise in the fiscal (or quasi-fiscal) deficit by increasing the differential between the interest rate on government domestic debt and that on international reserves; also, since sterilized intervention, if effective, prevents domestic interest

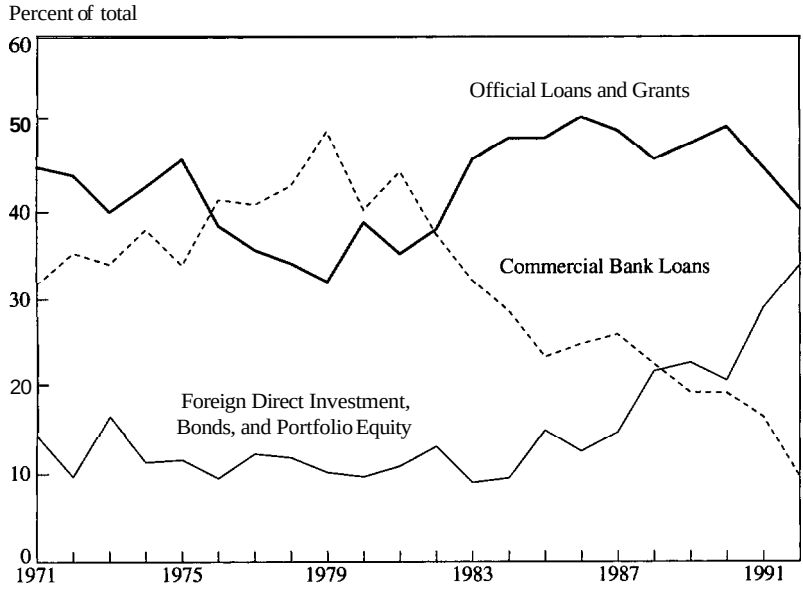
rates from falling, it tends to perpetuate the capital inflow. Not sterilizing, on the other hand, risks allowing the capital inflow to fuel inflationary pressures. Taxes on short-term borrowing abroad are likely to be less effective the longer they are in place, as efforts to evade these taxes (by under- or over-invoicing trade flows and the like) increase. Export subsidies can mute or offset the effect of a higher real exchange rate but they distort resource allocation and can involve substantial fiscal costs. An increase in banks' marginal reserve requirements, by limiting the capacity of banks to lend and by decreasing their exposure to a reversal of capital inflows, has some attractions, particularly where most of the inflows are in the form of short-term bank deposits. Like taxes on capital inflows, however, their effectiveness is likely to diminish over time, as new institutions develop to bypass these regulations; in addition, reserve requirements have been falling in recent years as part of the financial liberalization process, and authorities may worry that raising them would send a signal of a return to less market-oriented policies. Tighter fiscal policy is yet another option. While it doesn't halt the inflows, it can lower aggregate demand and limit the inflationary impact of these flows. But fiscal policy usually has its own medium-term orientation; nevertheless, if that medium-term orientation calls for a fiscal tightening, capital inflows may legitimately argue for somewhat earlier action. In the end, the appropriate mix of policy responses to surges of capital inflows will have to be determined on a country-by-country basis according to individual circumstances. But our point here, as in the European exchange rate episodes discussed earlier, is that capital markets--even if far from perfect—are now mobile enough and large enough, to put immediate constraints on domestic macroeconomic policies.

From a broader perspective, the recent resurgence of capital inflows to Latin America and to some other developing countries also invites two fundamental questions about the nature of today's international capital markets. One is whether that resurgence is an indication that, after a long hiatus, capital will once again be flowing from capital rich countries to capital poor ones. The other is whether the new pattern of private capital flows to developing countries, which relies more on bond and equity financing and less on commercial bank loans, is a welcome development.

A notable feature of international capital flows in the 1980s was that capital inflows to developing countries—and particularly, private capital inflows—remained almost stagnant, while gross inflows to industrial countries (mostly private sector flows) increased markedly.[54] This is not what one would expect from the textbooks. After all, industrial countries are relatively well endowed with capital relative to developing countries. This suggests that the marginal productivity of capital should be higher, other things equal, in developing countries than in industrial countries, and that accordingly, capital should normally be expected to flow from the latter to the former. This same reasoning also is consistent with the observed pattern of capital flows from industrial to developing countries during the gold standard, from the United States to Europe during the 1950s, and from the industrial countries to the developing countries during the 1960s and 1970s.

In the real world, of course, other things are *not* equal. In particular, the paucity of private capital flows to developing countries during the 1980s surely owes something to the then low quality of macroeconomic and structural policies in many of these countries, cum the disincentives to new investment associated with the external debt overhang. By the same token, we would regard the resurgence of those flows to developing countries during the 1990s as suggestive that better policies, more manageable debt burdens, and more hospitable attitudes toward both privatization and remission of dividends and profits, do matter for the direction of capital flows. The markets may well overreact (in both directions) to the actual progress made on policy reform, but they at least seem to get the trend right. This is not to say that policy reform is the whole story. As suggested earlier, cyclical and interest rate movements in some of the larger industrial countries (the United States and Japan) also count. Where gross capital flows are concerned, the openness, liquidity, and depth of financial markets likewise is an element in the direction of capital flows that favors the larger industrial countries. In any case, three years is too short a period to proclaim a "shift" in private capital flows toward the developing countries. Policy reform in those countries will have to be sustained to translate higher potential returns into higher expected returns. But the initial signs of the last few years are hopeful.

Chart 4
Developing Countries: Capital Flows



Turning to the changing cornpositon of private capital flows to developing countries, the recent rise of bond and equity portfolio flows and of foreign direct investment relative to commercial bank lending, is illustrated in Chart 4.[55] The significance of this change is not in terms of the direct cost of borrowing (since the return demanded by foreign investors is likely to be as high as the interest rate on commercial bank debt), but rather in other attributes of the new flows. For one thing, the rising share of direct foreign investment gives the host countries greater availability of state-of-the-art technology, as well as increased scope for human resource development, for stronger domestic competition, and for easier access to foreign markets. For another, bond and equity financing is probably better able than bank credit flows to adjust to shifts in perceptions about the creditworthiness of developing-country borrowers. With increased securitization, there is a greater role for price adjustments, which may signal emerging difficulties before the situation deteriorates to the point where market access is cut off. Since investors hold only a small proportion of their assets in the form of developing country securities, they are

also likely to be able to withstand a decline in the price of developing-country securities better than would a bank with a concentrated loan book. Some of these features of the new pattern of financing were evident in the second half of 1992 when there was a market correction in the demand for Latin American equities and bonds. The scale and terms of borrowing for Latin American issuers deteriorated during that period but there was no hint of any "systemic" concerns, and subsequently, market prices rebounded. Perhaps this is an inkling of the economic benefits of a more sophisticated and more diversified intermediation mechanism for international capital mobility.

Concluding remarks

In line with our mandate for this conference, we have surveyed the available empirical evidence on the integration across national capital markets. We have found that these international links have been increasing over the past decade—especially for high-grade, financial instruments traded actively in the wholesale markets of major financial centers. Capital markets in developing countries too are becoming more closely integrated with markets in the rest of the world, although they have progressed less far in that direction than the industrial countries.

It is still way too early to speak of a single, global capital market where most of world saving and wealth are auctioned to the highest bidder and where a wide range of assets carry the same risk-adjusted expected return. Some important components of wealth (like human capital) are scarcely traded at all, and currency risk, the threat of government intermediation (especially during periods of turbulence), and the strong preference for consuming home goods and investing in more familiar home and regional markets, still serve to restrict the range and size of asset substitutability. But the forces making for stronger arbitrage of expected returns are already powerful enough to have made a large dent in the autonomy that authorities have in the conduct of macroeconomic and regulatory policies. When private markets, led by the increasing financial muscle of institutional investors, reach the concerted view (rightly or wrongly) that the risk/return outlook for a particular security or currency has changed, those forces will be difficult to resist.

In some sense, authorities have suffered the fate of getting what they asked for. They wanted greater participation by foreign investors in their government debt markets, in part to make it easier to finance larger fiscal and external imbalances. They wanted a more efficient financial system that would erode the power of local monopolies and offer savers a higher rate of return and firms a lower cost of capital. They welcomed innovations that provided a wider range of hedging possibilities against volatile asset prices, and that made it more convenient to unbundle risks. They wanted to regain business that had migrated to the offshore centers in search of a less restrictive regulatory environment, and to level the playing field against foreign competitors. Much of that has taken place. But along with it has also come the creation of an enormous pool of mobile, liquid capital whose support, or lack of it, can often be the measure of difference in the success of stabilization, reform, exchange rate, and tax policies.

'We see little in the factors underlying the evolution of international capital markets to suggest that this increased clout of private markets will reverse itself in the future. Quite the contrary: international diversification is still in its adolescence; the costs of gathering, processing, and transmitting information and of executing financial transactions will probably decline further with advances in technology; the pace of financial liberalization (including cross-border ownership) and innovation continues unabated in most industrial countries; the pool of saving managed by professionals is growing (as private pension schemes supplement public ones, and as saving shifts from the banking sector into mutual funds); and the same reforms that reduce system risk (such as improvements in the payments and settlement system) often also enhance the private sector's capacity to redominate the currency composition of its assets and liabilities at short notice.

We would ***not*** go so far as to suggest that the growth and agility of private capital markets now makes it unrealistic to operate a fixed exchange rate arrangement durably and successfully. But we do believe that these factors have made the conditions for doing so more demanding. Specifically, there is now less room for divergencies of view among participants about the appropriate stance and medium-term orientation of monetary policy, less time to adjust to large,

country-specific shocks, and greater pressure to achieve closer convergence of economic performance. Some countries will find that they both want to, and can, credibly commit to those requirements. Others may be more skeptical—or may reason that these requirements can only be satisfied in a "hard core" arrangement where separate exchange rates are replaced by a common currency and where disputes about monetary policy only get aired within the board room of the single monetary authority. In the Western European context, much depends on how long it takes for Germany (still trying to cope with the effects of unification) and its EMS partners to forge a new genuine consensus on the appropriate path for monetary policy. The widening of bands should act in the interim to provide more room for maneuver to recover from the existing recession without giving away hard won gains on inflation.

With the benefit of perfect hindsight, it is not hard to identify instances over the past decade or so when international capital flows (like domestic ones) did not pay enough attention to fundamentals. The buildup to the external debt crisis in the 1970s, the final runup in the U.S. dollar in 1984-85, and the convergence play in the EMS in the late 1980s, are cases in point. Nevertheless, we see no basis for concluding that private capital markets usually "get it wrong" in deciding which securities and currencies to support and which ones not to. On the whole, most of the policy changes that have been forced by international capital markets seem to us to have been in the right direction. We therefore see merit in trying to improve the "discipline" of markets so that it is more consistent and effective rather than in trying to weaken or supplant the clout of markets.

Toward this end, two conditions (in addition to open capital markets themselves) are worth emphasizing. First, markets must be aware of the full magnitude of the debtor's obligations if they are to make an accurate assessement of his debt-servicing obligations and capacity. The lower is the range and quality of that information, the more likely is it that "contagion effects" will be present, since lenders will find it difficult to separate better credit risks from weaker ones. More comprehensive reporting of off-balance sheet borrowing (by private firms and sovereigns alike), greater transparency in the obligations of related entities (in conglomerates and the like), greater international

harmonization of accounting standards more generally, and more prompt disclosure of losses, would all be helpful. Second, market discipline cannot be effective if market participants believe that the borrower will be bailed out (one way or another) in the case of an actual or impending default. When there is such a perception of a bailout, the interest rate paid will reflect the creditworthiness of the guarantor—not that of the borrower—and there will be little incentive either for the borrower to rein in his errant behavior or for lenders to monitor and appraise the borrower's behavior in making loans. Just as important, it is the actual incurrence of losses by lenders and borrowers alike that helps to constrain excessive risk-taking in the future. The problem of course is that it is often very difficult to make such a no-bailout pledge completely credible—either because there has been a track record of previous .bailouts or because market participants suspect that, after the fact, there will be strong pressures for doing so (to prevent sytemic repercussions or to compensate parties for losses beyond their control).

Some others see things differently. If governments can pick only two among the three objectives of fixed exchange rates, independent monetary policy, and open capital markets, they would allow the latter to be the orphan by throwing "sand in the wheels" of the international capital market. Eichengreen and Wyplosz (1993), for example, writing after the ERM crisis of 1992, have argued for a variant of this proposal so as to deter speculative attacks and thereby safeguard the route to Stage 3 of European Economic and Monetary Union (EMU).[56] In short, we find little appeal in such proposals, for at least three reasons. First, while it is true that market activity in the foreign exchange market is dominated by interdealer transactions and is subject to considerable short-term "in and out" trading, this turnover needs to be compared with that in other liquid markets. For example, it has been estimated that the entire stock of U.S. Treasury marketable debt turns over on average approximately once every eight days.[57] An average daily turnover of about $900 billion in the global forex market, relative to a stock of publicly traded debt and equity of around $24 trillion, yields a comparabale turnover figure of about once every twenty-five days. It is therefore not apparent that turnover in the forex market is "excessive" unless turnover in the U.S. government securities market is excessive also. Second, with the displacement of buy-

and-hold finance by transaction-driven finance, it is becoming less clear what a "long-term investment" means. Improved liquidity allows even traditionally risk-averse players, like pension funds, insurance companies, and some mutual funds, to move quickly in and out of domestic and international investment positions. Are we willing to conclude that this activity--even when it is carried out by prudent investors acting according to their charters, should be discouraged? Third, whatever one's views on the social productivity of short-term trading, we doubt whether such "sand in the wheels" taxes would be effective in attaining their goals, since the currency denomination of assets can now be easily altered in many financial centers and since there is always an incentive for some center to capture more of the world's business by not imposing the tax.

None of this implies that authorities should be indifferent to the potential prudential and systemic risks that may be associated with the trend toward global capital market liberalization and innovation. Exchange rates are volatile asset prices and position-taking in foreign exchange is little different from other sources of market risk; it too could endanger the safety and soundness of financial institutions. Similarly, the rapid expansion of derivative markets has raised its own serious questions about credit risk, market risk, liquidity risk, and legal risk. A series of financial crises—the latest of which has been centered around heavy losses in real estate lending by banks in a number of industrial countries—has again driven home the point that it is precisely when financial institutions find both that their competitive position has been eroded and that they suddenly have expanded investment opportunities, that they are most susceptible to taking excessive risks—particularly in cases when much of that risk is effectively being underwritten by implicit and explicit government guarantees. The message however should not be to try and halt financial liberalization and the international integration of capital markets but rather to accompany that liberalization and integration with a strengthening of the supervisory framework that permits the attendent risks to be properly priced and that encourages risk management programs to be upgraded.

As the debt crisis of the 1980s so powerfully illustrated, these issues of the proper pricing and management of risk in international capital

markets are of deep concern to developing countries, as well as to industrial countries. More recently, surges of capital inflows into a number of developing countries are a hopeful sign that many of the problems that led to the debt crisis are being effectively resolved, most importantly by the rising credibility of the determined stabilization and reform efforts undertaken in a number of developing countries. Also, the changing character of much of the capital flow to developing countries—away from bank loans and toward bonds, equities, and direct foreign investment—suggests enhanced flexibility and resiliency of the international financial system in dealing with any future problems. These developments should assist the international financial system in performing one of its important functions: facilitating the flow of investable resources from countries where prospective returns are relatively low to countries where prospective returns are relatively high.

In this regard, probably the most important challenge now facing the world economic and financial system is the transformation of the formerly centrally planned economies of Europe and Asia into efficiently functioning market economies. During the next two decades, such a successful transformation will require literally hundreds of billions of dollars of new investment. From where will the savings necessary to finance all this new investment come? Will it come primarily from net new demands on existing world capital markets?

No, not if experience is a good teacher. External capital may play an important, but surely not a predominant role. Although we do not completely understand why, there is—as discussed earlier—a high correlation between national investment and national saving. In particular, the rapidly growing, relatively high investment countries have also tended to be relatively high saving countries. Investment during the postwar recoveries in Europe and Japan was largely financed by internally generated savings. More recently, in the rapidly advancing countries of East Asia, high levels of investment have typically been associated with high levels of saving. This is the same pattern that we should expect to see in the successful transformation of the formerly centrally planned economies—and for good reason. The same economic reform policies that will make these economies attractive environments for high levels of productive investment will also,

almost inevitably, make them hospitable to savers who wish to put aside part of their current income in the prospect of enjoying higher living standards in the future. Indeed, as in many other successful economies, much of the finance for new private business investment will probably not flow through wholesale national financial markets, but rather will come from re-invested profits and from the more informal channels through which much enterpreneurial investment is often financed. Nevertheless, the development of well-functioning capital markets and financial institutions will clearly be important, both for transferring resources from savers to investors and for disciplining the activies of entities that make use of national savings. In this regard, reform of the financial sector and of the financial operations of enterprises is often an urgent priority in the more general process of economic transformation. Economies do not usually function well when the financial system operates primarily to channel national saving to finance large scale government deficits or to cover the burgeoning losses of nonviable state enterprises.

It is early on in the transformation process that the role of external, official capital flows will be most vital. During this stage of high risks and great uncertainties, private flows of international capital typically tend to be quite limited and are often focused on particular investments with a high security of expected return. Hence, flows of credit from official sources and from the international financial institutions often tend to dominate the supply of external resources available to smooth the initial painful adjustments. Resources provided on the condition that countries design and implement serious programs of economic stabilization and reform are particularly important and appropriate at this stage. The key "market imperfection" that impairs the private supply of capital (both external and internal) in the initial stages of transformation is the doubt that inevitably exists about the durability and success of the reform effort. Conditional assistance linked to the implementation of sensible reform programs is needed to correct this market imperfection. Necessarily, such conditional assistance must come largely from public rather than private sources; and, appropriately, the risks associated with the provision of such assistance are balanced by the large potential public return to the world community from successful transformation of the formerly centrally planned economies. Success, of course, depends primarily

on the reform efforts of the transforming countries themselves. But, an adequate flow of external support and, even more importantly, an opening of markets to exports of transforming economies, are also critical. Subsequently, as success becomes apparent and the reform process gains self-sustaining momentum, flows of private capital should take over the overwhelming bulk of the task of financing the huge investments that transforming economies will surely require in the decades ahead.

Authors' Note: The authors are Director and Deputy Director, respectively, in the Research Department of the International Monetary Fund (IMF). The views expressed are solely those of the authors and do not necessarily represent the views of the IMF. The authors are grateful to colleagues in the Research Department, as well as to Barry Eichengreen, Jeff Frankel, Leo Leiderman, Peter Montiel, Maury Obstfeld, and Geoff Woglom, for helpful comments on an earlier draft.

Endnotes

[1]By 1992, the outstanding stock of publicly-traded debt and equity securities in Europe and the United States had climbed to roughly $24 trillion, while the notional amounts of financial derivatives outstanding had reached $7 trillion; see Goldstein and others (1993a).

[2]By "global" bonds and equities, we mean securities which are distributed internationally at issue, thereby allowing them to be tradable in more than one market from inception.

[3]Goldstein and others (1993a).

[4]OECD (1993).

[5]The analogous figure for trading of U.S. equities is about 10 percent.

[6]Breeden (1991).

[7]Folkerts-Landau and Mathieson (1988) and Crockett (1993).

[8]IMF (1993b). Under the IMF's Articles of Agreement (Article VI, Section 3), countries retain the authority to " . . . exercise such controls as are necessary to regulate international capital movements."

[9]Since the countries that do maintain capital account convertibility account together for a large share of world financial transactions, the effective degree of global capital account convertibility is substantially higher than suggested by a tally of the number of countries alone. Our point is simply to register that attitudes on liberalization of the capital account are not uniform across countries, and that many parts of the developing world have yet to embrace capital account convertibility.

[10]Corbett (1987) estimates that (in the mid-1980s) between one-half and two-thirds of the (gross) financing of nonfinancial corporations in the United States, the United Kingdom, and Japan came from retained earnings. Mayer (1989) obtains broadly similar findings for the G-7 countries over the longer 1970-85 period.

[11]Turner (1991).

[12]If we move beyond the G-7 to the smaller industrial countries, the incidence of large current account imbalances in the 1970-93 period increases.

[13]Tesar (1991). French and Poterba (1991).

[14]Baxter and Jermann (1993).

[15]Goldstein and others (1993a).

[16]Useful surveys are Obstfeld (1993a), Frankel (1991, 1992), and Tesar (1991).

[17]The offshore/onshore differentials for Japan shown in Chart 1 are for 3-month deposits; one-month deposits seem to show smaller differentials, but there is still a trend toward increased integration; see Obstfeld (1992a).

[18]Giavazzi and Pagano (1985), Frenkel and Levich (1977). Fieleke (1975).

[19]Tests of CIP can involve onshore comparisons or offshore/onshore comparisons.

[20]Dooley and Isard (1980).

[21]Since domestic closed-end mutual funds also sometimes display these differences, one needs to evaluate the premia in the country funds relative to those for domestic funds.

[22]Solnik (1991). Jorion (1992). Because of the existence of country-specific shocks, it is not Likely that even a perfectly integrated capital market would exhibit perfect correlations of stock prices across countries. Still, one would expect higher integration to be associated with higher correlations of returns across countries.

[23]Jorion (1992), examining correlations among national stock markets for 16 industrial countries (plus Hong Kong and Singapore), reports that the correlations increased slightly as between 1959-70 and 1971-78, but then decreased, on average, in the 1979-86 period.

[24]Hamao and others (1990) and Eun and Shim (1989).

[25]Jorion (1992).

[26]Isard (1992) provides a useful discussion of both CIP and UIP, as well as a review of the empirical evidence on each.

[27]Cumby and Obstfeld (1984), Frankel and Froot (1987).

[28]Mussa (1990).

[29]Hansen and Hodrick (1980). Tryon (1979).

[30]Cumby and Obstfeld (1984).

[31]A complementary explanation is that market participants are risk averse—not risk neutral—and that they attach a high subjective variance to long-term investment in foreign assets; see Feldstein and Bacchetta (1991). We take up this issue when we discuss departures from optimally diversified portfolios.

[32]Frenkel and Goldstein (1988), Mussa and Isard (1993).

[33]Tesar and Werner's (1992) figures on international portfolio investment (relative to GNP), covering five industrial countries over the 1980-90 period. tell a similar story. with the U.S. ratio climbing from 2 to 4 percent, and the ratios for Germany, Japan, and the United Kingdom registering much larger increases. Their estimates also suggest large differences across the five countries in the degree of international diversification, with the United Kingdom at the top (26 percent), Japan and Germany in the middle (18 and 11 percent respectively), and the United States and Canada at the bottom (around 4 percent).

[34]Golub (1990) reaches a similar conclusion about excessive "domestic asset preference" by employing a different methodology. He reasons that if capital were perfectly mobile internationally, the share of country 1's assets purchased by residents of country 1 should equal that country's share in world lending. Actual home shares, however, are far higher than that for 12

OECD countries during the 1970s and 1980s.

[35]Some studies even suggest that once one adds the expected return from human capital into the calculation, the home bias becomes even larger. This is because the expected return from human capital is best hedged by taking a ***short*** position in domestic financial assets (that is, by having domestic assets take a negative weight in the optimal portfolio); see Baxter and Jermann (1993).

[36]Incomplete diversification hardly relates exclusively to international transactions. Here, French and Poterba (1991) cite the popular practice of owning a home close to where you work, downplaying the high correlation between the returns on human and physical capital.

[37]It could also be that there are differences across countries in the degree of risk aversion. For example, it is sometimes argued that European investors have a more negative attitude toward low-rated paper than do investors in North America, and that the former has something to do with the lack of a global market in paper rated A or below; see OECD (1993).

[38]See Feldstein and Bacchetta (1991), Obstfeld (1993), Frankel (1991, 1992), and Tesar (1991) for surveys of this savinglinvestment literature.

[39]Both Frankel (1991) in tests for the United States alone, and Feldstein and Bacchetta (1991) in tests for 23 OECD countries, find that the correlations for the 1980s are lower than those for the 1960s and 1970s. Obstfeld (1993), however, suggests that savinglinvestment correlations for 1986-90 appear higher than those for 1980-85. Earlier studies (Dooley and others, 1987)—comparing the last dozen years of Bretton Woods with the first decade of floating—were unable to detect a decline in these correlations.

[40]See Dooley and others (1987) and Montiel (1993).

[41]Summers (1988) provides some numerical examples—as well as a regression relating public-sector saving/investment imbalances to private-sector ones, to illustrate this point of view.

[42]A disadvantage of regional data however is that smaller size probably means a less diversified economic structure and hence, a higher incentive to use international capital markets. In this sense, comparing country results with regional results is not entirely free of violations of the ceteris paribus condition.

[43]Caprio and Howard (1984). Frankel (1986). Dooley and others (1987).

[44]See Mendoza (1993).

[45]Lack of reliable flow of funds data makes it difficult to test this conjecture on a wide sample of developing countries. Singh and Hamid (1992) show, rather surprisingly, that for a sample of about 10 developing countries, internal funds account for a smaller share of net investment expenditure than is the case in industrial counmes. This finding, however, relates only to the largest firms (the top 50 manufacturing companies quoted on the stock market of each country).

[46]Feldstein and Horioka (1980) and Tesar (1991).

[47]Dooley and others (1987) argue that it is less costly for the host government to impose taxes or penalties on some assets (say, foreign equity claims) than on others (say, government

securities), and that this distinction reduces substitutability between the two. They then go on to argue that market participants will not be willing to build up large, net international claims in those classes of assets for which default penalties are relatively low. It is not clear, however, what the testable implications of such a "hostage theory" of international capital flows are.

[48]Obstfeld (1993b) takes some account of this possibility by explicitly allowing for oil price shocks.

[49]Our analysis here draws heavily on Goldstein and others (1993a), Mussa and Isard (1993), and G-10 Deputies (1993).

[50]The same convergence scenario also provided justification for the financial sector and large corporate issuers in the high-yield currencies to increasingly fund themselves in the lower-interest rate ERM currencies (mainly the deutsche mark and to a lesserextent, the Dutch guilder).

[51]It is noteworthy that several of the stylized facts of the Latin American experience differ from those of Asian developing countries who experienced a large, capital inflow during this period. In the latter's case, real exchange rate appreciation was not the norm, more of the capital inflow financed an increase in investment, and a higher share of the inflow came in the form of foreign direct investment; see Calvo and others (1993b). All this may explain why concerns about "hot money" flows are more prominent in Latin America than in Asia.

[52]Note that low interest rates in some industrial countries made investments in Latin America more attractive not only because of relative yield considerations but also because low international interest rates reduce developing countries' debt-service obligations and hence, improve their creditworthiness.

[53]IMF (1993a).

[54]Turner (1991), Goldstein and others (1991).

[55]Chart 4 also documents that it is only recently (since 1990) that the share of official loans and grants in the total of long-term capital flows to developing countries has declined—after roughly a decade during which the share of the official sector climbed appreciably.

[56]Eichengreen and Wyplosz (1993) suggest deposit requirements on open positions in foreign exchange as a temporary arrengement only for European countries seeking to complete the transition to EMU. They are mainly concerned with potential protectionist pressures associated with exchange rate volatility

[57] This calculation is derived by taking the average daily volume of U.S. Government securities settled through the book entry system (about $400 billion in 1989) and comparing to an end-of-year stock of U.S. Treasury marketable debt of $3.4 trillion ($2.6 trillion in the hands of the public); see Goldstein and others (1993a).

[58]Notes to Chart 2, p. 270: The following definition applies for the short-term interest rates: 3-month certificate of deposit (CD) rate for the United States (before 1976, eurodollar deposit rate) and Japan (before July 1984, Gensaki rate), 3-month interbank deposit rates for Germany and France (before 1970, money market rate), and 3-month prime corporate paper for Canada; and yields on government bonds with residual maturities of 10 years or nearest are taken as the long-term interest rates. Real rates are nominal rates minus the 4-quarter percentage change in the GDP (GNP) deflator.

References

Baxter, M., and U. Jermann. 'The International Diversification Puzzle is Worse Than You Think,'' Working Paper No. 350, Rochester Center for Economic Research, University of Rochester, May 1993.

Bayoumi, T. ''Saving-Investment Correlations,'' IMF ***Staff Papers,*** June 1990.

_____, and A. Rose. ''Domestic Saving and Intra-National Capital Flows,'' ***European Economic Review,*** 1993, forthcoming.

_____, and G. Sterne. ''Regional Trading Blocks, Mobile Capital and Exchange Rate Coordination,'' Bank Of England Discussion Paper, Bank of England, 1993, forthcoming.

Bonser-Neal C., G. Brauer, and S. Wheatley. ''International Investment Restrictions and Closed-End Fund Prices,'' ***Journal of Finance,*** vol. 38, 1990.

Bordo, M. ''The Bretton Woods International Monetary System: A Historical Overview,'' in M. Bordo and B. Eichengreen, eds., A ***Retrospective on the Bretton Woods System.*** Chicago: University of Chicago Press, 1993.

Breeden, R. ''Reconciling National and International Concerns in the Regulation of Global Capital Markets.'' Lecture given at the London School of Economics, November 1991.

Calvo G., L. Leiderman, and C. Reinhart. ''Capital Inflows and Real Exchange Rate Appreciation in Latin America,'' IMF ***Staff Papers,*** March 1993a.

_____, and _____. 'The Capital Inflows Problem: Concepts and Issues,'' International Monetary Fund, unpublished, April 1993b.

Caprio, G., and D. Howard. ''Domestic Saving, Current Accounts, and International Capital Mobility,'' International Finance Discussion Paper No. 244, Board of Governors of the Federal Reserve System. 1984.

Corbett, J. ''International Perspectives on Financing,'' ***Oxford Review of Economic Policy,*** Winter 1987.

Crockett, A. ''Monetary Implications of Increased Capital Flows,'' Paper presented at this conference, August 1993.

Cumby, R., and F. Mishkin. ''The International Linkage of Real Interest Rates: The European-U.S. Connection,'' ***Journal of International Money and Finance,*** vol. 5, 1986.

_____, and M. Obstfeld. ''International Interest Rate and Price Linkages Under Flexible Exchange Rates: A Review of Recent Evidence,'' in J. Bilson and R. Marston, eds., ***Exchange Rate Theory and Practice.*** Chicago: University of Chicago Press, 1984.

Dooley, M. ''Capital Flight: A Response to Differences in Financial Risk,'' IMF ***Staff Papers,*** September 1988.

_____, and P. Isard. ''Capital Controls, Political Risk, and Deviations from Interest-Rate Parity,'' ***Journal of Political Economy,*** April 1980.

_____, J. Frankel, and D. Mathieson. ''What Do Saving-Investment Correlations Tell Us?' IMF ***Staff Papers,*** September 1987.

Edwards, S., and M. Khan. ''Interest Rate Determination in Developing Countries,'' IMF ***Staff Papers,*** September 1985.

Eichengreen, B., and C. Wyplosz. ''Mending Europe's Currency System,'' ***The Economist,*** June 5, 1993.

Eun, C., and S. Shim. ''International Transmission of Stock Market Movements,'' ***Journal of Financial and Quantitative Analysis,*** vol. 24, 1989.

Faruqee, H. ''Dynamic Capital Mobility in Pacific Basin Developing Countries,'' IMF Working Paper No. 115, International Monetary Fund, November 1991.

Feldstein, M. ''Domestic Saving and International Capital Movements in the Long Run and the Short Run,'' ***European Economic Review,*** 1983.

_____, and C. Horioka. ''Domestic Saving and International Capital Flows,'' ***Economic Journal,*** vol. 90, 1980.

_____, and P. Bacchetta. ''National Saving and International Investment,'' in D. Bernheim and J. Shoven, eds., ***National Saving and Economic Performance,*** University of Chicago Press, 1991.

Fieleke, N. ''Exchange Rate Flexibility and the Efficiency of the Foreign Exchange Markets,''

Journal of Financial and Quantitative Analysis, vol. 10, 1975.

Folkerts-Landau, D., and D. Mathieson. "Innovation. Institutional Changes, and Regulatory Responses in International Financial Markets," in W. Haraf and R. Kushmeider, eds., *Restructuring Banking and Financial Services in America*. Washington D.C.: American Enterprise Institute, 1988.

Frankel, J. "International Capital Mobility and Crowding Out in the U.S. Economy," in R. Hafer, ed., *How Open is the U.S. Economy?* Lexington: D.C. Heath, 1986.

_____. "Quantifying International Capital Mobility in the 1980s," in D. Bernheim and J. Shoven, eds., *National Saving and Economic Performance*. Chicago: University of Chicago Press, 1991.

_____, "Measuring International Capital Mobility: A Review," *American. Economic Review*. May 1992.

_____, and R. Froot. "Using Survey Data to Test Standard Propositions Regarding Exchange Rate Expectations," *American Economic Review*. May 1987.

French, K., and J. Poterba. "Investor Diversification and International Equity Markets," *American Economic Review, May 1991*.

Frenkel, J. "The Collapse of Purchasing Power Parities During the 1970s," *European Economic Review*, vol. 16, May 1981.

_____, and M. Goldstein. "Exchange Rate Volatility and Misalignment," in *Financial Market Volatility*, Federal Reserve Bank of Kansas City, 1988.

_____, and R. Levich. 'Transactions Costs and Interest Arbitrage: Tranquil versus Turbulent Periods," *Journal of Political Economy*, vol. 86, 1977.

Giavazzi, F., and M. Pagano. "Capital Controls and the European Monetary System," in *Capital Controls and Foreign Exchange Legislation*, Occassional Paper, Milano, Euromobiliare, June 1985.

_____, and A. Giovannini. *Limiting Exchange Rate Flexibility: The European Monetary System*. Cambridge: MIT Press, 1989.

Goldstein, M., D. Mathieson, and T. Lane. *Determinants and Systemic Consequences of International Capital Flows*, IMF Occassional Paper No. 77, International Monetary Fund, March 1991.

_____, D. Folkens-Landau, and others. *International Capital Markets: Developments, Prospects, and Policy Issues*, IMF World Economic and Financial Surveys, September 1992.

_____, and _____. *International Capital Markets: Part I, Exchange Rate Management and International Capital Flows*, IMF World Economic and Financial Surveys, April 1993a.

_____, and _____. *International Capital Markets: Part II, Systemic Issues in International Finance*, IMF World Economic and Financial Surveys, September 1993b.

Golub, S. "International Capital Mobility: Net Versus Gross Stocks and Flows," *Journal of International Money and Finance*. December 1990.

Group of Ten Deputies. *International Capital Movements and Foreign Exchange Markets*. Rome, April 1993.

Hamao, Y., and P. Jorion. "International Capital Market Integration," in P. Newman, M. Milgate, and J. Eatwell, eds., *New Palgrave Dictionary of Money and Finance*. London: Macmillan, 1992.

_____, R. Masulis, and V. Ng. "Correlations in Price Changes and Volatility Across International Stock Markets," *Review of Financial Studies*, vol. 3, 1990.

Hansen, L., and R. Hodrick. "Forward Exchange Rates as Optimal Predictors of Future Spot Rates," *Journal of Political Economy*. vol. 88, 1980.

Haque, N., and P. Montiel. "Capital Mobility in Developing Countries," IMF Working Paper No. 117, International Monetary Fund, December 1990.

Hilley, J., C. Beidlemen, and J. Greenleaf. "Why is There No Long Forward Market in Forward Exchange?" *Euromoney*, January 1981.

International Monetary Fund. *World Economic Outlook*, IMF World Economic and Financial Surveys, October 1993.

_____. *Exchange Arrangements and Exchange Restrictions, Annual Report, 1992*, Inter-

national Monetary Fund, 1992.

Isard, P. "Uncovered Interest Parity," in P. Newman, M. Milgate, and J. Eatwell (eds)., ***New Palgrave Dictionary of Money and Finance.*** London: Macmillan, 1992.

Jorion, P. "The Linkages Between National Stock Markets," in R. Aliber, ed., ***Handbook of International Financial Management.*** Homewood, Ill.: Dow Jones-Irwin, 1993.

Lane, T. "Market Discipline," IMF ***Staff Papers***, March 1993.

Leiderman, L., and A. Razin. "Introduction," in L. Leiderman and A. Razin, eds., ***Capital Mobility: Smoothing or Volatizing?*** Cambridge: Cambridge University Press, 1993, forthcoming.

Mankiw, N., and S. Zeldes. "The Consumption of Stockholders and Nonstockholders." ***Journal of Financial Economics,*** vol. 29, 1991.

Mathieson, D., and L. Rojas-Suarez. ***Liberalization of the Capital Account,*** IMF Occasional Paper No. 103, International Monetary Fund, March 1993.

Mayer, C. "Myths of the West: Lessons from Developed Countries for Development Finance," World Bank Working Paper No. 301, World Bank, November 1989.

Mendoza, E. "Robustness of Macroeconomic Indicators of Capital Mobility," IMF Working Paper No. 111, International Monetary Fund, December 1992.

Mishkin, F. "Are Real Interest Rates Equal Across Countries?' ***Journal of Finance,*** vol. 39, 1984.

Montiel, P. "Capital Mobility in Developing Countries: Some Measurement Issues and Empirical Estimates," World Bank Policy Research Working Paper No. 1103, World Bank, February 1993.

Murphy, R. "Capital Mobility and the Relationship between Saving and Investment in OECD Countries," ***Journal of International Money and Finance,*** vol. 3, 1984.

Mussa, M. "Exchange Rates in Theory and in Reality." ***Princeton Essays in International Finance,*** No. 179, International Finance Section, Princeton University, December 1990.

_____, and P. Isard. "A Note on Macroeconomic Causes of Recent Exchange Market Turbulence," Annex V in G-10 Deputies [1993].

Obstfeld, M. "Capital Mobility in the World Economy: Theory and Measurement," in ***Carnegie-Rochester Conference Series on Public Policy.*** Amsterdam: North Holland, 1986.

_____. "How Integrated Are World Capital Markets? Some New Tests," in G. Calvo and others, ***Debt, Stabilization, and Development: Essays in Honor of Carlos Diaz-Alejandro.*** Oxford: Basil Blackwell, 1989.

_____. "Are Industrial-Country Consumption Risks Globally Diversified?" University of California at Berkeley, unpublished, 1992.

_____."International Capital Mobility in the 1990s." Paper presented at a conference celebrating the 50th Anniversary of Essays in International Finance, Princeton University, unpublished, April 1993a.

_____. "The Intemational Diversification of Industrial-Country Consumption," in L. Leiderman and A. Razin, eds., ***Capital Mobility: Smoothing or Volatizing?*** Cambridge: Cambridge University Press, 1993b.

Organization for Economic Cooperation and Development. "New Instruments and Operations in Financial and Foreign Exchange Markets," Annex III in G-10 Deputies, 1993.

Popper, H. "International Capital Mobility: Direct Evidence from Long-Term Currency Swaps," Intemational Finance Discussion Paper No. 386, Board of Governors of the Federal Reserve System, 1990.

Razin, A., and A. Rose. "Business Cycle Volatility and Openness," in L. Leiderman and A. Razin, eds., ***Capital Mobility: Smoothing or Volatizing?*** Cambridge: Cambridge University Press, 1993, forthcoming.

Rojas-Suarez, L. "Risk and Capital Flight in Developing Countries." in M. Goldstein and others. 1991.

Singh, A., and J. Hamid. ***Corporate Financial Structure in Developing Countries,*** IFC Technical Paper No. 1, World Bank, 1992.

Sinn, S. "Saving-Investment Correlations and Capital Mobility," ***Economic Journal,*** vol. 102, September 1992.

Solnik, B. ***International Investments.*** Reading: Addison-Wesley, 1991.

Summers, L. "Tax Policy and International Competitiveness," in J. Frenkel, ed., ***International Aspects of Fiscal Policy,*** University of Chicago Press, 1988.

Tesar, L. "Saving, Investment, and International Capital Flows," ***Journal of International Economics,*** vol. 31. 1991.

_____, and I. Werner. "Home Bias and Globalization of Securities Markets," University of California at Santa Barbara, unpublished, 1993.

Tryon, R. "Testing for Rational Expectations in Foreign Exchange Markets," International Finance Discussion Paper No. 139, Board of Governors of the Federal Reserve System, 1979.

Turner, P. ***Capital Flows in the 1980s: A Survey of Major Trends,*** BIS Economic Papers, No. 30, Basle: Bank for International Settlements, April 1991.

Commentary: The Integration of World Capital Markets

Martin Feldstein

Every day we see more and more evidence of the growing internationalization of capital markets. Investors diversify their portfolios and corporate treasurers tap debt and equity funds abroad. These tendencies are strengthened by the expansion of derivative products markets that now permit market participants to hedge long-term currency and interest rate risks.

It is important to consider therefore the economic effects of these links among national capital markets, including the effects on investment, growth, monetary policy, and exchange rates. In their paper for this conference, Michael Mussa and Morris Goldstein have combined a wide-ranging summary of the existing research on the integration of world capital markets with their own carefully considered judgments on these issues. Since I found their judgments to be sound and carefully considered, I will not discuss their specific remarks, but will comment instead on a few of the issues raised by their paper and, more generally, by the subject of capital market integration: the international mobility of savings, the European exchange rate mechanism (ERM), and the impact of capital mobility on the effectiveness of domestic monetary policy.

The limited mobility of savings

Any consideration of the extent of world capital market integration highlights the paradox that although the ***gross*** flows of funds among

countries are very large, the ***net*** flows are surprisingly small. The key fact is that countries with high saving rates have high domestic rates of investment. Savings stay largely in the country in which the saving is done.

Compare for example the situations in the United States and Japan. The United States has a national saving rate net of depreciation of about 5 percent of GDP while Japan has a net national saving rate over 15 percent of GDP, a difference that reflects government tax and budget policies, social arrangements, and cultural attitudes. In a completely integrated world capital market, we would expect that capital would flow from the high saving countries like Japan to low saving countries like the United States on a large enough scale to eliminate any link between the national saving rates and the corresponding rates of investment. What we see instead is that there is only a small tendency in this direction. Thus the United States has a capital inflow of about 2 percent of GDP, bringing net domestic investment to about 7 percent of GDP while Japan has a capital export of about 2 percent of GDP, leaving a net domestic investment rate of more than 13 percent of GDP.

Although the United States and Japan are at the extreme ends of the savings spectrum among major industrial countries, the same pattern of behavior can be observed among the other industrial countries as well. More than a decade ago, Charles Horioka and I studied the relation between national saving rates (relative to GDP) and the corresponding domestic investment rates among the twenty-four industrial countries of the Organization for Economic Cooperation and Development (OECD) (Feldstein and Horioka, 1980). We found that each extra dollar of sustained saving in a country leads to a sustained increase of 80 to 90 cents in fixed investment and inventory accumulation.

This estimate of a "savings retention rate" of 80 to 90 percent has turned out to be remarkably robust. The Feldstein-Horioka study has been replicated and extended by many other researchers, but always with similar empirical results. Mussa and Goldstein discuss the attempts by some economists to explain away this result as a statistical artifact rather than a fundamental economic fact and correctly reject those

explanations. They also provide a very useful discussion of some of the reasons why savings tend to remain in the country in which they originate.

I will extend their discussion with a few remarks on five aspects of this issue.

First, it is useful to note that the investment-saving relation that I have been describing refers to ***national*** saving and not just to private saving. Moreover, statistical estimates (Feldstein and Bacchetta, 1991) show that total domestic investment responds in the same way to changes in private saving and to changes in government saving (or budget deficits). This reinforces the conclusion that the causation goes from international differences in saving rates to international differences in investment rates rather than the other way around.

Second, it should be stressed that the investment-saving relation is a ***long-tern*** relation based on comparison of decade-average investment rates and decade-average saving rates. Year-to-year fluctuations in national saving are often balanced by changes in international capital flows, but this does not continue when the savings differences are sustained.

In the United States, the increased budget deficit in the early 1980s led to a capital inflow and the associated trade deficit. This link between the two was widely noted and frequently referred to as the problem of the twin deficits. But that link between the budget deficit and the trade deficit (and capital inflow) was temporary. Between 1987 and 1990, the U.S. current account deficit declined from **3.6** percent of GDP to only 1.6 percent of GDP even though the persistence of the government deficit and the decline of private saving actually caused the U.S. net private saving rate to decline over these years. The declines in U.S. national saving and in the capital inflow have been matched by a corresponding decline in investment as a share of GDP.

A third aspect of the estimated saving-investment relation that should be kept in mind is that it is an average relation based on data for a cross-section of countries. There is good reason to believe that

the saving retention coefficient may differ among countries. Some evidence indicates that the saving retention coefficient is in fact lower within the European community than it is for the OECD as a whole and may be declining as those capital markets become more closely integrated.

Mussa and Goldstein note that estimates of the saving retention coefficient in less developed countries (LDCs) are generally lower than estimates of the coefficient in the industrial countries of the OECD. They say that they are surprised by this result since the less developed countries have less developed capital markets and are more dependent on domestic saving to finance local investment. My judgment is that the low estimated saving retention coefficient for the LDCs reflects the difficulty of measuring saving rates accurately in less developed countries where much of the economy is rural and much of the saving and investment is done within households or villages. Because the country-to-country differences in saving rates are not accurately measured, the impact of the true underlying differences in saving rates cannot be accurately assessed. This is the traditional "errors in variables" estimation bias that is well known to cause estimated coefficients to understate the corresponding true parameter values when the explanatory variable is measured with random error.

My fourth comment deals with foreign direct investment. I have recently been studying the effect of foreign direct investment (both inbound and outbound) on overall domestic investment rates. As a by-product of that study, I have found that taking foreign direct investment into account does not alter the estimated saving retention coefficient.

Finally, as Mussa and Goldstein note, a high saving retention coefficient suggests that the Eastern European countries will have to finance their own investments with national saving. Mussa and Goldstein are optimistic that these countries will have high saving rates just as Korea, Taiwan, and other Asian newly industrialized countries (NICs) did. That is certainly possible. One reason is that there was relatively little private saving during the years of Communist power. Since national saving is the difference between the saving of the

savers and the disaving of the disavers and there is little past private saving to disave, national saving can be high even if the current workers do not save at particularly high rates.

But there are reasons to worry that saving in Eastern Europe will not be as high as it is in the Asian NICs. In particular, I worry that the combination of high retirement pensions provided by the government and a generous safety net will leave little reason for most individuals to save. If so, high investment levels will require a capital inflow from abroad. It is important for those countries to provide good investment opportunities to foreign investors if they are to attract such funds. Despite the generally high saving retention coefficient, these relatively small economies can compete successfully for the international pool of investable funds for a decade or more if they do offer attractive enough investment opportunities to foreign investors.

The European exchange rate mechanism

Although this conference deals with the integration of world capital markets, it is interesting to look at the somewhat narrower issue of the integration of capital markets within Europe. The end of capital controls within Europe was a very important step toward capital market integration within the European Community. It was also the end of capital controls and the availability of internationally mobile short-term capital that made it impossible to sustain artificial exchange rate levels. The result was the realignments of exchange rates in the fall of 1992 and in the summer of 1993 and the decision to shift to a de facto floating exchange rate system. It is still very much a managed float, but with the bands widened to 15 percent limits it can be described accurately only as a floating rate system.

All of this puts the possibility of full monetary union further off into the twenty-first century and increases the probability that it won't happen at all. As many of you know, I think this is a favorable development for the economic well-being of Europe (Feldstein 1992b, 1992c, 1993). I would also call attention to an article in the *Financial Times* on August *15,* 1993, that described a study by the staff of the European Commission itself that concluded that monetary union would significantly increase the rate of unemployment in the

European Community. That study was apparently completed some time ago, but had been suppressed until now.

Capital mobility and monetary policy

Discussions of increased global capital market integration inevitably raise concerns about the effect that it has on the Federal Reserve's ability to make monetary policy and on the efficacy of monetary policy.

I believe that the common assertion that increased integration of the world capital markets weakens the Fed's ability to make monetary policy is wrong. There is simply no evidence to support such an assertion. If monetary policy is defined by changes in short-term interest rates, there has been no reduction in the Fed's ability to achieve the changes that it wants. If monetary policy is defined by changes in a broad monetary aggregate like M2, the difficulties that the Fed has been experiencing reflect the very limited scope that remains for reserve requirements rather than the greater international links in capital markets.

Does the mobility of capital affect the impact of monetary policy on the economy? My reading of the evidence is that it strengthens the effectiveness of monetary policy by adding an important international trade channel and an important price channel to the ways that monetary policy affects the domestic economy.

Consider the experience of the early 1980s. It was clear that the Fed was taking a tough stand and was determined to reduce the rate of inflation. That determination made dollar assets less risky and contributed to the rise of the dollar. The increase in the dollar reduced inflation directly by lowering the cost of imports and by forcing domestic firms to reduce their prices to compete with the lower cost imports. More generally, the rise in real interest rates that resulted from monetary and fiscal policies increased the value of the dollar and thereby reduced inflation and demand. These international channels mean that monetary policy does not have to get all of its effect through the traditional domestic route of changes in fixed investment and inventories.

Future developments

I turn finally to some speculation on what might change in the future. Savings retention coefficients may well decline in the years ahead. That decline would reflect financial innovations and the growing sophistication of institutional investors and corporate financial officers.

Cross-border portfolio investments may increase as institutional investors recognize that international diversification reduces risk and can result in both higher yields and lower variability than current portfolios. In the fixed income markets, the availability of long-term derivatives also permits institutional portfolio investors to hedge the currency risk while diversifying the interest rate risk. Similarly, corporations may do more cross-border borrowing using long-term swaps to eliminate unwanted currency risks.

But while such trends are under way, we are still far from a fully integrated world capital market. For now, the key feature of the international capital market is still a high degree of short-term integration combined with a strong tendency for most saving to remain and be invested in the country where the saving is done.

References

Feldstein, Martin. "The Budget and Trade Deficits Aren't Really Twins," ***Challenge*** (March/April 1992).(1992a)

_____. "Does One Market Require One Money?" in ***Policy Implications of Trade and Currency Zones,*** papers and proceedings of the 1991 public policy symposium sponsored by the Federal Reserve Bank of Kansas City, 1992. (1992b)

_____. "The Case Against EMU," ***The Economist,*** June 13, 1992. (1992c)

_____. "Why Maastricht Will Fail," ***The National Interest,*** 1993.

_____, and Phillipe Bacchetta. "National Saving and International Investment," in John Shoven and Douglas Bemheim (eds.), ***The Economics of Saving.*** Chicago: The University of Chicago Press, 1991.

_____, and Charles Horioka. "Domestic Savings and International Capital Flows," ***Economic Journal,*** 1980.

Commentary: The Integration of World Capital Markets

***Robert* A.** *Johnson*

The fine paper by Mr. Goldstein and Mr. Mussa encompasses a broad set of issues related to the history, measurement, and policy implications of international capital market integration. In my comments I will not focus on the empirical puzzles discussed in the paper as the other discussant, Dr. Feldstein, is much better acquainted with those questions and much better qualified to explore their resolution. Rather, I will focus on the recent episode in the European exchange rate mechanism (ERM). In particular, I will articulate my perception of what happened and why, look at some proposed reforms and efforts to repair the ERM in the context of a world economy that is adjusting to the presence of new "emerging regions," and finally, I will speculate on where the next systemic crisis could arise.

The crisis in the ERM: History

The disintegration of the exchange rate mechanism is a textbook case of re-equilibration of markets in the aftermath of a shock to the real sector. The fiscal consequences of German reunification drove a wedge between Germany and non-German Europe. The rule of thumb from textbook macroeconomics is that real shocks require real exchange rate adjustments while financial shocks can be contained without adjusting the system.

The alternative view of the ERM crisis that is cited in some quarters explains this episode as an example of "excessive speculation," or as

an "Anglo-Saxon plot" to undermine an otherwise sound and stable system. I believe such a view is without foundation.

The key challenge for the ERM was how to implement the real exchange rate adjustment given the divergence of fiscal policies between Germany and non-German Europe in the aftermath of German reunification. One way would have been to adjust nominal exchange rates. The non-German European countries were unwilling to do this because they were attempting to import credibility from the Bundesbank and to submit to a realignment would have been a setback in that endeavor.

The second means of adjustment involved maintaining fixed nominal exchange rates, within the bands, and allowing an inflation differential to emerge between Germany and non-German Europe. In that manner an adjustment in the real exchange rate could be accomplished as Germany's competitiveness deteriorated through higher relative inflation. Note the emphasis on relative inflation. That led to the key question: What would be the absolute level of German inflation that the Bundesbank would tolerate? If German inflation were held down, the credibility of the Bundesbank would be maintained but the implication was that the level of inflation or perhaps deflation that would be required in non-German Europe to facilitate the change in real exchange rates would be very difficult to achieve. When the Bundesbank would not tolerate inflation rising much above 4 percent, the downward pressure on prices and activity in most other countries in the ERM with high unemployment became too much to bear for their political economic equilibrium. This is where the markets got wind of the weakness of the ERM system. Raising interest rates to defend the currency parity no longer worked in the traditional manner of stabilizing the system because interest rates that were too high to stabilize the real economy were viewed as unsustainable by market participants. Reserves were drained by the private investors and the boundaries broke down.

Reform of the ERM

The question of reform of the ERM is now potentially quite important. In this stagnant environment the temptation for governments to

engage in devaluation to export deflationary pressures is quite strong and a system that discourages that may be quite helpful in stabilizing commerce in Europe.

The remedies to exchange rate system malfunction that are proposed tend to be of two varieties. They can be classified as efforts to inhibit private sector errors or as efforts to reduce policymaker errors. Floating exchange rates with capital mobility, as we have seen, tend to punish policymakers' errors. What some call a problem may actually be a remedy.

In the first category, efforts to inhibit private sector errors from being introduced into the price system, is the "sand in the gears" proposal first espoused by James Tobin. Various forms of transactions taxes or margin requirements are proposed for inhibiting "speculative excess." One cannot deny that there is a possibility of speculative excess. The bootstrap bubble in the U.S. dollar in early 1985 was, in my view, an instance where the financial market got off on a tear, created an exchange rate misalignment, and produced an adverse impact on the real economy.

But is that the malady the ERM suffered from in this instance? I believe that this episode was the result of an error made by policymakers in the ERM. That error was reluctance on the part of governments to adjust exchange rate parities pro-actively when adjustment was warranted. Something was lost in the process of avoiding adjustments, until such time that the imbalances became so profound that the international capital markets forced them. What was lost was the credibility of European policy officials. It will now take some time for those officials to rebuild their credibility, though some seem tempted by capital controls and other mechanisms as an alternative and short cut to regaining their influence over markets.

In the current climate, many public officials are actively engaged in the ritual of scapegoating and painting a portrait of how they are trying to protect their innocent populations from speculators. I find this unfortunate. I fear that the new design of the European financial system will be compromised and poisoned by this ritual of scapegoating and efforts to regain "control" by policy officials. I would argue

that the degree of policymaker control should be heartily debated as part of the process of system reform. The redesign of the European exchangerate mechanism should be done soberly according to criteria that seek to promote economic welfare of European citizens and policymaker desire to avoid further embarrassment or the psychic rents appropriated by those managing the system should be given little weight in the process. If the problem is one of policymaker reluctance to adjust, putting sand in the gears or introducing capital controls would only serve to prolong the disequilibrium and lead to an even more violent and brutal re-equilibration ultimately.

Both private market participants and policy officials are human and therefore capable of introducing error into the price mechanism. No one has a monopoly on wisdom in either the private or public sector and doing things to restore' "control" to policymakers may not be in the best interest of the citizens of Europe. Despite the difficulties of implementation, sand in the gears may be a remedy for markets plagued by flawed investors. But it certainly does not address the problem created by policymakers maintaining flawed policies in the face of a real shock when exchange rate adjustments are needed.

What are the criteria for good reforms? How does one construct a fixed but adjustable system? If one wants pure fixity, I agree with Andrew Crockett's view that one should go directly to monetary union. If that is unfeasible then one must look at the process of adjusting from one stable regime to another. I strongly applaud Jacob Frenkel for his comment at this conference when he says that a system's performance should be measured by its response to episodes of stress. At present, the credibility of the system is shattered. But the exchange rates do not appear to be far out of line with equilibrium value in the aftermath of German reunification. Adjustment to that shock appears nearly complete. The problem with refixing exchange rates is that no one can guarantee that there will not be another real sector shock that disturbs relative value in Europe. German reunification may have been more than two standard deviations from the mean shock. But one does not now put the system back together on the basis that there will be no more stress. One question that should inform efforts and design and rehabilitation of the ERM is how will a system handle the next shock of significant proportion? I think the

key question for the survivability of systems promoting exchange rate stability is: How does one get policymakers to preemptively adjust exchange rates when real exchange rate adjustment is necessary? Fixity in normal times and flexibility with preemptive adjustment when stress from real shocks is strong is the prescription. The difficulty is in the details.

I believe that one important element in the details is to keep the bands wider, say 6 percent plus or minus from the central rate. Then policymakers can make adjustments by overlapping the bands on devaluations. If one moves down 6 percent then the old bottom of the band becomes the new central rate. Speculators must beware because in the lower half of the band prior to devaluation there is scope for experiencing losses if the currency appreciates after a 6 percent band adjustment. Wider bands also serve to penalize speculators if the devaluation is not implemented for there is a longer room to run if the market turns around.

Both factors tend to make the speculator more wary and tend to stabilize the currency and dampen reserve losses provided that policymakers did not delay until a very large devaluation of 15 or so percent were required to re-equilibrate the market.

There is another detail of system design that deserves attention as well. It is the problem of the distribution of the burden of adjustment between countries. I think it is quite important in this context of slack activity in Europe. As Keynes pointed out at the time of the formation of Bretton Woods, a system does not function well when the weaker currency country is called upon to do all of the adjustment.

On the other hand, in this instance, had Germany been forced to ease monetary policy in the face of the fiscal burden of unification it would have diminished the incentive for other nations to agree to an exchange rate realignment.

Some, particularly in Europe, may feel that having a system that forced Germany to ease monetary policy would have been preferred to the current debacle. That may be. Yet if Germany had been forced to ease aggressively and tolerate a significantly higher rate of inflation

they would have lost that precious credibility that so many European governments have been craving to hitch their wagon to in the last few years. A system without anchor is a flotilla. I would argue that preemptive exchange rate adjustment was first best, Germany's being induced to reflate was second best, and the current system in tatters is third best. The challenge I would pose for policymakers putting the system together again is to examine the interaction between the incentive to adjust exchange rates and the mechanism for burden sharing in defense of the system.

The global challenge to Europe

The design parameters of the system and allowance for flexibility and adjustment are quite important to my mind because, while there may not be an intra-European shock of the proportion of German reunification, the world economy is struggling to adjust to the integration of the emerging countries of Asia, Europe, and Latin America. I sense that this is a horribly difficult period for politicians in the mature capitalist democracies. Rising education levels in the developing nations, computer-aided manufacturing technologies that replace skilled labor, and telecommunications that permit multi-plant global production combine to create a supply shock to manufacturing located in the Organization for Economic Cooperation and Development (OECD) nations.

In the medium to long run, the allocative efficiency of reorienting production to these lower cost areas will combine with the rising living standards, consumer spending, and infrastructure building in these emerging regions such as China, the ASEAN nations, India, Argentina, Brazil, Mexico, and some parts of Eastern Europe. This will ultimately provide a stimulus to jobs and improve living standards in the OECD nations as they export to these vibrant new regions. But in the interim, the stress on the profitability of businesses that are uncompetitive, the loss of jobs, the decline in real wages in many traditional sectors, the declining government revenue, and therefore the reduced capacity for public sector investment, and the dampened incentive for private investment at home combine to make the policymaker's challenge formidable in the traditional industrial nations. The burden on elected representatives has to be extraordinary as the

demand from the body politic for some alleviation of the pain of transition makes itself felt.

Monetary policies are too tight in Europe presently. Yet businessmen complain that wages are too high and that labor is unrealistic. The problem is not one of inflation but that the level of competitiveness is way out of line with the emerging market nations. What is needed is not deflation of nominal wages with a constant exchange rate, but a gain in competitiveness accomplished by a nominal depreciation of European currencies against the dollar and dollar-pegged currencies of Asia and Latin America.

In this period of underemployment and slack capacity it is very difficult to imagine that a nominal exchange rate depreciation will not lead to real exchange rate depreciation.

It is well known that monetary policy has an impact on fiscal deficits through influencing the interest cost of public debt. But even leaving aside the impact of the interest on the debt, monetary and fiscal policy are not independent. As the pain of the adjustment burden intensifies, monetary policy that is too restrictive tends to induce fiscal expansion. Fiscal deficits expand as the cyclical decline reduces revenue and the cry for help inspires government spending by survival-oriented elected representatives.

When it comes time to decide whether to finance these shortfalls through higher taxes or through bond issuance, the international investors step up to the plate with oodles of liquidity making it easy for the bond finance route to prevail. At the same time, the future generations of young taxpayers who will inherit that debt burden do not yet scare the politicians while current taxpayers, aching from a slump and angry, are a frightening prospect. Ricardian equivalence is an elegant notion but it will hardly appease my grandson when he pays the bill. The path of least resistance, despite pronouncements from authorities, is for debt and deficit to GNP ratios to march ever upward. We are living in an era of price stability, central bank credibility, and fiscal laxity. These things are not independent.

A sovereign debt crisis in the OECD?

If there is one area I could cite today as a candidate for mispricing of risk, and therefore financial crisis, in the coming years it is in the area of sovereign debt in some OECD countries, particularly in some of the European countries that are small in relation to the wealth deployed in international capital markets. Mr. Goldstein and Mr. Mussa suggest that one role policymakers should play is to ensure risk is adequately priced internationally. I wonder if they can play such a role when the price that is too high is the price of government debt, the good that public officials can influence. I do not think the risks are imminent. Yet if we follow present trends of bond-financed deficits for another five to seven years, the problems of sovereign credit risk could become acute.

What can be done about this from the standpoint of central banks? Rather than the traditional case where the central bank holds out the carrot of lower interest rates, we now are in an environment where lower interest rates are a precondition for growth, which in turn is a precondition for the political courage to address the fiscal imbalances. The Federal Reserve, led by Chairman Alan Greenspan, has lowered interest rates to facilitate the return of growth in the United States and the Congress and the President have recently passed legislation to address the U.S. fiscal problems. One may not approve of the contents of that legislation; I do not want to debate that here. My point is only that the Federal Reserve helped to foster an economic climate that was conducive to fiscal deficit reduction. I can therefore comfortably conclude with applause for the home team and thanks to the Federal Reserve Bank of Kansas City for including me in its program.

Monetary Policy Implications of Increased Capital Flows

Andrew Crockett

Introduction and overview

The growing integration of world capital markets has led to major changes in the environment for monetary policy. It has broadened the range of considerations that need to be taken into account in decisions about the choice of exchange rate regime. It has undermined the use of intermediate targets for domestic monetary policy. And it has made international policy coordination both more complex and more important. In exploring these issues the perspective of this paper will be that of practical decisionmaking, rather than theory.

A good place to start is the so-called "impossibility theorem." This holds that policy authorities cannot simultaneously and continuously follow the three objectives of free capital mobility, fixed exchange rates, and an independent monetary policy.

Something has to give. But is it a simple matter of choosing one of the three goals to abandon, and then pursuing the other two? This is an oversimplification. Even with extensive capital controls, there are limits on how far it is possible to pursue an independent monetary policy without putting exchange rate stability at risk. And even if the exchange rate is allowed to float, monetary policy cannot be entirely independent of what is happening to the external value of the currency.

The question cannot be put in absolute terms. Now that global capital markets have become integrated, the issue is rather one of the relative importance attached to exchange rate stability and domestic monetary independence. In seeking an optimal tradeoff, policymakers will have to be aware of capital market responses to their policy actions.

In any discussion of the impact of increased capital flows on monetary policy, a first step is to assess the extent to which capital mobility has grown. The first section of this paper explores in more detail the factors that have contributed to greater capital movements. It provides some statistics to illustrate the explosive growth of cross-border capital flows in the past few decades. And it considers the extent to which the global capital market is now fully integrated, or whether significant differences in investor preferences remain, such that monetary authorities can indeed influence conditions in their respective markets.

From one perspective, it can be argued that capital mobility is now effectively perfect, in that formal impediments to cross-border capital flows have been removed in all the major industrial countries, and the volume of transactions has increased manyfold. Arguing along these lines would lead one to the conclusion that expected yields in different currencies (after due allowance for expected exchange rate changes) would be equalized. Currency denomination would then become largely irrelevant in borrowing and lending decisions, even under conditions of floating. Domestic monetary policy could affect the rate of inflation in domestic currency but not the effective interest rate faced by borrowers and lenders.

Alternatively, and in my view more realistically, one can view national capital markets as still being separated by the currency preferences and habits of market participants. Uncertainties with regard to the future evolution of interest and exchange rates mean that agents are not indifferent as to the currency denomination of their assets and liabilities. In addition, tax considerations influence the preferred form of yield (interest return versus capital appreciation). Moreover, stickiness in domestic wages and prices means that real interest rates can vary from country to country even if the yields in

different currencies do not. This suggests that domestic monetary policy retains the power to influence economic behavior, and can have a significant effect on cyclical developments.

Clearly, the scope for an independent domestic monetary policy is greater if exchange rates float. But floating has its own costs, especially if it leads to volatility and uncertainty in real exchange rates. Monetary authorities need to balance these costs against the advantages of greater freedom in setting domestic policies. The second section of the paper therefore discusses the choice of exchange rate regime in conditions of capital mobility.

The polar choices are free floating and fully fixed exchange rates. The arguments in favor of each are fairly well known, and the basis for a reconciliation of the arguments exists in the optimum currency area literature.[1] (Unfortunately, the theoretical insights of this literature have proved difficult to translate into practical guidance for decisionmaking.)

A major policy issue, particularly in the wake of the turbulence in the European exchange rate mechanism (ERM) over the past year, is whether "middle way" solutions, involving fixed-but-adjustable exchange rates, have been rendered more unstable by the growth of capital flows. In my view they have, so that a protracted period of fixed-but-adjustable rates with narrow margins is unlikely to provide a smooth "glide path" for the eventual achievement of European Monetary Union (EMU).

After a country has chosen its exchange rate policy regime (fixed, floating, or fixed-but-adjustable) it then has the task of adapting its domestic monetary policy to this environment. The third section of the paper deals with a number of issues connected with the formulation and implementation of monetary policy when capital is mobile. In other words, what should be the ultimate objectives of policy, and what instruments and intermediate targets should be employed?

This is a relatively simple matter for countries that have chosen to fix irrevocably to a dominant anchor, although even for them, issues arise as to how much of the room for maneuver provided by exchange

rate bands should be exploited. The issue is more complex and substantive where greater exchange rate flexibility is concerned. Once again, the role of the capital movements can be a complicating factor. Capital movements can obscure the signals being provided by, for example, monetary aggregates. In addition, as is well known, policy actions can lead to exchange rate "overshooting," when the speed of response in goods and financial markets differs.[2]

Understanding the issues involved in the choice of domestic policy regime has been greatly advanced by the theoretical insights provided by the literature on rational expectations, time-consistency, and reputation effects. The new framework for monetary policy in the United Kingdom, which I will describe briefly in this section, owes much to our growing understanding of the role of credibility.

The fourth and last section of the paper covers the question of international cooperation. This is a more contentious issue than it might appear at first sight. Some influential observers[3] have argued that international policy coordination is, in effect, a snare and a delusion. Countries should focus on getting their own macroeconomic policies right. Open trade and free capital markets will do the job of international adjustment, and will in the long run provide a more stable exchange rate environment than will result from activist coordination.

There is much in this view with which to agree. Certainly, responsible international behavior has to be based on stability-oriented domestic macroeconomic policies. And market forces ought to play the dominant role in determining trade and investment flows, and the pattern of exchange rates. Going against the grain of market views has almost invariably met with failure.

In my view, however, there remains an important role for policy coordination. It is based fundamentally on what we have learned about the behavior of international capital flows. International capital flows clearly influence the transmission of monetary conditions across countries. Experience also seems to suggest that they can lead to sustained misalignments in exchange rates. The overvaluation of the U.S. dollar in the early 1980s is perhaps the most striking example of

this. Why should such misalignments occur? Part of the reason lies in the overshooting phenomenon referred to earlier. Part is less easy to explain, but may be related to "herd instinct" among investors, discrete reappraisals of prospects for political stability, and other hard-to-quantify factors.

In this fourth section of the paper, therefore, I will try to evaluate the case for international coordination of monetary policies. I will also touch on the objectives that coordination can legitimately seek to achieve, as well as procedures for coordination. Such coordination can be pursued both within fixed rate regions, such as the ERM, as well as among the three major currency blocs.

The growth of capital flows

The past two or three decades have seen enormous changes in the world's capital markets.[4,5] If anything, the pace of change has accelerated in the past ten years. In large part, this has been a reflection of the growing ascendancy of the free market philosophy, and the recognition that the efficient functioning of capital markets is a central element in improving resource allocation in the real economy.

An important step in the growth of cross-border financial transactions was the removal of exchange controls. In the 1970s most industrial countries retained quite far-reaching exchange controls. The United States, Canada, Germany, the Netherlands, and Switzerland were the major exceptions. Now, virtually all industrial countries have abolished such restrictions. As a result, domestic and offshore markets have become increasingly integrated.

Just as significant has been liberalization and deregulation in domestic markets. As recently as ten or fifteen years ago, significant restrictions existed in most countries, covering geographical location and spread of business of financial firms; interest rates paid to depositors; access to new issue markets; and so on. At the same time, cartel-type arrangements among financial institutions were officially tolerated and sometimes used to support quantitative and even interest rate controls on lending.

By the early 1990s, most of these controls had disappeared. Those that remained were greatly reduced in scope. None of the large industrialized countries now retain ceilings or other major constraints on lending. Reserve requirements on banks have been lowered, and compulsory portfolio investment requirements on other financial institutions have been eased.

The more liberal regulatory environment undoubtedly contributed to developments in financial technology. (Of course, the causality was two-way: financial technology made it easier to avoid regulations, and thus hastened their demise.) Whatever the precise causal sequence, the spectrum of available financial instruments has been greatly enlarged. This has partly been the result of traditional financial instruments being issued in new countries and currencies. More significantly, perhaps, derivative instruments have been developed to facilitate new forms of hedging and position taking.

Information technology has played a role in this. High-speed computers have dramatically lowered the costs of processing information and executing transactions. This has, in particular, facilitated the development of highly sophisticated derivative products. It has made possible an explosion of gross financial transactions, relative to underlying asset stocks.

Other developments that have contributed to the growth of capital markets include securitization, and the increasing institutionalization of investment activity. Securitization has greatly increased the share of financial liabilities and claims that are readily tradable. And the concentration of portfolio management in more sophisticated institutional investors has resulted in growing demand for (and supply of) derivative products, as well as an increased willingness to trade securities across currency boundaries.

The combination of domestic financial liberalization, the removal of cross-border controls, and technological advance has resulted in a dramatic growth in international financial transactions. A few statistics will serve to illustrate this point. In the United States, for example, gross transactions in bonds and equities between domestic and foreign residents were just under 3 percent of GNP in 1970, had risen to almost

10 percent of GNP in 1980, and were not far short of 100 percent in 1990 (Table 1). The figures for the United Kingdom are even more striking. Although data are not available for the early years, the existence of exchange controls suggests that cross-border transactions in securities must have been very small in 1970, yet amounted to almost 700 percent of GNP in 1990. Other countries also show sizable increases, and the fact that the level of transactions is still far below that of the United Kingdom suggests there is substantial scope for further growth.

Table 1
Cross-Border Transactions in Bonds and Equities[1]
(as a percentage of GDP)

Countries	1970	1975	1980	1985	1990
United States	2.8	4.2	9.3	36.4	92.5
Japan	n.a.	1.5	7.0	60.5	118.6
Germany	3.3	5.1	7.5	33.9	57.5
France	n.a.	n.a.	8.4[2]	21.4	53.3
Italy	n.a.	0.9	1.1	4.0	26.7
United Kingdom	n.a.	n.a.	n.a.	367.5	690.1
Canada	5.7	9.6	9.6	26.7	63.8

[1] Gross purchases and sales of securities between residents and nonresidents.
[2] 1982.
Source: BIS Annual Report 1992, p.193

Derivative markets are a more recent phenomenon, but their growth has been no less striking, as may be seen from Table 2. Perhaps most relevant in the context of the implications for monetary policy, foreign exchange transactions averaged some $880 billion a day in 1992[6]— roughly sixty times the volume of world trade in goods.

What does all this mean for domestic monetary policy?

One extreme would be to argue that world capital markets had now become so perfect that the cost of finance was effectively equal in all markets, with differences in nominal interest rates simply offsetting expected exchange rate changes. This would imply that shifts in

Table 2
The Expansion of Selected Financial Derivative Markets

(notional principal amounts in billions of U.S. dollars[1])

Instruments	1986	1987	1988	1989	1990	1991
Exchange-traded instruments	583	724	1,300	1,762	2,284	3,518
Interest rate options and futures	516	609	1,174	1,588	2,054	3,231
Currency options and futures	49	74	60	66	72	77
Stock index options and futures	18	41	66	108	158	210
Over-the-counter instruments	500	867	1,330	2,402	3,451	4,080[2,3]
Interest rate swaps	400[2]	683	1,010	1,503	2,312	2,750[2,3]
Currency and interest/currency swaps[4]	100[2]	184	320	449	578	700[2,3]
	—	—	—	450	561	630[2,3]
Grand total	1,083	1,591	2,630	4,164	5,735	6,900[2,3]
Memorandum items: Ratio of grand total to: International claims[6] of BIS reporting banks	0.27	0.31	0.47	0.64	0.76	1.007
OECD GDP	0.10	0.13	0.19	0.29	0.35	0.40[7]

[1] Amounts outstanding at yearend.
[2] Estimate.
[3] June.
[4] Adjusted for reporting of both currencies.
[5] Caps, collars, floors, and swaptions.
[6] cross-border and local foreign currency claims.
[7] Estimates on the basis of June figures.
Source: BIS Annual Report 1992, p. 192.

domestic monetary policy had rather little effect on real economic activity even in the short run. The alternative view is that the existence of different currencies, whose relative values can change, ***does*** distinguish assets with different denominations. Economic agents will, as a result, respond to changes in interest rates on domestic assets. Monetary policy, in other words, ***can*** affect economic activity in the short run, as well as the rate of inflation in the long run.

The argument that capital movements can negate an independent monetary policy, even when exchange rates are floating, runs as follows: economic agents allocate their portfolios so that returns, denominated in a common currency, are equalized at the margin. In making this calculation, they will add capital appreciation (depreciation) to any running yield. If the authorities in one country lower the yield on short-term assets, their currency will fall in exchange markets, so that the interest rate change is exactly offset by a corresponding change in the expected appreciation (depreciation) over the holding period. If ultimate borrowers and lenders are indifferent to the ***form*** in which they pay (or receive) the yield on an asset, they will "see through" the change in the nominal interest rate, and avoid changing their behavior.

The paradigm just sketched could be considered perfect currency substitutability. It leads to a conclusion made familiar by McKinnon.[7] This is that domestic monetary policy affects essentially the exchange rate among currencies. Monetary conditions (that is, interest rates adjusted for exchange rate changes) can only be changed by collective action by issuing monetary authorities acting together to affect the world money supply.

To my mind, the foregoing analysis overlooks two crucial factors which, in the real world, restore some freedom of maneuver to monetary authorities. First, goods and factor prices are a good deal more sticky than the exchange rate. When monetary policy causes the exchange rate to fall to maintain capital market equilibrium, no similar adjustment takes place in goods and factor prices. An exchange rate fall is therefore associated with a fall in real factor costs (that is, factor costs expressed in world prices). This leads to an increase in competitiveness and a "crowding-in" of domestic production.

A second factor helping restore autonomy to domestic monetary policy is imperfect substitutability among assets in different currencies. Although portfolio holders ought in principle to be indifferent between interest return and capital appreciation, it is hard to believe that risk aversion does not play a role. Exchange rate changes are notoriously hard to forecast, and interest differentials have proved to be extremely poor predictors of future currency movements.[8] In such cases, many investors and borrowers are likely to remain in their "preferred habitat" of domestic markets, notwithstanding some incentive to go outside.[9] In addition, where borrowing is constrained by current cash flow, a change in the current servicing costs of borrowing may affect behavior, even when the overall costs of borrowing remain unchanged. A further impact on behavior may be introduced by differences in the tax status of income and capital gains.

My tentative conclusion is that, even when there is considerable capital mobility, countries can acquire a degree of monetary policy independence if they are prepared to forego control of the exchange rate. In more concrete terms, a cut in domestic interest rates will have an effect on domestic savings/investment decisions that will not be offset by an accompanying expectation of subsequent appreciation of the exchange rate.

Capital flows and the choice of exchange rate regime

The choice of exchange rate regime is a key element in establishing the environment for domestic monetary policy. This section therefore considers a number of issues related to this decision. Realistically, of course, the choice is mainly relevant for small and medium-size countries. The currencies of the three major countries, the United States, Japan, and Germany, are likely to float against one another for the foreseeable future. Other countries, however, can choose either to let their currencies float freely, to peg them irrevocably to another currency or group of currencies, or to adopt some intermediate regime of fixed-but-adjustable rates. This question is particularly relevant for European currencies.

Before getting into the substance, a brief terminological digression may be helpful. I will reserve the definition *fixed* exchange rate for a

situation in which the authorities of the country concerned have expressed their intention not to change their currency's parity in terms of its peg and this commitment is regarded as fully credible by the markets. I will define a *floating* exchange rate as one where the value of a currency is allowed to vary continuously in response to changing market conditions. A *fixed-but-adjustable* arrangement is one where markets perceive the possibility of a step change in the value of a currency as a result of an administrative decision. This taxonomy obviously does not capture all possible regimes: a crawling peg, for example, involves parities and margins, but can be designed to avoid discrete changes in market rates. Target zones also can combine elements of fixity and flexibility without requiring step changes in rates.

The degree of capital mobility can be an important consideration in which exchange rate regime to adopt in practice. It will be my contention in this section that capital mobility adds to the stabilizing properties of both fully fixed and freely floating exchange rates. However, it adds to the destabilizing properties of fixed-but-adjustable systems. This means that countries are pushed toward the two ends of the spectrum that runs from fully fixed to fully flexible rates, leaving fewer in the middle ground. And it means that when countries wish to shift from one end of the spectrum to the other (say to establish a monetary union) they should do so only when conditions are right and without lingering too long in an intermediate stage.

Before examining the impact of capital flows on the choice of exchange rate regime, it is perhaps wise to begin by asking what functions we expect an exchange rate regime to serve. At the most general level, an exchange rate regime should contribute to the achievement of internal and external balance in participating national economies.

To be slightly more specific the goals are:

—to enable countries to pursue domestic macroeconomic policies that permit the achievement of noninflationary growth, without undue cyclical fluctuation,

—to promote the international adjustment process through achieving and maintaining sustainable real exchange rates, and

—to facilitate the removal of impediments to or distortions in international trade and investment.

Fixed exchange rates have been favored by their advocates because they are thought to provide a better environment of stability for the growth of trade. In addition, for countries prone to inflation, linking to a stable anchor has often been seen as imparting a welcome counterinflationary discipline. It is accepted that exchange rate fixing means giving up an independent monetary policy. But the subordination of domestic policies to an external constraint is not necessarily a bad thing if cyclical conditions in the "follower" and "leader" country do not get too far out of line and if movements away from sustainable real exchange rates are corrected relatively quickly.

It has always been recognized, of course, that simply fixing *nominal* exchange rates does not ensure *real* rates that are either stable or sustainable. **A** mechanism is needed to make sure that domestic prices move in a way that is consistent with overall balance of payments equilibrium. Capital mobility can help in this connection by ensuring that "good" balance of payments deficits (that is, those that reflect an efficient use of world saving) are financed by sustainable capital inflows. It also, I will argue, adds to the pressure to correct "bad" (that is, unsustainable) deficits.

Under fully fixed exchange rates, capital flows can help avoid fluctuations in the domestic price level in response to reversible movements in the balance of payments. Consider the case of a country with a sudden increase in investment opportunities (say, as a result of oil discoveries). In the absence of capital flows, domestic absorption would have to be cut back in order to "make room" for the resources used in the new investment. This process would be reversed once the output of the investment came on stream. With freedom of capital movements, however, the country can tap international savings. Its current account will initially deteriorate, and will strengthen subsequently as the yield from the initial investment builds up.

Capital flows also help to stabilize fixed rate systems (provided they are credibly fixed) by preventing structural disequilibria from building up over time. In the absence of capital flows, a current account deficit caused by loss of competitiveness can be financed by reserve drawdowns and official borrowing. The effect of a weaker trade position on domestic economic activity can be offset, for a time, by easier monetary and fiscal policy. Eventually, however, the perpetuation of inflation differentials can no longer be sustained (perhaps because borrowing opportunities are exhausted). A painful and potentially wasteful process of deflation becomes necessary if the fixed exchange rate is to be maintained.

With capital mobility, however, an incipient loss of competitiveness can, in principle, lead more quickly to self-correcting developments. Monetary policy cannot be eased to offset the effect of a declining trade position on overall economic activity. Fiscal policy, too, will be constrained by the ability of domestic savers to direct their savings abroad if they perceive the government to be over-borrowing. The realization by labor market bargainers that they cannot be "bailed out" by continuing inflation should help limit unrealistic wage bargains. (Admittedly, this influence does not appear to have worked very effectively in Germany following reunification.) In general, however, capital mobility helps ensure that a loss of competitiveness gives rise to corrective disinflationary pressures in a timely fashion.

With floating exchange rates, too, increased freedom of capital movements is likely to be a stabilizing factor. If foreign exchange markets handle mainly transactions arising from the current account, the principal source of exchange rate "smoothing" is official intervention. If official reserves are limited, current account imbalances can lead to undesirable volatility in the exchange rate. The existence of efficient capital markets should allow "good deficits to be financed without a change in the exchange rate. Unsustainable deficits can be corrected through a rapid movement of the exchange rate to a new equilibrium, at which level capital inflows can be attracted during the period in which the current account is strengthening. In principle, the deeper the market for a currency, the more stable should its exchange rate be in the face of temporary shocks.

Thus, the growth of capital flows, and the growing sophistication of international investment, should be beneficial to the working of floating exchange rates. Broadly speaking, I believe this theoretical expectation applies in practice. To go further and claim that floating rates thereby produce optimal results is a more debatable proposition. It assumes that market participants can identify sustainable real exchange rates and act so as to bring actual exchange rates toward them (the efficient markets hypothesis). Experience does not allow us to be sanguine on this point. Nevertheless, it is not clear how far the fault lies with the policy signals the authorities have given, and how far with market imperfections as such. Either way, a case can be made for a degree of policy coordination to manage the working of floating rates. I will return to this issue in the final section of the paper.

The stabilizing properties of capital flows are very different when exchange rates are *fixed* but adjustable. Fixed-but-adjustable rates are compatible with exchange market stability in the absence of capital mobility, but become more difficult to manage as capital markets become more integrated. This is not to say that such systems are necessarily unstable: but the preconditions for successful operation become more demanding.

In the absence of capital mobility, fixed-but-adjustable exchange rate systems offer an attractive "middle way" between the polar choices of irrevocable fixing and free floating. The element of fixity helps avoid the volatility that might otherwise arise from cyclical and other reversible fluctuations in the current account position. And the "safety-valve" of parity adjustments allows unsustainable disequilibria to be corrected without painful domestic deflation or inflation.

The trick, of course, is to be able to distinguish between reversible fluctuations in the current account and unsustainable disequilibria. Doubtless, policymakers have often got it wrong. But when capital movements are limited, they will at least not be forced into making unneeded changes in exchange rates because of overwhelming market pressure. Nor will they be required to subordinate domestic economic objectives in order to control pressure on the exchange rate.

The situation is quite different when capital markets are fully

integrated. The calculation that private agents make is not simply whether a deficit is reversible or fundamental, but whether the authorities may be forced into a realignment. And if so, when and by how much? It is quite possible for speculators to believe the existing exchange rate to be compatible with current account equilibrium, but still to take positions against a currency. For example, if a portfolio manager believes there is a 20 percent chance that a currency will devalue by 10 percent in the next two weeks, and an 80 percent chance that it will not, an interest differential of 50 percent in favor of the suspect currency would be required to justify continuing to hold it.

There are, moreover, self-reinforcing factors at work. The more pressure builds against a currency through capital flows, the more other market participants may come to believe the authorities will succumb. If the pressure is absorbed by intervention, markets will know that the financial resources to continue intervening are finite. If pressure is resisted by increasing interest rates, any incompatibility with domestic policy requirements will be noted. This incompatibility with domestic requirements will be particularly acute if short-term. money market rates are quickly passed forward into politically sensitive lending rates. This is the case in the United Kingdom where the great bulk of home mortgages are adjusted in line with changes in money market rates.

The vulnerability of fixed-but-adjustable rate systems can be illustrated by developments in the ERM over the last year. Following the Danish referendum, and in the run-up to the French referendum, market participants realized that ERM parities could not necessarily be regarded as the basis for locked parities in Stage III of EMU. At the same time, they were increasingly aware of the cyclical disparities in the position of member countries. Germany, the anchor, was still struggling with the inflationary consequences of reunification, while many other countries were in, or headed toward, recession, with rising unemployment.

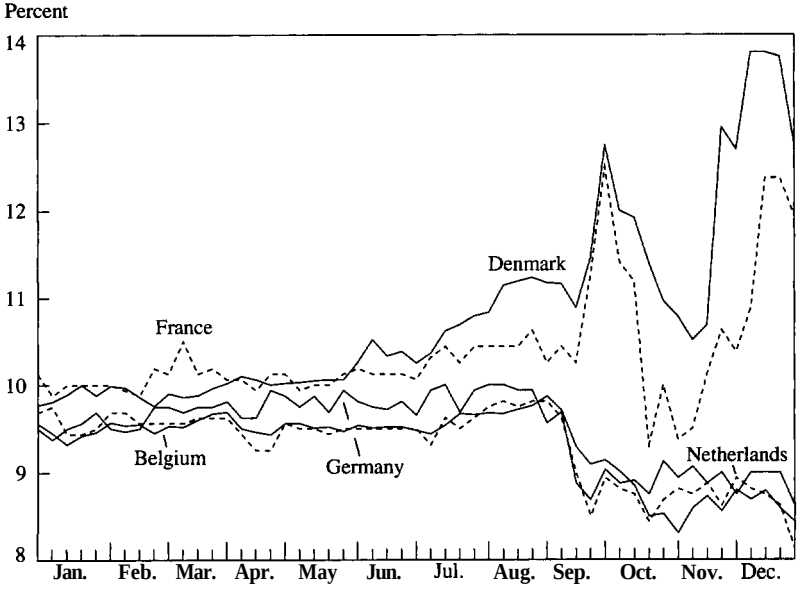
Portfolio managers had to take a view on the chance of existing parities being changed. Initially, most of them concluded the danger was not imminent, probably because pressures on official reserves remained moderate, and all countries had made a strong political

commitment to hold their existing parities. But as movements out of suspect currencies built up, pressures became self-reinforcing. Where pressures were met by increases in interest rates, market participants had to ask how long such rates could be maintained, given their basic inconsistency with domestic economic requirements. Where countries chose to use intervention or borrowing, the question was how far they would be prepared to incur additional indebtedness, with the risk of foreign exchange losses if devaluation could not be avoided.

Interestingly, a distinction can be drawn between those countries (the Netherlands is the best example) that were regarded by the markets as having a fully fixed relationship with the deutsche mark; and others whose situation was regarded as at least potentially subject to realignment. France and Denmark were in the latter category, although both successfully resisted realignment pressures until mid-1993. Countries with fully credible pegs (which in 1992 included Belgium and Austria as well as the Netherlands) were not subject to major capital flows. They were therefore able to survive the initial turbulence without pressure on their exchange rates or any need to change interest rates (Chart 1). Countries with fixed-but-adjustable pegs all had to make major changes in interest rates in the "wrong" direction from a domestic perspective, in order to preserve their exchange rates.

What should we regard as the main lessons of the ERM crisis for the selection of exchange rate regimes? First, it is clear that for those countries who are able and willing to bind their economic policies to those of the anchor country, there are advantages in convincing markets that the instrument of exchange rate adjustment has been effectively abandoned. The more markets believe that other forms of adjustment will always be used in preference to exchange rate realignment, the less likely is exchange market pressure to emerge in the first place. The Netherlands and Austria have reached this position, and it protected them from much of the turbulence in the ERM. Other countries made valiant efforts to put themselves in the same position. In the end, however, markets were not convinced that their policies could be sustained. This was because divergences in cyclical positions had become so significant that the subordination of monetary policy to the exchange rate link was perceived as economically and politically unrealistic.

Chart 1
Short Term Interest Rates in the EC*



* 3-month Euromarket rates.

A second conclusion is that those countries that are thought willing to avail themselves of exchange rate flexibility should not become too committed to any particular exchange rate. So long as markets suspect that a central rate can change, it will be costly to preserve it when it comes under pressure. Those countries that have not yet established an adequate anti-inflationary track record would be better advised to retain more flexibility than existed in the period 1987-92. This could either be through floating, or through the use of wide margins (wider than 2 1/4 percent) and a willingness to undertake timely realignments. In particular, it is desirable that realignments should normally be smaller than the width of the band. This was recognized in the Basle-Nyborg agreement as necessary to avoid the "one-way bet" nature of speculating on a parity change.[10]

Third, and this is perhaps the more novel conclusion, the route from flexibility to fixity should not be the gradual one of progressive hardening. Rather, countries should establish a track record of price stability during a period in which their exchange arrangements are

relatively flexible. The attempt to use "hard exchange-rate constraints to enforce price level convergence when the initial position is one of substantial inflation divergence has considerable dangers. International portfolio managers will inevitably be skeptical about whether external disciplines will be allowed to work when domestic disciplines have proved inadequate. Such skepticism means that destabilizing capital flows are a constant risk when markets perceive an inconsistency between the objectives of internal and external balance. Accordingly, any move to "hard exchange rate constraints should only take place when the prospective need for exchange rate adjustments has been virtually eliminated.

Implementing monetary policy under alternative exchange rate regimes

Once the monetary authorities have chosen an exchange rate regime for their currency the question arises of the operating guidelines for domestic monetary policy. In other words, what should be the intermediate objective of policy and what should act as the trigger for changes in policy settings? Here too, capital flows are an important element of the environment affecting policy decisions.

Under fixed exchange rates with full credibility and no margins, the question becomes trivial. Arbitrage will equalize interest rates throughout the monetary area, and at all maturities, for equivalent assets denominated in different currencies. This would be the situation of Stage III of EMU, before a common currency was introduced. It is not different in substance to the situation that prevails in a single currency area like the United States.

A slightly more interesting case is where fixed exchange rates exist with full credibility, but with margins of fluctuation around parities. This would roughly correspond to the situation of the Netherlands within the ERM. In principle, while monetary policy will be "keyed" to that of the anchor currency the existence of margins ought to permit a measure of flexibility in interest rate policy. If margins are at 2 1/4 percent, an ERM member with full credibility ought to be able to reduce its short-term interest rates below German levels by, say, 2 percent for about a year, without falling out of the band. Its currency

would decline to a point at which the expected subsequent appreciation back to the central rate would compensate for the lower interest yield in the meantime.

In practice, the authorities of countries such as the Netherlands have been very reluctant to use the flexibility that might be thought to exist in principle. They generally consider the credibility of their fixed rate to be at risk if they allow the exchange rate to depart more than marginally from the central rate.[11] Thus the Netherlands has for some time observed de facto margins for the guilder of about one-half of 1 percent around the central rate.

The conclusion to be drawn is that, in a fixed rate system, the introduction of narrow margins provides only limited additional room for maneuver in monetary policy. Capital flows are equilibrating only so long as fluctuations in the exchange rate are kept within very strict limits. This means that interest rate differentials must be kept small.

What about systems that avowedly use fixed-but-adjustable exchange rates? In this case, the potential for destabilizing capital movements is clear. Monetary policy has to be formulated in order to prevent such pressures from arising.

Dilemmas abound, as recent experience has shown. If "follower" countries align their interest rate policy on the anchor, they may find it inappropriate for their own domestic needs. This may be because they are at a different stage in the economic cycle, or because underlying inflation differentials require a different nominal rate to produce the same real yield. Consider the case of a country with relatively strong inflationary pressures, linked to a currency with better price stability. If the high inflation country has the same nominal interest rates as its partner, real interest rates will be lower, and economic activity will be stimulated further. Inflation will tend to rise. If, on the other hand, it raises interest rates to combat inflation, it will experience heavy capital inflows that push its currency to the top of the band. This was the experience of Spain and Italy during much of the 1990-92 period. It is a dilemma that has come to be known as the "Walters Critique" of the ERM.[12]

The reports of the Monetary Committee and EC Governors Committee[13,14] on the lessons to be learned from the exchange rate turbulence of 1992-93 attempt to address this question. They recommend that the interest rate policies of ERM members should be clearly directed to defense of the exchange rate, if they are to carry conviction. They also recommend that, where economic fundamentals have diverged, exchange rate 'adjustment should be undertaken promptly, before market pressures have been able to build up. These recommendations are easy to state, but much harder to carry into practice in the dilemma situations likely to characterize the actual operation of a fixed-but-adjustable exchange rate system.

Lastly, I turn to the issue of implementing monetary policy under floating rates. The complication introduced by capital flows is that they may obscure the signals used to guide monetary policy, or act against the objective of domestic monetary policy.

It might be thought that the common pursuit of monetary policies aimed at price stability ought also to produce stable capital flows, and thus stable real exchange rates. Certainly, in the absence of stable counter-inflationary monetary policies, the prospects for exchange rate stability are dim.

The "monetarist" corollary would be for countries with an independent monetary policy to adopt the objective of stable growth in their domestic money supply. Provided there is a reasonably robust relationship between money and nominal GNP, the pursuit of such a rule by all countries should stabilize exchange rates and inflation rates. The knowledge that monetary authorities have committed themselves to a stabilizing rule would enable private agents to plan with confidence. Any tendency for exchange rates to move away from the medium-term equilibrium consistent with the monetary rule would be countered by capital flows.

Unfortunately, experience does not suggest that the relationship between money and GNP is robust enough to perform the stabilizing role that a monetarist rule would assign to it. (Though doubtless monetarists might accuse policymakers of undermining a stable relationship by excessive recourse to discretionary policy shifts!)

In most countries that have used monetary aggregates as a guide to policy, previously stable relationships have tended to break down. The reasons are not fully clear, and may vary from country to country. Financial liberalization has undoubtedly played a part. A greater variety of assets, and new ways of holding transactions and precautionary balances, have brought unpredictable changes in the shares of wealth economic agents choose to hold in the form conventionally classified as "money." Greater mobility of capital has also contributed to obscuring the meaning of monetary aggregates. When exchange market conditions are stable, foreign currency denominated assets can perform the function of adding to domestic liquidity. When markets are more disturbed, inflows and outflows of funds can have temporarily significant effects on the monetary base.

Faced with these uncertainties, monetary authorities have been obliged to rely less on monetary targets, and more on discretionary assessments of monetary conditions. Even those that still believe monetary aggregates have a crucial role to play, such as the Deutsche Bundesbank, have been forced to allow targets to be missed for extended periods without taking countervailing action.

The weakening of the traditional relationships between money and nominal GDP poses a difficult issue for policymakers. To return to a purely discretionary policy regime puts credibility at risk. How, economic agents may ask, can we assess the objectives of policy, and the likely reaction to different types of economic disturbance? How can we trust the authorities not to weaken or abandon their commitment to stated policy goals?

In the United Kingdom, the authorities have attempted to deal with the credibility issue by specifying as precisely as possible the ultimate objective of monetary policy, then being as transparent as possible about the decisionmaking process. The framework is similar, in its broad lines, to that employed in some other countries operating with inflation targets (Canada, New Zealand, Sweden, and Finland, among others).

The point of departure is uncontroversial enough. It is the proposition that the ultimate goal of monetary policy is to deliver price

stability, durably and credibly. In order to provide guidance to economic agents, and a yardstick to measure success, we have quantified the inflation objective. It is to hold inflation of the Retail Price Index (RPI) in the range 1-4 percent during the lifetime of the present parliament (that is, probably until 1996 or 1997).[15] In the latter part of this period, it is intended to reduce inflation to the lower half of the target range, while in the longer run, price stability probably implies RPI inflation in the range 0-2 percent.

There is no single intermediate objective, such as a monetary aggregate, as an operating target for monetary policy. In the terminology of Bryant and others, there is a "one-stage" decisionmaking procedure, not a two-stage one.[16] U.K. experience does not suggest that the relationship between any potential intermediate target and the ultimate objective is reliable enough to improve on the direct pursuit of the ultimate objective.

In the absence of intermediate objectives, what acts as a trigger for a policy response? I believe it is easiest to think of U.K. monetary policy as driven by a single indicator: namely, the forecast for inflation one to two years ahead. This forecast is built up from a careful assessment of the various factors that determine inflation: the current level of cost and price increases, prospective changes in demand pressures, developments in monetary aggregates, changes in the exchange rate, asset price developments, commodity price trends, and so on.

These various influences are not captured in a single or composite indicator. Instead, we have attempted to be as transparent as possible in revealing the basis on which our assessment of inflation trends is made. As part of this process, the Bank of England publishes a comprehensive quarterly analysis of inflation trends and prospects. This is set out in the Bank of England Quarterly Bulletin and is also separately available.[17] We cannot hope, of course, that inflation forecasts will always be right. What we do aim at is to convince market participants that the assessment is unbiased and professional. Over time, therefore, it should provide the appropriate basis for stability-oriented use of monetary instruments.

The instrument of monetary policy is the authorities' control over

short-term interest rates. In practice, we recognize that monetary conditions involve more than simply looking at the level of nominal short-term rates. An assessment of expected inflation is necessary to obtain real interest rates; and changes in the exchange rate act as an independent influence tightening or easing perceived monetary conditions. Subject to these caveats, the authorities would act to tighten monetary conditions when the "news" about price pressures one to two years out showed an increase in inflation. We would aim to keep monetary conditions tight for so long as our inflation forecast showed a likelihood of inflation being outside the top of the target range.

International coordination of monetary policies

This section deals with the issue of how far countries should coordinate their monetary policies in the face of increased capital mobility. International policy coordination has received mixed reviews in recent years. Despite the potential benefits suggested by game theory (for example, the Prisoner's Dilemma), doubts persist.

It is not hard to imagine situations in which policy coordination can be counterproductive. Consider, for example, a case in which countries agree to try and stabilize exchange rates through adjustments in interest differentials. If an enlarged fiscal deficit in one country is tending to push up the equilibrium real exchange rate (as with the U.S. dollar in the early 1980s), its monetary policy might have to be excessively accommodative to restrain the rise. In other words, if fiscal policy is overexpansionary, monetary policy may have to be overexpansionary as well, to balance the effect on the exchange rate. The result would be higher inflation.

The fact that policy coordination can be misapplied is not, of course, an argument against coordination per se. But it is a reason to be clear about policy objectives, and the interaction among various objectives.

In a fully fixed exchange rate system, the issue of coordination among members of the system is straightforward. There can only be one monetary policy, and arbitrage will act to keep interest rates together throughout the system. There is, of course, an important question as to whether the monetary policy is set by a hegemonic

"anchor" country, or is shared in some fashion between members of the system. But this does not change the fact that, under irrevocably fixed exchange rates, coordination involves all countries following a single monetary policy.

Of more interest in present circumstances is the issue of policy coordination in a situation of fixed-but-adjustable exchange rates. A system such as the European exchange rate mechanism is designed to emphasize mutuality in policy obligations. Three areas in which coordination is required can be distinguished: first, the choice of exchange rate parities; second, adjustment of monetary policies (that is, interest rates); third, exchange market intervention.

It seems reasonable that there should be mutual agreement in the setting of parities, if there are mutual obligations in the defense of parities. Unless creditor countries feel that they have "bought in" to the existing pattern of exchange rates, it is probably unrealistic to ask them to do more in defending it if it comes under pressure.

To help ensure greater support for parities, the reports of the Monetary Committee and Central Bank Governors' Committee on the September crisis have suggested procedures aimed at facilitating a more continuous review of the appropriateness of exchange rates in the ERM.[18] One can be skeptical, of course, about how much flexibility will be achieved. The exchange rate is a highly sensitive variable, and devaluation is nearly always viewed as a political defeat. An expressed willingness, in the abstract, to consider realignment is not the same thing as doing it in a concrete case. If the ERM is to be revived and strengthened it will be important, therefore, to devise procedures that allow peer pressures to be brought to bear effectively, and that help depoliticize exchange rate adjustments.

The second element in managing a fixed-but-adjustable exchange rate system is the use of interest rates to defend against pressures provoked by capital flows. It was this element that produced the most vocal criticism of the working of the ERM in the September 1992 crisis. Some members of the system were faced with the requirement to raise domestic interest rates to very high levels to counter incipient capital outflows. Moreover, there was a self-reinforcing character to

interest rate increases. A moderate increase induced some economic agents to view the new level as "unsustainable" in a domestic political context, and therefore to attempt to move more funds out of the currency. A further interest rate increase was then required, and so on.

In a fully symmetric system, there would probably be some sharing of the interest rate adjustment burden. Policymakers would take a collective view on the aggregate monetary policy appropriate to meet the counterinflationary goals of the fixed rate area as a whole. Once a suitable aggregate monetary policy was in place, pressures on exchange rates could then be met by broadly symmetric interest rate adjustments. Countries facing downward pressure on their exchange rate would increase interest rates, while those experiencing capital inflows would lower rates. The mere knowledge that such a system of burden sharing was in place could contribute to the stability of the system by discouraging capital flows in the first place.

While the symmetric approach has a clear rationale in theory, it has drawbacks in practice. Chief among these is the fear that it would be seen as diluting the anti-inflation discipline of the system. The German authorities believe that to compromise on their domestic counterinflation objectives would undermine the anchor role of the deutsche mark, to the long-run detriment of all participants in the system. Given the nature of the Bundesbank's domestic legal responsibility, it is hard not to sympathize with this view. Until, therefore, the credibility of all members of a fixed-rate system is effectively established, it is perhaps unrealistic to expect the anchor country to modify its monetary policy in order to ease pressures on its partners. The corollary is that divergent policy needs are bound to lead to major strains in the system.

The third element in the cooperative management of a fixed-but-adjustable exchange rate regime concerns intervention arrangements. In the ERM, intervention obligations are mutual and unlimited when two currencies reach the permitted margin of fluctuation against one another. This gives rise to two sorts of problem. First, those countries which intervene are subject to risk of loss in the event of a realignment. The creditor country lends its currency to the debtor country at a fixed ECU conversion rate. If a realignment takes place before the transac-

tion is unwound, both the creditor and the debtor will suffer a loss, in terms of their own currency, when reserve holdings return to their original level. (This has been particularly resented by creditor countries when they felt that the exchange rate they were called upon to defend was unrealistic.)

The second complaint is that capital flows financed by marginal intervention enlarge the money stock in the creditor country. Precise sterilization of capital inflows is not easy, particularly when the amounts involved are large. This complicates monetary management and makes the interpretation of monetary conditions difficult. In the second half of 1992, for example, sales of deutsche marks by European central banks (including those of the Nordic countries) reached DM284 billion, equivalent to some 18 percent of the stock of German M3 in mid-1992. Of this, DM188 billion was used to defend ERM parities.[19] This contributed to the very rapid rise in broad money during the same period.

Various techniques can be imagined to limit intervention obligations, or to spread the burden of risks differently. But such techniques risk undermining the credibility of intervention in defending rates. If there were ceilings on the volume of intervention, this fact would almost certainly become known to market participants, perhaps provoking additional capital flows when it was thought that the ceilings were being approached. And if the burden of exchange risk were shifted, so as to protect creditors against loss, this could be interpreted as a weakening of their commitment to defend existing parities.

The approach which seems to have been preferred by EMS members[20] prior to the ERM crisis of July/August 1993 involved a package. On the one hand, countries would accept the need to make timely exchange rate realignments when "fundamentals" diverge. On the other, there would be a greater mutual commitment to defend parities when exchange rates were judged to be appropriate. This defense would involve a willingness on the part of weak currencies to use interest rates promptly; and by creditor countries to extend visible and extensive financial support. This approach was used with success in the defense of the Danish krone in February 1993.

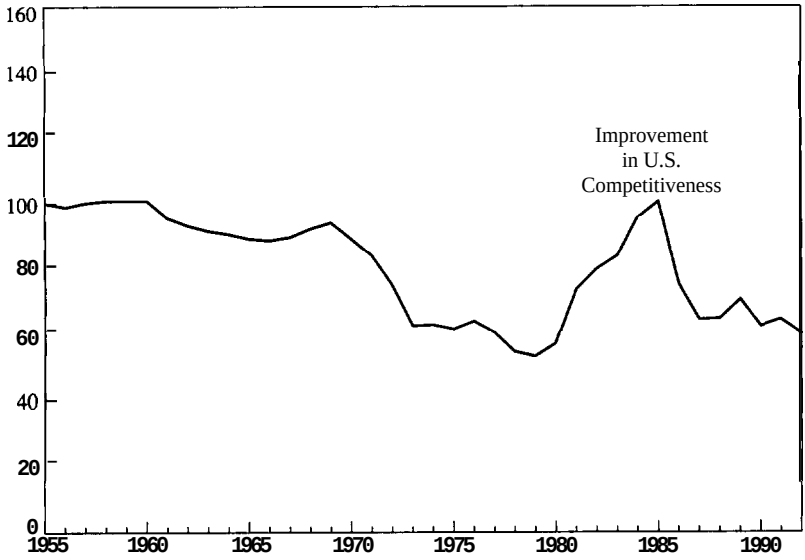
Cooperation in managing the exchange rate consequences of capital flows is also important between countries with floating currencies. Capital flows are now so large relative to current transactions that exchange rate movements are largely driven by changes in the incentives for capital flows, at least in the short-to-medium term.

In many circumstances, the influence of capital flows on exchange rates can be benign. Consider, for example, the case when one country experiences an increase in economic activity, relative to its partners. The reasons could be fiscal stimulus or simple "animal spirits." The result is that the ex ante investment/savings balance shifts toward spending, and interest rates tend to rise. Rising interest rates attract capital from abroad, causing the exchange rate to appreciate and moderating the rise in interest rates. The partner country will experience a strengthening of net exports, due both to the higher activity in the first country and to the improvement in its competitiveness. The effects of the initial disturbance to demand in the first country are therefore spread to its trading partners. At the risk of oversimplification, it may be said that capital mobility improves welfare by spreading the effects of inflationary and deflationary influences that would otherwise be "bottled up" in the country of origin.[21]

But actual experience with capital flows under floating exchange rates has not always been so beneficial. Both theory and observation suggest that capital movements can cause exchange rates to "overshoot" their long-term equilibrium, in response to short-term disturbances. The simple reason for this, first clearly identified by Dornbusch,[22] is that different markets tend to reach equilibrium at different speeds. Markets in financial assets equilibrate very quickly, those for goods and physical capital more slowly. Moreover, "bubble" phenomena can lead to the creation and sudden reversal of market disequilibria.

Whatever the theoretical arguments, it is certainly true that real exchange rates have been more volatile under floating rates than they were in the Bretton Woods period. Chart 2 shows fluctuations in the real DM/U.S.$ rate for the period 1955-93. It may be seen that the rate has become markedly more volatile after about 1970.

Chart 2
Real DM/U.S. Dollar Exchange Rate*



* Deflated by CPIs.

Not everyone sees this volatility as a problem. Studies of the effect of exchange rate volatility on trade have had mixed success in finding substantial effects.[23] These studies, however, have generally focused on exchange rate volatility over very short periods, for which hedging techniques are readily available. Most observers remain uncomfortable with a situation in which medium-term swings in real exchange rates far exceed the contemporaneous shift in competitiveness. The heightened uncertainty that results is seen as reducing the willingness to engage in international trade and direct investment. Moreover, shifts in balance of payments positions fuel protectionist pressures.

Three types of approach to reducing exchange rate volatility among floating currencies can be distinguished: target zones, "sand-in-the-wheels," and policy coordination. This paper ends with a brief consideration of each.

The "target zone" approach has been imaginatively developed and tirelessly advocated by John Williamson.[24] The idea is that the major

countries with floating exchange rates should commit themselves to hold their exchange rates within a (perhaps quite broad) band that is considered consistent with long-term sustainability in the balance of payments. If exchange rates tend to move outside this range, such movements would be resisted by the conventional means (intervention, policy statements, changes in fiscal/monetary mix). Different policy responses will of course be needed, depending on the perceived reason for movements in the market rate. The basic target zone approach can therefore be enriched by specifying the response to be used in particular circumstances.[25]

There are two aspects of the target zone proposal that make me skeptical of its applicability, at least in any very formal fashion, to the currencies of the three largest industrial countries. First, the identification of an equilibrium exchange rate remains elusive. Even the use of wide bands is of limited assistance, since negotiation inevitably focuses on the mid-point of the bands first, then the ranges. Second, use of monetary policy to target the exchange rates can lead to the compounding of an error in fiscal policy. If, for example, an expansionary fiscal policy leads to exchange rate appreciation (as in the United States in the early 1980s, or Germany more recently), easing monetary conditions to hold the exchange rate down would serve to intensify inflationary pressures. Advocates of target zones would admit that the response to exchange rate movements has to be differentiated according to the underlying causes. Too often, however, the inflexibility of fiscal policy is likely to force the authorities to use a monetary policy response, whether or not it is indicated.

The "sand-in-the-wheels" approach is widely associated with the name of Tobin.[26] More recently, Eichengreen and Wyplosz[27] have argued that some form of control over capital flows offers the most promising prospect of maintaining stability in the ERM in the run-up to monetary union. Tobin's proposal rests on the proposition that unfettered capital flows can be destabilizing because of "irrational" behavior, or by simple "churning," by private market participants. The imposition of restrictions (or, better, a tax) on cross-border transactions would discourage destabilizing speculative movements. It would also curtail rent-seeking behavior on Wall Street and the City of London, a further social benefit in Tobin's eyes. Moreover, pro-

vided the tax is set at a low level, the impact on "productive" international capital flows should be slight.

I am not very attracted by this proposal either. In the first place, it is difficult to believe that market participants will not find ways to get around it, and to take positions in ways that do not involve the payment of tax. Second, a tax would impair the efficiency and stabilizing properties of capital markets by reducing liquidity and making hedging more difficult. And third, the short-term foreign exchange rate volatility that is the object of the proposal is much less damaging than the medium-term misalignments that distort international trade and threaten protectionist pressures.

A more modest role for "sand-in-the-wheels" would be to buy time in a period of exchange rate turbulence to enable more far-reaching policy adjustments to be agreed and implemented. Something of this sort occurred during the ERM crisis of September 1992. Some countries imposed restrictions or taxes on borrowing to finance capital outflows, while others employed moral suasion to induce domestic banks to refrain from passing on higher money market rates to borrowers. Such techniques probably helped the countries concerned withstand the immediate crisis. Their usefulness beyond the short term is open to doubt, however. Even the knowledge that their use was being considered would make portfolio managers unwilling to invest in assets whose liquidity might be compromised. The lessons of experience suggest that any short-term gains from capital restrictions are outweighed by longer-term costs.

The third means of reducing exchange rate volatility in conditions of capital mobility is through intensified policy coordination. The grandly named "***G-7*** process" is intended to be the vehicle by which the major countries inform each other about their respective policy goals and intentions, and strike mutually beneficial bargains. After the initial success of the Plaza and Louvre agreements, however, it is not easy to detect policy shifts that have come about as a result of the G-7 process.

Yet if exchange rate movements are driven largely by changes in relative policy mix, it is essential to address the issue of policy mix if

a basis for exchange rate stability is to be achieved. And the achievements are not as meager as is sometimes assumed. There is now a consensus around the proposition that monetary policy should be addressed to price stability, as well as a broad agreement as to what price stability means. Equally, there is a shared desire to bring budget deficits down to more sustainable levels. (The present level of fiscal deficits is sometimes used to suggest that this desire has no substance. I think this overlooks the hard decisions that have been necessary to prevent deficits being even higher than they are.)

There is also the beginnings of agreement on how policies in individual countries should be adjusted in furtherance of the international adjustment process. In 1992, for example, it was widely agreed that Japan should deal with its slowing in economic activity by fiscal expansion, while in Germany, the appropriate approach would be fiscal restraint, balanced by easier monetary conditions. In the United States, a reduction of the fiscal deficit was seen as helpful in "making room" for an improvement in the payments position.

So in my view, there exists a rudimentary basis for a model of international economic interactions. I believe it will be more fruitful to build on and extend this beginning, rather than seek other, more simplified means of dealing with international capital flows.

A difficult task is to develop a procedural basis for ongoing, policy coordination. In an earlier contribution,[28] I identified three levels on which international cooperation and coordination could take place:

—agreement on a set of formal rules binding national authorities,

—development of operational guidelines on how policies should respond in typical situations, and

—the establishment of institutional procedures for monitoring and evaluating policies on a continuing basis.

The first of these seems out of reach, as a way of formalizing cooperation among the three major economic areas. Apart from subscribing to the principle of not "manipulating" exchange rates to

gain competitive advantage, it seems unlikely that countries will find a formula for international policy coordination similar to that in, say, the Bretton Woods System.

The other two levels of cooperation could, I believe, be developed further. Institutional procedures for cooperation are now mainly based on the G-7. These could usefully be developed so as to take into account economic developments elsewhere in the global economy, and to permit analytical staffwork to underpin policy coordination. This points to greater involvement for international organizations. This should facilitate the other basis for coordination; namely, the analysis of policy interactions among countries, and the development of models of policy response.

The continuing integration of world capital markets will give rise to evolving challenges for domestic policymakers. Addressing these challenges will, I believe, call for an intensification of international cooperation on a variety of levels.

Author's Note: The views expressed in this paper are those of the author and not necessarily of the Bank of England. Helpful comments on an earlier draft were provided by Tony Coleby, Morris Goldstein. Charles Goodhart, Mervyn King, John Williamson, and Paul Wright.

Endnotes

[1]Yoshihide Ishiyama, "Theory of Optimum Currency Areas: A Survey," IMF Staff Papers, vol. 22, no. 2 (July 1975).

[2]Rudiger Dornbusch, "Expectations and Exchange Rate Dynamics," Journal of Political Economy, 1976, pp. 1161-75.

[3]Martin S. Feldstein, "Thinking About International Economic Coordination," reprinted in Journal of Economic Perspectives, vol. 2, no. 2 (Spring 1988) pp. 3-13.

[4]Bank for International Settlements. *62nd Annual* Report *1991-92*, pp. 191-212.

[5]Group of 10, "International Capital Movements and Foreign Exchange Markets: A Report to the Ministers and Governors by the Group of Deputies" (April 1993).

[6]Bank for International Settlements, Central Bank Survey of Foreign Exchange Market Activity in April 1992, Basle (March 1993).

[7]R.I. McKinnon, "An International Standard for Monetary Stabilization," Institute for International Economics, MIT Press, 1984.

[8]Peter Isard, "Exchange Rate Modeling: An Assessment," in Ralph Bryant, Dale Henderson, Gerald A. Holtham, Peter Hooper, and Steven Symansky, eds., Empirical *Macroeconomics* for Interdependent *Economies*. Washington: Brookings Institution, 1988).

[9]Michael Mussa and Morris Goldstein, "The Integration of World Capital Markets," a paper prepared for the symposium 'Changing Capital Markets: Implications for Monetary Policy," Jackson Hole, Wyo., August 19-21, 1993, Federal Reserve Bank of Kansas City.

[10]Committee of Governors of the Central Banks of the Member States of the European Economic Community, "Report on the Strengthening of the EMS' (September 1987).

[11]André Szasz, "The ERM Hard Core: The Netherlands Case" in Paul Temperton, ed., The European Currency *Crisis*, EFFAS/European Bond Commission, (forthcoming).

[12]A.A. Walters, Britain's Economic Renaissance, Oxford, 1986.

[13]Monetary Committee of the European Community, "Lessons to be Drawn from the Disturbances on the Foreign Exchange Markets" 28 (April 1993).

[14]Committee of Governors of the Central Banks of the Member States of the European Economic Community, "The Implications and Lessons to be Drawn from the Recent Exchange Rate Crisis," (April 21, 1993).

[15]Defined for this purpose as the 12-month change in the Retail Price Index excluding mortgage interest payments. RPIX was chosen because of its timeliness and familiarity. A range for inflation (rather than a point) was selected in order to give a clear signal of the margins beyond which policy action would be called for.

[16]Ralph C. Bryant, Peter Hooper, and Catherine L. Mann, "Evaluating Policy Regimes and Analytical Models," (forthcoming).

[17]Bank of England, "Inflation Report," various issues.

[18]Monetary Committee of the EC and Committee of Governors, 1993.

[19]Group of 10, paragraph 57.

[20]See Monetary Committee.

[21]J. Marcus Fleming. "Domestic Financial Policies Under Fixed and Under Floating Exchange Rates," *IMF Staff Papers*, vol. 9, no. 3 (November 1962) pp. 369-79. Robert A. Mundell, "Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates," *Canadian Journal of Economics and Political Science*, vol. 29, no. 4 (November 1963), pp. 475-85.

[22]See Dornbusch.

[23]International Monetary Fund, "Exchange Rate Volatility and World Trade," Occasional Paper No. 28.

[24]John Williamson, The *Exchange Rate System*, 2nd ed., Institute for International Economics, Washington, 1987.

[25]John Williamson and Marcus H. Miller, "Targets and Indicators: A Blueprint for the International Coordination of Economic Policy," Institute for International Economics. Washington, 1987.

[26]James Tobin, "A Proposal for International Monetary Reform," Cowles Foundation Discussion Paper 506 (October 1978).

[27]Barry Eichengreen and Charles Wyplosz, "The Unstable EMS," INSEAD Paper (April 1993).

[28]Andrew D. Crockett, "The Role of International Institutions in Surveillance and Policy Coordination," in Ralph Bryant, David A. Currie, Jacob A. Frenkel, Paul R. Masson, and Richard Portes, eds., *Macroeconomic Policies in an Interdependent World*, Brookings Institution, 1989.

Commentary: Monetary Policy Implications of Increased Capital Flows

Antonio M. Borges

I'm pleased to deal with the issue that we are discussing from a more academic point of view. Having left the central bank a few months ago, I find that I now have a great deal more freedom, and that, I think, is a lot more fun. This is, of course, because not being part of the decisionmaking process, investors and market participants don't care the least bit anymore about what I say. Therefore, I can say what I want.

Now let me turn to Andrew Crockett's paper, which I read with pleasure and interest. I think it's a good paper that surveys most of the issues related to the topic. I think the paper is quite representative of the best thinking among policymakers, particularly European policymakers, on these issues.

You may have found that the paper is often inconclusive, especially in its recommendations, or that it defends compromises or compromise solutions. This may be a reflection to a certain extent of the recent turmoil in Europe, which has shaken confidence and has left people, if I might say so, anchorless. It also reflects more positively a recognition that these issues of monetary policy are complex and difficult. And this after a long period of perhaps excessive optimism about the feasibility of some rosy dreams.

The paper is on monetary policy but refers all the time to exchange rates and exchange rate regimes. And this is indeed the key point. The

fact is that capital flows influence monetary policy essentially because of their impact on exchange rates. This is the point on which I will try to focus my remarks.

Let me begin by saying that I agree with almost everything that Andrew states in his paper. But because he covers so many points, I'll just focus on some key ideas and try to elaborate a little more on some of these key points.

Perhaps the most important point of the paper is that strong capital flows or significant financial integration force a clarification of the exchange rate regime. It is not possible in those conditions to have hybrid solutions attempting to reconcile too many objectives. One has to opt for fairly free floating exchange rates or very credibly fixed ones. Fixed rates, we all agree, require a complete subordination of monetary policy. I'll come back to this point later on. Any autonomy of monetary policy will thus require floating rates.

The point I want to make, however, is that the autonomy of monetary policy under floating rates is largely illusory. I would not go as far as stating as McKinnon did that monetary policy does not influence interest rates at all—that it only has an impact on exchange rates. But certainly it is true, and recent experience I think shows, that with strong financial integration most of the impact of monetary policy is actually felt on exchange rates. In fact, with strong capital flows monetary policy influences the real economy essentially through the exchange rates, which means that the impact of monetary policy will fall essentially on the tradable goods sector, on imports and exports, which are affected to a certain extent disproportionately relative to other sectors of the economy. This is in strong contrast with more traditional analysis of monetary policy, which attribute the impact to such interest-sensitive sectors as fixed investment, inventories, and so forth.

Matters are greatly complicated by the fact that exchange rates are frequently unstable. There is always the reality of overshooting, as well as the possibility of speculative bubbles, and other kinds of behavior that are seemingly irrational—as mentioned by Andrew in his paper. One may, therefore, conclude that changes in monetary

policy that yield relatively small changes in interest rates may in fact cause very large swings in exchange rates. We only need to look at recent depreciations—in the United Kingdom of about 20 percent and in Italy of about 30 percent—with relatively small declines in interest rates to illustrate what I am trying to say. I don't think that anybody can argue that this magnitude of devaluation is a movement in the direction of equilibrium. It is rather clear that things have gone way too far in response to a relatively minor change in interest rates.

Perhaps U.S. economists and policymakers will dismiss the importance of large swings in exchange rates. But for open economies, and in particular for very open economies that have 40 to 50 percent of GNP in foreign trade, these large and sudden moves in relative prices may have very detrimental effects on the economy. The exchange rate is a very key price in those cases. Perhaps short-term trade flows will not be affected because there are sufficient instruments to cover against uncertainty in the short term, as Andrew points out. But in the long term, resource allocation is very much affected by this type of instability. And furthermore—as Jacob Frenkel pointed out yesterday—in small, very open economies the exchange rate is a very useful and important instrument of stability, and it is very hard to accept that the exchange rate has to move very substantially in order to gain a little bit of autonomy on monetary policy.

I would like to remind everybody that the same thing happens in the opposite direction—not only in the case of depreciation, but also in the case of appreciation of currencies. A strong positive demand shock countered by monetary policy will probably always have, with strong capital flows, excessive and undesirable effects on the exchange rates. We often mention the U.S. case of the early 1980s, but more recently we can talk about German unification or we can talk about the effects of accession to the European Community on the economies of Spain and Portugal. We can also talk about what has happened in Mexico—a case which I know less well but which I believe has quite a few parallels with what happened in Spain and Portugal two or three years ago.

Tighter policies attract strong capital inflows and lead inevitably to an appreciation of the currency. If the appreciation is resisted, infla-

tion accelerates and the real appreciation takes place. Of course, as I think Andrew also pointed out, the alternative option of accommodating the shock would produce far more destructive consequences.

So in fact, monetary policy is likely to lead to very large swings in exchange rates. And if such swings are to be avoided, the scope for activist policy is very limited.

One may always defend a better policy mix as the solution; that is the theoretical answer. But I think that in all the cases I mentioned—the German case, the Portuguese and Spanish cases, and perhaps even the Mexican case—the change in fiscal policy that would have been required to stabilize the situation would be too large to be realistic given our experience with fiscal policy decisions. That of course is why stable exchange rates have proven to be so difficult to achieve.

It is possible to solve this dilemma—of how to have an effective monetary policy without big exchange rate swings—through better policy coordination. This is more relevant for optimum currency areas, to the extent that they exist, than for the world as a whole. But it is not to be excluded. This requires, however, that the effects of shocks be spread more uniformly and that the cost of fighting them be accepted by all. For example, this would have required that France be prepared to pay the price of high interest rates to help fight inflation in Germany, Spain, Italy, and Portugal. I believe that this acceptance was actually implicit in the decision not to revalue the deutsche mark at the time of German unification—by far the easiest way of dealing with that problem. By choosing to keep the exchange rate constant, every country in the European exchange rate mechanism (ERM) was, in fact, accepting the need to share the burden of fighting inflation in Germany and elsewhere. But I am convinced now that the implications of that option were underestimated at the time.

Let me turn to the other extreme in Andrew's option, the credibly fixed exchange rate system. I certainly agree that free capital flows do not prevent fixed exchange rates, even with very powerful speculators in the markets. But they do impose a very tough discipline. Speculative capital flows can become very large. But even the most successful speculators, and I can mention even Mr. Soros in this

context, have admitted frequently that central banks have all the instruments necessary to defend parities. The question is whether the authorities are willing and able to use those instruments. Sometimes the use of certain instruments is excluded because of situations of extreme financial vulnerability or fragility. Other times, the instruments ***can*** be used but are not used because of other conflicting objectives of policy.

The reason that central banks are potentially all-powerful is that currency speculation can only proceed if it is financed by central banks. Massive sales of a currency drain massive amounts of liquidity from the market in a matter of days, sometimes hours. If exchange market intervention is not sterilized, the funds available for speculation dry up. Certainly, interest rates will shoot up. There is no doubt about that. But as the Dutch say, I believe that the appropriate source is the Dutch, "If you want low interest rates, you have to be prepared to let them go up when necessary." Furthermore, with some margin of fluctuation as in the original ERM rules, punitive interest rates combined with significant potential exchange rate losses for speculators can be a very powerful deterrent and produce quick results. But this implies that fluctuation bands should not be interpreted as providing scope for monetary policy autonomy, but rather as a tactical weapon to be used in the case of an attack on the currency. In fact, in my view, the properly used margins of fluctuation provide sufficient sand in the wheels to maintain some control over speculative movements, much better than other alternatives that have been floating around recently.

However, to make these strategies successful, it is necessary that (1) every other objective of monetary policy be sacrificed, and (2) conditions must exist to make possible the use of all instruments. The Maastricht Treaty, which apparently is still alive, has some convergence criteria in it. I would argue that they are now insufficient to achieve stable fixed exchange rates. We also need low levels of public and private debt. The reason is not just the free-riding problem—which was the original reason for putting limits on public debt in the Maastricht Treaty—but also to reduce the vulnerability of the financial system to speculative attacks on the currency. Beyond this, we also need very limited or no indexation in financial markets to reduce

the possibility of quick transmission of limited short-term swings in interest rates to the rest of the financial system. And perhaps even more important, we would need very, very flexible operating procedures on the part of central banks.

As Andrew emphasizes, much of this would depend on credibility. Without credibility, this process of stabilizing exchange rates does not have much of a chance. Credibility requires not only the ability and willingness to use the appropriate weapons but also that central banks avoid some clear pitfalls. Protracted battles are not sustainable and therefore not credible. Results must be achieved very swiftly. Any mention or even a resemblance of a multiplicity of objectives for monetary policy is immediately interpreted by the markets with all of its implications. And any impression that authorities are trying to test the limits of the autonomy of the system is again a signal that things are going to go wrong.

So let me conclude by saying that free capital flows mean that fixed rates require in fact quasi-perfect convergence. Any divergence in the near or distant future is brought to the present immediately and puts intolerable pressures on the exchange rate. Perhaps this is only now a matter of historical interest, but since European politicians keep sticking to the project of European Monetary Union, I would agree with Andrew that in Europe monetary union might not be feasible with a long, smooth, and gradual transition. Instead, achieving monetary union in Europe may require that tough convergence criteria be met well before any further move can be envisioned.

Commentary: Monetary Policy Implications of Increased Capital Flows

Alberto Giovannini

The paper by Andrew Crockett nicely summarizes the current questions in the theory and practice of monetary policy. The paper focuses on the effects of increased international capital movements, a sign of increased international capital mobility, on the problem of coordinating monetary policies, on the choice of an exchange-rate regime and on the benefits of rules versus discretion.

These are the classical questions in international monetary policy and they have gained a new light after a rather extraordinary sequence of events that has affected especially European countries and European currencies over the past twelve months. Andrew Crockett touches upon these events, but prefers to discuss the general issues. In my comments, I will take the opposite perspective: I will comment on the recent events, and from them draw a few observations on the general issues. In particular, I will discuss the options now available to European countries in the wake of the most recent exchange rate mechanism (ERM) crisis.

The last twelve months have been the climax of a period of about thirteen years during which European countries embarked in a system of fixed exchange rates. Such a system, when it was conceived in a regime characterized by an extensive use of capital controls by almost all of its member countries, was meant to deliver more stability of relative prices by assuring more stable nominal exchange rates. Only in the early to mid-1980s did the ERM transform itself, in the language

of academic economists, into a "commitment technology." In other words, in the early 1980s European policymakers saw the ERM as a device to produce an exchange-rate-based inflation stabilization. A commitment technology is a device that ensures the authorities' commitment to an announced plan, in this case the decrease of the inflation rate. It can do so if the authorities are bound to their promises. In the case of the ERM, the promise is not to change the exchange rate.

Such a promise was made increasingly credible by the decreasing frequency at which the realignment occurred, and by the increasing number of "chips" that authorities put on the table. The European Monetary System (EMS) was followed by the Single European Market program, itself followed by Economic and Monetary Union (EMU). In both cases, implicitly or explicitly, the stability of the European Monetary System was viewed as a pillar of these initiatives, thus gaining strength from them.

Now, what do we know about exchange-rate-based stabilizations? From the experience of many countries who followed such policies before the European Community (EC) member countries, we know that they usually do not last. Exchange-rate-based stabilizations are very successful in eliminating the first and largest chunk in the inflation differential vis-à-vis the reference currency, but usually cannot get rid of the last few percentage points of difference. Hence, after some time, the exchange-rate pegs are abandoned.

In the case of the EC, things were complicated by Economic and Monetary Union. The ERM became instrumental to EMU, by becoming the pillar of the gradual convergence plan envisioned in the Maastricht Treaty. Once again, the ERM was viewed--even though unofficially—as the cornerstone of the convergence plan. After EMU was announced, some important members of the ERM thought (probably correctly) that parity changes were not admissible, because they would have undermined convergence and would have destroyed whatever anti-inflation credibility they so strenuously acquired. If credibility had to be stably acquired, exchange rates were to be progressively abandoned, at all costs. The necessity of abandoning the exchange-rate "instrument" during the transition to EMU is both

expressed in the Delors plan and in the Maastricht Treaty, according to which a convergence criterion is the absence of realignment of ERM parities.

Thus, the gradualism strategy of the Maastricht Treaty required that countries undertake significant stabilizations without using exchange rates. This strategy was sharply criticized by several observers, including this writer (see Giovannini, 1990a,b, 1991), on the grounds that—in general—major reforms, to be credible, cannot be gradual and that credibility is a key of the success of a reform that requires time. Hence—by this argument—the optimal period of time required to introduce a single currency in Europe collapses to zero. In other words, governments should not establish—ahead of the reform—hurdles whose difficulty is endogenously determined by the financial markets' assessment of the credibility of the reform itself.

There are a number of additional structural reasons why the gradualism strategy might be self-defeating. The first arises from the problem of exchange-rate-based inflation stabilizations. Consider a country pegging its nominal exchange rate to a partner, at the time when the differential in the inflation rate is still significant and relative prices (the real exchange rate, that is, the relative price of domestic goods in terms of foreign goods) are approximately in line. As the inflation rate converges—the inflation differential is progressively eliminated—the country loses competitiveness—the real exchange rate appreciates. Hence, in exchange-rate-based stabilizations, inflation differentials not only have to be eliminated, they also have to be "undone," that is, the real exchange rate appreciation produced by inflation differentials has to be undone.

The elimination of relative price distortions produced by exchange-rate-based inflation stabilizations can only be produced in either one of two ways:

—by keeping the exchange rate stable, and generating more inflation in the "reference" or "anchor" country than in the partner countries, or

—by depreciating the currency of the country attempting the

convergence.

This choice highlights the wrong incentives implicit in gradualism. The country attempting stabilization will be unwilling to depreciate its currency to bring back relative prices into line, because it will view that as a loss of reputation. Similarly, the "anchor" country will try to force the former one to devalue, to avoid higher inflation at home—again a loss of credibility from its own perspective. In sum, the credibility game implicit in exchange-rate-based stabilizations is a zero-sum game: the credibility gained by one country is at the expense of the loss of credibility in its partners. It is hard to believe that such a system would be capable of delivering a smooth path to successful monetary union!

In the case of Europe, things were further complicated by the German unification which, according to many observers, required a further real appreciation of the deutsche mark vis-à-vis its partners, thus exacerbating the relative price distortions accumulated by those countries that did not change their exchange rates since 1987, and yet experienced higher inflation than Germany.

Finally, the process of ratification of the Maastricht Treaty provided additional focus in the foreign exchange markets, both on the countries for which ratification was not warranted and on the countries whose compliance of the convergence criteria, prospectively, was considered to be problematic.

Now, however, the treaty is ratified. In a sense, the deep concerns about the feasibility of monetary union should have been largely removed by the completion of the ratification process. More importantly, the ratification, by submitting the choice of a single currency in Europe to national electorates or to their representatives, has immensely strengthened the support for such an endeavor. Ironically the Maastricht Treaty is currently enjoying the lowest popularity ever, but it would be a mistake to underestimate the importance of its acceptance by the majority of the European electorate.

The completion of the ratification and the dismemberment of the narrow-band ERM that occurred in early August make it appropriate

to discuss the options currently open to European countries. I would consider three options: re-establishment of the narrow-band ERM; modified narrow-band ERM with acceleration option; wide-band ERM, as suggested by Andrew Crockett in his paper.

The re-establishment of the narrow-band E M is the most obvious alternative available to EC countries. This could be done after an adjustment of the French franc/deutsche mark parity, and of other parities in the ERM, as it may seem fit. After all, if the crisis was justified by "fundamental disequilibria" as pointed out by so many observers, the adjustment of parities would be considered, by these same observers, the appropriate answer to the crisis.

That the narrow bands have not been re-established soon after the crisis is, in my opinion, more of a signal that countries fear a more serious flaw with the narrow-band ERM, than a signal that some countries, like France for example, are unwilling to change the deutsche mark parity value of their own currency. And this is consistent with my own interpretation of the currency crisis. On the other hand, the abandonment of the narrow-band E M poses two problems. The first is devising new intermediate targets for monetary policy. The second is the problem of countries like Belgium. It is my own opinion that Belgium has gained significantly by pegging its currency to the deutsche mark in terms of low costs of debt financing. The abandonment of the narrow band could mean, for that country, a significant increase of the cost of financing of public debt, with negative impact on their public finances. Thus, the return to the narrow-band ERM has attractions and drawbacks.

A second option is the establishment of a narrow-band ERM with acceleration option, as I suggested in my Princeton Essay (Giovannini, 1990b), and as was recently proposed by French authorities (see Commissariat General du Plan, 1993). The logic of that proposal was to eliminate the dangers of gradualism, by announcing that any destabilizing foreign exchange speculation was to be met with an acceleration of monetary union, rather than a slowdown. This, in equilibrium, would still allow countries slow convergence, but would deter speculation driven by the awareness of the potential of multiple equilibria. The acceleration option is obviously attractive to those

who intend to implement the (popular) mandate to introduce a single currency in Europe, but may be difficult to implement in practice, given the constraints imposed by the Maastricht Treaty, which fixes rigidly all dates and procedures. Thus the acceleration option could only be adopted voluntarily and outside the Maastricht framework by any given group of (at least two) countries.

The last option is what I will call, for ease of exposition, the Crockett proposal. That option is to maintain the wide band, induce further convergence of inflation, interest rates and public finances through the independent actions of individual countries' monetary and fiscal authorities, and call the wide bands the "normal bands" mentioned in article 3 of the Protocol on Convergence Criteria of the Maastricht Treaty. By leaving room for exchange rates to fluctuate, it provides some insurance against destabilizing speculation. In sum, this strategy kills gradualism, and at the same time leaves intact all options open on whether or not to pursue monetary union.

The problem with this strategy is monetary management. Many countries have gotten used to the practice of managing money through the exchange-rate target, which in Europe retains significant importance, given the openness of all economies. Abandoning the exchange rate altogether may be impossible even in the absence of any requirement to peg it.

In sum, there is not an unambiguous argument for any one of the options described above. Each of them has its strengths and costs. Whichever option is chosen, however, most European authorities will have to deal with a basic challenge, egregiously met by their U.S. colleagues: to bring down ex-post real interest rates, without jeopardizing the achievements on the inflation front. It is well known that historical experience suggests that such an endeavor is a difficult one to achieve. It is especially difficult in Europe, which I hope will soon enter a recovery, at a time of high nominal interest rates, with little room for controlling overheating with interest-rate policy.

References

Commissariat General du Plan. ***A French Perspective on EMU.*** Paris: Commissariat General du Plan, (February 1993).

Giovannini, Alberto. "European Currency Reform: Progress and Prospects," ***Brookings Papers on Economic Activity, 2,*** 1990a, ***pp.*** 217-92.

_____. "The Transition to European Monetary Union," ***Princeton Essays in International Finance,*** no. 178, (November 1990b).

_____. "Is EMU Falling Apart?" ***International Economic Outlook,*** vol. 1, no. 1, (June 1991), ***pp.*** 36-41.

Overview

Stanley Fischer

Like everybody, I would like to thank the Kansas City Fed for inviting me to this wonderful conference. It's not only the environment that is wonderful, we've also had five very interesting papers, which together with the comments, have covered the topic of the impact of financial innovations on monetary policy very well indeed.

They all start from the changes in the structure of the financial system: the decline of banking, the rise of other financial intermediation, the growing internationalization of the system, and the invention of new instruments. And they all say that this is an unprecedented rate of technical change—the invention of high-speed computers, improved communications, and so on.

I think that's just wrong. The most important financial and technical innovation that relates to financial markets is the invention of the telegraph, which put international markets together in the late nineteenth century. There is very little evidence that interest rates move together more closely now than they did at the end of the nineteenth century. Similarly, the discussions we're having on the decline of banks were a central feature of the monetary economics literature of the early 1960s including the work of Gurley and Shaw and of Patinkin in the second edition of his classic work. And the things we are saying today on the theory of how monetary policy works were in fact being discussed then.

This is not to say that there is nothing new under the sun, but it is

to say that we're dealing with a process that has been going on for at least 150 years. If this integration of capital markets was for a time set back, and if there's been an accelerated pace of integration of capital markets in the post-World War II period, that has more to do with policy changes—with the introduction of capital controls in the 1930s, and their gradual removal—than with technology. We are now roughly where we were a century ago with regard to the international integration of the financial markets.

The papers fall into two groups. Those yesterday addressed what the changes in domestic financial systems mean for monetary policy. And then today's papers address what the growing integration of international capital markets means for monetary policy, where now exchange rate policy is explicitly recognized as part of monetary policy. I'd like to second the lament of the Governors, John Crow and Jacob Frenkel, who each had to point out that, at least in their countries, the exchange rate is a central element in monetary policy, and that the distinction even for the United States between what these innovations mean for domestic monetary policy and what they mean for exchange rate policy is an artificial one. Even in the United States, movements in the exchange rate that follow on changes in interest rates are a central part of the transmission mechanism of monetary policy. And of course that applies even more strongly to smaller, more open economies.

Rather than pursue the distinction between domestic and international implications, I'd like to organize my discussion around the three questions Alan Greenspan raised yesterday. But I'll take them up in a different order than he posed them.

The first question is, "What do these changes mean for the stability of the economy?' The answer is that we don't really know yet, except that so far, so good. In principle, these innovations —specially derivative securities—allow for a better allocation of risks than was possible before. This leads to welfare gains for economic agents. The magnitude of such gains is typically not as large as people in financial markets would have you believe, but they are no doubt a benefit.

We don't know yet how instruments will hold up under pressure.

We have had one scare, which was the **1987** worldwide stock market crash. That crash can in part be attributed to the innovations about which we are talking. But I think that scare and that shock did not affect the economy very much because of the immediate and appropriate response of monetary policy. Some people argue that the inflation of **1988** and **1989** was caused by central banks' overreaction to the stock market crash. But I think that the shock was handled correctly and that the system showed itself capable of dealing with what may have been a consequence of financial innovation in the stock markets.

We should recognize, though, that the final word is not in on the role of derivatives and on the very sophisticated hedging that is now possible. The mere fact that hedging becomes sophisticated means that we're also increasing the potential contagion effects of a mistake or a fraud somewhere in the system. We haven't seen it happen and we won't know that it will happen until it does. Yet, probably, one day it will. Then the question will be what mechanisms have central banks put in place for dealing with the potential panic that may happen as a result.

There is one point that should be borne in mind as we discuss stability. It is that as these innovations develop, and as markets learn to respond more rapidly to information, we may see ***greater*** fluctuations in the financial markets than we've seen before. It is not necessarily the case that because hedging is better, asset price fluctuations will be reduced. Once the capacity of asset prices to react to news has increased, the reactions may simply be faster and the fluctuations may be bigger. These innovations could even lead to more unstable production. If the economy reacts more rapidly to price signals, we may well see changes in production of different goods happening more rapidly than before. That would be good from the viewpoint of the allocation of resources. Thus it should not be ruled out that there may be more macroeconomic instability as a result of these innovations, but that macroeconomic instability would not be an economic problem.

The second question of Alan Greenspan's is "How does monetary policy affect the economy?" The answer to that is very simple. So

long as there is a demand for high-powered money and so long as the Fed controls the supply of high-powered money, the Fed can affect interest rates and thereby affect the economy. In the absence of credit effects, the pure interest rate mechanism operates as the Fed affects the federal funds rate, which then spreads through the system by affecting also the exchange rate, expectations, and ultimately economic activity and inflation. That is a textbook story about the transmission mechanism of monetary policy, which may be supplemented by a direct supply of bank credit effect that was analyzed in the paper by the Romers yesterday. There is nothing that has changed very much with regard to that story.

But we have to be worried about the demand for high-powered money in the United States. There is a fascinating recent Fed paper which has some estimates about how much high-powered money is held in one foreign country, Argentina. The number is $25 billion. If that is right, it means that about 10 percent of the United States' stock of high-powered money is held in one foreign country. There are probably several other countries that hold very large amounts. So in analyzing H, high-powered money demand, we're not necessarily dealing with the United States economy.

The question this raises—and it's raised explicitly in Hans Tietmeyer's paper—is whether, if the leverage of monetary policy comes through high-powered money, the central bank should take steps to maintain the demand for high-powered money. Tietmeyer leaves no doubt that the Bundesbank has done so. It has maintained that demand in a variety of ways and, Tietmeyer claims, at no cost to the efficient operation of the system. I doubt that taxing banks heavily does not produce distortions. But it is not necessary to produce distortions to generate a demand for high-powered money. Namely, provided interest is paid on reserves, the central bank can ensure a demand for H. It is not clear why central banks are so resistant to doing this-especially since they all run such tight budgets and don't really need the profits that they are now making. But if it is necessary to maintain a demand for high-powered money and if we want to extend reserve requirements to M2 in order to get control over M2, then we can do that without penalizing the banks unnecessarily.

Looking beyond **2020,** there are very intriguing questions about what happens in the limit as high-powered money or settlement balances vanish entirely from the system. How would monetary policy operate if we had a cashless society? What would happen if we got rid of reserve requirements and banks managed to do without them? These are interesting questions that needn't occupy us at this conference. They would become relevant for successive conferences somewhere **30** or **40** years down the road. There has been some discussion in the literature as to what a central bank would then do. It would presumably set standards by announcing what a dollar is, even if it doesn't control the supply. It could, for example, describe the dollar as being a right to purchase some bundle of goods. It would have a role as supervisor of the system. And it might turn out to be optimal to equip it with a large stock of whatever is operating as the medium of exchange in case it needs to intervene in markets, just as we equip our central banks and Treasuries with stocks of foreign exchange at present. But these are very speculative issues.

The last question posed was, "What do these changes mean for monetary policy?" And the short answer is that, domestically, central banks should use interest rates as their short-term policy guide. This is a big relief to me. I started learning monetary economics at the feet of Professor Richard Sayers, the intellectual force behind the Radcliffe Committee. He taught us that to tighten monetary policy, raise interest rates. I am glad to learn some 25 years later that the right answer to what you want to do if you want to tighten monetary policy is to raise interest rates.

The financial innovations that we've had recently have indeed made various money demands unstable. Such innovations mean that you cannot use monetary rules, except ones that become too complicated to understand. We were asked yesterday what the ultimate distinction is between a rule and discretion. I don't think that ultimately there is a distinction, in the following sense: in the eyes of someone who can understand everything, what the Fed is doing is just a rule. It's very hard for us to comprehend it, but the Fed behaves in predictable ways, responding to the data that come in. If you're smart enough you can figure out exactly what the rule is. But the existence of such a rule doesn't help very much. A useful rule has to be a simple, predictable

response to events.

The discussion that Allan Meltzer has been conducting with everybody here in the last few days on the distinction between rules and discretion fails to recognize the crucial distinction between the predictability of outcomes and the predictability of actions. It really doesn't help to have a predictable set of actions if those actions have no reasonable relation to anything that matters for the economy. So to keep M2 on track when the demand for M2 is unstable really wouldn't help. What the economy needs is a monetary policy where the public knows both that the monetary authority will do its best, and that its best is good, to produce outcomes in terms of inflation in particular and output on which they can rely. Namely, the public must believe that inflation will not be allowed to get out of hand and that in times of recession the Fed will not pursue its inflation target relentlessly. What really matters is the predictability of outcomes produced by the central bank.

There is then an argument which economists can conduct and can perhaps help central banks think through regarding the policies that are most likely to produce those outcomes. Those methods may involve money and they may involve interest rates. For long periods, the methods may involve money targets for MO, the monetary base, or M3. But it will not be the case, given the financial innovations that have been taking place for centuries, that any of those intermediate target rules will stay very useful.

It is important to note that the academic discussion of the 1970s and 1980s on rules versus discretion is being bypassed by the very interesting changes in monetary policy now being implemented in New Zealand and Canada. These are not rules in the sense of Milton Friedman. They are rules in the sense of Henry Sirnons, who in the first discussion of a monetary rule proposed the rule of stabilizing the price level. That is not a recognizable rule in the sense the notion was used in the 1970s and 1980s. But it is the rule that Canada and New Zealand and no doubt others, including perhaps the United Kingdom if Andrew Crockett's description is accurate, are moving toward. That is, there is an agreement in those countries—and it's a very subtle agreement—n what the inflation target will be. It is up to the central

bank to produce that result as well as it can, and there are incentives for the central bank to produce that result rather than to dodge the issue in a variety of ways.

Now why is it subtle? It's subtle because the inflation target is not an absolute. The Bank of Canada can recontract with the government if conditions change. So in the face of a supply shock, the Bank of Canada and the government may sit down to modify the inflation target, to raise it a bit. Therefore the inflation target is not an absolute. The rule leaves no doubt that the ultimate focus is on inflation. But it is not so rigid as to tie the hands of the central bank inappropriately.

I would also like to second Mike Mussa's comment on the Bundesbank, by quoting from Helmut Schlesinger: "Pragmatic monetarism as accepted in the Federal Republic must not be confused with rigid adherence to scholarly doctrine." The Bundesbank does not follow a monetarist rule. The Bundesbank undertakes tradeoffs like everybody else. Germany has 4 1/2 percent inflation as a result of German unification. It could have had zero; or it could have had 7. The Bundesbank had to face the tradeoff as to how much recession they wanted. They made that tradeoff just as everybody does. And that's what central banks are paid to do.

Third, the discussions in this morning's papers focused on the exchange rate issue. They were concerned, rightly so, with what the enormous extent of short-term international capital mobility means for exchange rate management. Even here, we shouldn't exaggerate the changes. On one day in March 1973, not March 1993, the Bundesbank bought 10 billion deutsche marks worth of dollars. And the system was much smaller then. Very big flows took place in the 1970s as Bretton Woods was breaking up; it was possible to mobilize those flows because a sufficient number of large countries already at that stage had no capital controls. So we're in an environment and with questions similar to those that arose at the breakup of the Bretton Woods system.

The question is, What exchange rate system(s) should we use? I like the logic of Andrew Crockett's paper, and in Mussa and Goldstein's paper, that there really are only two extremes. A floating rate system,

a genuine floating rate system, will work well with capital mobility; or a genuine fixed rate system with irrevocably fixed exchange rates would work well with the capital mobility that we have. I was a little taken aback by Andrew's claim that the shock of German unification is unique. I am sure that the particular shock is unique, that there won't be another German unification shock. But there will be many more shocks. Within Europe itself, a big change in the oil price will put an enormous strain on relative exchange rates. And no doubt, there are other shocks that we are not smart enough to think about yet that will come along and require changes in exchange rates unless the system has gotten itself to the point where it's willing to deal with them other than through exchange rates. So, I wouldn't think that the future is much easier with regard to the possibility of shocks than the past.

Moreover, the Europeans stress the impossibility of running a floating rate system when countries trade a lot. I don't know why the Canadian-U.S. experience gets so little attention in this regard. The United States and Canada have had floating exchange rates without a great deal of noise coming out of either country on the difficulties that this float causes for trade. And there hasn't been much pressure to move to a fixed rate system as the free trade arrangement has developed. In a private discussion with André Icard a while ago, he argued that in fact the single market project is far more far-reaching than the free trade area. But up to this point, the single market hasn't happened. And it would have been possible for trade in Europe to continue integrating with floating rates.

Much as I like its logic, I don't think that the Crockett scenario is a realistic one. I doubt that Europe will go to the European Monetary Union (EMU) in the way that he says, namely, by going from 15 percent bands to fixed rates. I even doubt that it will happen with the 15 percent bands being available, but unused. Rather, it will happen through a tightening of bands.

Now why do you need EMU? The economic case is not very strong, despite the argument that the single market needs it. EMU is a political statement, a very important political statement. Monetary union is justified on political grounds, namely the imperative of European political integration: Europe will end up moving toward EMU, which

I regard as ***politically*** beneficial and as ***economically*** mildly costly. But I think monetary union will happen by a gradual tightening of bands from where they are now—after some time in which there's been convergence of inflation performance and some period of stability of exchange rates. It's far from certain that the move will take place with all countries joining at once. Rather the two-speed or multi-speed EMU is still the most likely outcome.

One last question. If EMU is going to happen, what about the big three whose exchange rates float—Europe, the United States, and Japan? Why does everyone accept that it's good for these rates to float when it's not good for other rates to float? Andrew's argument is basically that there's nothing you can do about fluctuations in these rates, so you'd better settle that problem through international policy coordination.

I don't any longer take the view that international policy coordination is useless. I think that when countries beat up on each other regularly at meetings, it has some small impact. I'm sure for instance that keeping the U.S. budget deficit in full view over the 1980s, as everybody kept complaining about it, had some impact on what Secretary of Treasury Baker wanted to do about the deficit. Such pressures are constructive. But we will not get very much out of the policy coordination business because the major countries have not yet seen it as being in their interests to change their domestic policies in accord with international considerations. That is why rates will continue to float among these countries for a very long time. Most likely, these will be genuinely floating rates, not ones with target zones. That would be the one extreme of the Crockett scenario.

What about in the year 2020? So long as we look far enough ahead, we can look forward to the eventual advantages of operating with a single world money. But that's a very long way off.

Overview

Jacob* A. *Frenkel

Eight years ago, in this very place, the theme of the conference was "The Rocky Dollar on the Rocky Mountains." Well, we still have the Rocky Mountains, we may have the rocky dollar, we may also have a misaligned dollar, and we still have exchange rate volatility. In addition, there was a debate about whether volatility or misalignment was worse. We are now discussing the financial instruments that were developed to deal with these problems, and how these solutions to the problem of volatility and misalignment have come back to haunt us, and made the conduct of monetary policy more difficult.

The three questions that Chairman Greenspan posed at the beginning of our meetings were fully addressed at this conference. We discussed the effects of changes in financial markets on the way that monetary policy affects the economy; we discussed how the changes affect the way monetary policy is formulated and implemented; and we also discussed how all these changes affect the stability of the financial system.

We began with Franklin Edwards' paper, which described and documented the decline in the banks' share in the economy. Edwards' discussant, Kumiharu Shigehara, showed that this phenomenon is really an international one. Several questions were posed. Is this phenomenon due to excess capacity in the banking industry? Is it due to excess regulation? How should we react to it? And, in short, need we worry about it? Charles Sanford predicted that in the year 2020 banks will not exist the way we know them today, and therefore,

maybe there is no point in occupying ourselves with these questions.

However, we should be concerned if the declining role of banks arises from a distortion, such as that induced by regulations like the Glass-Steagall Act. The key challenges are on the supervisory side. For example, do we have the capacity to supervise this new breed of sophisticated financial products? Do we have the expertise? The issue goes beyond the distinction, discussed by Shigehara, between a functional and an institutional approach to regulation. What we have now is a situation in which the markets are much more prominent, and the entire role of supervision and regulation in the new world should be based more on market than on administrative rules.

Sanford indicated that the challenges in the year 2020 will be how to make technical experts and managers play the same tune. I don't believe that Alan Greenspan's challenge on how to ensure communication between managers and experts was met. As a matter of fact, in a changing world, the managers of today, who were the experts of yesterday, might almost by definition already be obsolete. They became managers because the new experts came from the new breed. Thus, if we define the challenge as a technical one, the issue of communication and interpretation remains with us.

The world is changing. Indeed, Ben Friedman began his remarks by noting that M2 relations have broken down, that M1 relations had broken down previously, and even relations based on the debt concept that Ben promoted so well in the previous decade have broken down. Basically, the vast changes in the nature of the financial system have rendered previous rules obsolete.

This reminds me of the story of Mr. Rabinovich, who went to his friend's office and said to him, "Oh, you've changed so much. You used to be tall, and now you are so short. You used to have a beard, and now you are clean-shaved. You used to wear glasses, now you don't? What happened to you, Mr. Rabinovich?' "I'm not Mr. Rabinovich," he replied. "So you have also changed your name!"

In this rapidly changing world, mathematical formulas are not a substitute for good judgment and analysis. The role of formulas is

rendered even more complicated in the world in which Rabinovich changes his name, because history is no longer linked to the present, which is a new universe, and also the past is not what it used to be. As a matter of fact, as people change and society carries with it experience and memories, even the future is not what it used to be.

Lewis Carroll's rhyme applies particularly to this changing world: "All the king's horses and all the king's men, couldn't put Humpty Dumpty together again." This is due not to poor engineering, or lack of ability to deal with mathematical formulas, but to changes, real changes of circumstances, changes in the rules of the game.

What does all this tell us about the European exchange rate mechanism (ERM)? One thing is certain, as Andrew Crockett said: German unification is a unique event, and indeed it is. The ERM will never be the same again. In the past, people held conferences full of nostalgic views of Bretton Woods, and asked how can we return to those days? I assume their predecessors asked similar questions about reverting to the gold standard, and in the next few years there will probably be numerous conferences asking how can we return to the ERM? It seems to me that the ERM will not return, at least not in the same form.

What does this tell us about policy? What lessons about policies can be learned? We were told by Sanford that in 2020 we should avoid systemic collapse; this is also true today. We were told that in 2020 "one should never lend unsecured to anyone who eats." Morris Goldstein and Michael Mussa gave us the right response to this: risk must be appropriately priced. If it is, this will not be such a difficult problem.

A recent conference, organized by Marty Feldstein some years ago, looked at the entire spectrum of crises in the history of monetary systems and domestic policymaking. A major conclusion from that conference was that most crises ultimately arise from situations in which uncertainties and risks have not been properly priced. People, corporations, and enterprises have undertaken excessive risk—"excessive" from society's perspective—assuming that "Big Daddy" (the State) will bail them out. And that is why the second dictum of Goldstein and Mussa—the "no bailout" provision—should be strictly

adhered to.

More generally, as the financial system and the role of policy change, we come back to the question of rules versus discretion. And we reached several conclusions. First, the obvious one: bad rules are always worse than good rules. While this sounds trivial, most rules that failed were of the bad variety. So let's not take it lightly. Second, we recognize that the future of rules lies in their consistency, transparency, and predictability rather than in randomness. We also recognize that discretion usually brings about the "too little, too late" syndrome. But this is not an argument against discretion, but against hesitation. The real issue, as far as I am concerned, is the distinction between systematic versus erratic policymaking. Systematic discretion becomes a rule if it is followed consistently.

This brings us to the issue of forecasting. Donald Kohn told us that monetary policy involves making forecasts. Andrew Crockett told us that monetary policy in the United Kingdom today is, in general, geared toward the forecast of inflation one or two years ahead. But Allan Meltzer maintained that adaptive rules, while using new information, need not engage in forecasts. This reminds me of a lesson about forecasting that Marty Feldstein taught me in early 1987, when I joined the International Monetary Fund. He told me: "If you have to make a forecast, don't put a date on it; if you do, do not use a quantitative forecast; and if you are stupid enough to put a date on a quantitative forecast, then make sure you revise it frequently."

Nevertheless, I do come down on the side of forecasts. It is very difficult to think of the design of economic policy in general, and monetary policy in particular, without being engaged in some type of forecasting. Policy design involves asking what a policy change will do to the economic system, rather than whether we adhere to the rules, even if it is designed to deal with new information in an adaptive fashion.

We then switched to the drama of war and peace. Ben Friedman brought us Clausewitz's dictum, Donald Kohn reminded us that monetary policy is hell, and Arthur Bums told us about the agony of central banks. In this debate, I side with Michael Mussa's view that

in the new world with powerful private markets, policymakers should befriend the markets and enlist their help rather than make enemies of them. Policy is not an exercise in fooling markets. It is not an exercise in wiping out enemies and winning wars, but rather one of engagement in a long-term relationship which requires continuous communication.

What are the criteria for a successful system? There was no explicit discussion of this issue but there was an implicit one. Before answering the question, we must first ask whether we judge the success of a system according to its operation during "normal" or "stormy" periods. I would say that in normal periods, when the water is calm, it doesn't matter. Most systems would work—including fixed or flexible exchange rates. It is precisely during times of noise and crisis that the winners can be distinguished from the losers as far as the quality of systems is concerned. It is during crisis that the strength of a system should be assessed. What is the valve that ensures that the adjustment of a system under pressure reflects the successful operation of the system, rather than signaling its collapse and destruction of its credibility? In other words, the frequent adjustments needed in a changing world must be an integral part of a properly designed system, rather than a manifestation of its demise.

As Henry Kissinger once said, "The new world order should not be viewed as an emergency measure." Goldstein and Mussa argued the case for orderly rules of collapse. What is interesting about the difficulties of the exchange rate mechanisms of 1992 is not the fact that they arose, but their disorderly fashion.

This reminds me of a friend, who spent much of the week before his wedding working on the divorce contract. When he was asked why, he replied, "Because now, as we love each other, we have clear heads, and so if we split up, it won't be in a disorderly way." I don't suggest that this is always a good strategy. (By the way, he got divorced because since everything was ready, it was so easy for him.) But there is a lesson in this story—the way in which a system disintegrates illustrates the quality of the system itself.

What are the general lessons that can be learned? Lesson number

one: never lose credibility. As a matter of fact, those of you who read Hans Tietrneyer's paper will have noticed that it has two parts. One part was written when the system was working, and the last few paragraphs tell us about the lessons to be learned from its demise. He says: "Don't lose credibility. After all, credibility is a central bank's most important asset." I agree.

But how do you make sure you don't lose credibility? Lesson number two: don't lose your anchor. Don't engage in real exchange rate rules or in real interest rate rules, because they can be adhered to at any rate of inflation. Such rules are dangerous. In other words, if you are going in this direction, make sure that you still have a nominal anchor at hand. It can be a nominal quantity or a nominal price. In the world of change, I would probably recommend an exchange rate policy as a possible anchor.

Lesson number three: do not put "sand in the wheels." I think there was a complete consensus on this issue. I did not hear a single dissenting voice. As any mechanic knows, if you put sand in the wheels you may cause irreversible damage. The proper solution to traffic problems is to widen the road and install seatbelts in vehicles, rather than to narrow the road or even stop driving. It is a mistake to stop the free movement of capital.

Lesson number four: if you decide to liberalize and deregulate your financial system, you must strengthen the system of supervision. As a matter of fact, almost paradoxically, a system that is very rigid, and that allows no freedom of action, does not need a lot of regulations. If nothing is allowed, there is very little that is left to be regulated. It is precisely in a system which is supposedly free that the rules of the game must be very well designed and supervised.

It was a very telling remark of the Goldstein and Mussa paper that it is only in the last three years that some European countries have adopted complete capital account convertibility. Three years ago we were sitting here, discussing current account and capital account convertibility in Eastern Europe and the republics of the former Soviet Union. I remember that the first step the various republics wanted to take was to have a currency of their own, internationally tradable and

completely convertible. Needless to say, that is the last step along this road, not the first.

Tietrneyer reminded us that while liberalizing, it is important not to undermine your capacity to conduct effective monetary policy. If you do, you lose the anchor of stability, and it will be argued (wrongly) that the uncertainties and inflation were caused by the deregulation, rather than by the poor conduct of policies.

Lesson number five: foreign-exchange intervention is ineffective. I think this has been in the air since the famous Jurgensen report. Many people hoped that we could simply intervene in foreign exchange markets, substituting that for real fundamental changes in economic policies. I think we have learned that this just does not work. It does not work because there are massive capital flows. Still, during normal periods intervention can be useful, by sending signals about economic policy changes. But those signals must be credible. ***Go*** back to lesson number one and Tietmeyer's remark.

Lesson number six. Here there was a controversy. Andrew Crockett concluded that basically we have a two-system universe, flexible and pegged. Anything in between is so complicated that it should be carefully avoided. And so the sixth lesson is: reach first the stage of convergence of the new economic variables and once you have reached it, get hooked—to whichever pegged currencies you desire. Pegging according to this argument should not occur before convergence, since you will not be able to sustain the peg. However, I think it would be a shame if the benefits from the stable or pegged system are delayed until that last stage.

In Israel, we have introduced an exchange-rate system that I think can provide a solution to this transitional dilemma. Our exchange-rate system is basically a "crawling band." We have an inflation target which implies an exchange-rate path and we allow for a band around this average exchange-rate path, so as to allow for equilibrium real exchange rate changes. We have a central parity which changes at a rate equal to the difference between our inflation target and our trading partners' expected inflation rate. As we make progress on the inflation front, we are lowering the slope of this diagonal band. Eventually, we

will converge to the "nirvana" that Andrew Crockett wants to achieve at the end of the road. But the crawling band exchange-rate system helps us during the transition. The system has been working for us for two years. It has helped us to cut inflation by half, while maintaining external competitiveness and stability.

I would like to speak about the constraints of monetary and fiscal policies. There was a question, which was also implicit in Alan Greenspan's first question, about whether the rapidly integrated capital market has diminished the capacity to conduct monetary policy. Most papers indicated yes. I agree.

With highly integrated capital markets, information travels so rapidly that a policymaker barely has time to breathe and assess where he is. This is very important. Do you remember Herbert Stein's statement that the challenge facing policymakers is to decide what to do when you ***don't know*** what to do? In other words, you don't have time to formulate a policy response, and in this sense the rapidity of response does affect the capacity to act.

Allow me to make a few additional remarks. First, Goldstein and Mussa indicated that the stability of a pegged system requires a single monetary policy. The logical result, therefore, as indicated by Crockett as well, is that you need convergence. But do you need to have it ***before*** or *after* adopting a fixed exchange rate? The answer depends on whether you go the route of Crockett, or you adopt the Israeli diagonal exchange-rate system of the crawling band. But ultimately, a single monetary policy is needed.

Second, Goldstein and Mussa argue that the internal requirements of monetary policy do not permit it to focus only on inflation. It also needs to consider unemployment, the real exchange rate, maybe the stability of banks, the situation in the cycle—a lot of things for this poor policymaker. But then, how do countries that follow these indicators choose a pegged exchange rate with a country that only looks at inflation? After all, the convergence of inflation rates is not enough, because first you need to agree on the goals for the so-called common monetary policy. If they incorporate more than just inflation, then we are really in deep trouble. But this is precisely the issue.

Therefore, we should not be surprised about the ERM, and the problems may not be just due to convergence.

That reminds me of the story about the French nobleman. As you know, during the French Revolution many people were beheaded. After being beheaded, one French nobleman took his head under his arm and started walking from Paris to Versailles. When he arrived at Versailles, everyone applauded. But a wise man looked at them and said, "I don't understand why you applauded when he reached Versailles; you should have done so when he made his first step out of Paris." In other words, if the precondition for the ERM is a resolution of the debate about the goals of monetary policy—prices only, prices and unemployment, stability of banks—then why are we discussing questions of convergence? We should really go back to Paris before taking the first step.

My final remark concerns policy coordination. And here I must make a confession. For many years I have been standing here making the case for coordination. And indeed, there is a lot to be said for coordination—intellectually at least. But every day that passes brings me closer to Marty Feldstein's views. The way the policymaking process works, the formation of policymaking, requires much more coordination, between the Ministry of Trade and the Ministry of Finance, between the Ministry of Finance and the Governor of the central bank, or between the parliamentary finance committee and the executive. Only then does international coordination become relevant. If the latter works and the former does not, then you cannot really go very far.

So policy coordination is good, but I would think of it as the frosting on the cake. It is not a substitute for the real hard choices. Here I must conclude by siding with Andrew Crockett. The danger of focusing on monetary coordination is that this is feasible. And there is the temptation to do it just because it is feasible—at the expense of not doing anything else, especially on the fiscal and structural fronts. Then a "successful" coordination of the wrong policies may indeed be ineffective or even counterproductive.

Overview

Toyoo Gyohten

I would like to thank the Kansas City Fed for making it possible for me to participate in this stimulating symposium in this gorgeous setting. When Paul Volcker asked me, at the last moment, to substitute for him on this panel, I appreciated his trust in me. But, at the same time, I thought that his trust was on the excessive side.

Since the other two panelists have already given excellent overviews of the discussion during the last two days, I think I will provide a brief review of an intriguing episode of capital markets: the movements in international capital between Japan and the rest of the world since the middle of the 1980s. This episode was truly remarkable in two aspects.

First, the amount of the long-term capital outflow from Japan during the second half of 1980s was enormous. During the five-year period from 1986 to 1990, Japan's cumulative current account surplus was about $350 billion, and the net long-term capital outflow was $532 billion. In other words, there was, on average, more than $100 billion of capital flowing out of Japan each year to the rest of the world.

Second, there was a dramatic reversal of this trend in the 1990s. During 1991 and 1992, Japan's current account surplus increased again to $197 billion, but the long-term capital export in this two-year period was reduced to a mere $9 billion. In other words, the net long-term capital export from Japan almost disappeared.

In my comments, I hope to explain how these developments took place.

One important aspect is to understand what happened in the second half of the 1980s. Here I will address two questions. Why was there such a large capital export? And, how was this large gap between the current account surplus and the capital export financed? While there are several reasons behind the large capital export during the second half of the 1980s, there are three major monetary factors behind the capital export.

First, there was a very substantial interest rate differential between the United States and Japan, due to the very easy monetary policy pursued by the Japanese authorities after 1986. This substantial interest rate differential encouraged large portfolio investment by Japanese institutional investors and business corporations.

Second, there was the strong yen. As you recall, after the Plaza Accord in the fall of 1985, the yen appreciated rapidly against the dollar. This appreciation enhanced the yen's international purchasing power. For Japanese investors, investment abroad in foreign securities and foreign properties became a cheap buy. In addition, the strong yen made Japanese industries less competitive in the international market, which led them to transplant their factories to overseas markets. This encouraged their foreign direct investment.

Third, prices in the stock market and property market in Japan soared, a development often called a speculative bubble. This greatly enhanced the ability of Japanese businesses to raise funds at a very low cost. At one point, Japanese business corporations could raise funds through equity financing using warrants and convertible bonds almost at a negative cost. And also during this period, Japanese banks were quite eager to extend credit to borrowers. Given all these different factors, there was a tremendous surge in long-term capital export.

Let me now turn to the second aspect, which pertains to how the large gap was financed. As I said, there was almost a $200 billion gap between the current account surplus and the long-term capital export

during the five-year period between 1986 and 1990.

The answer lies in the fact that during this period, Japanese bank borrowing in the Euromarket increased tremendously. During the five-year period from 1986 to 1990, short-term positions of Japanese banks deteriorated by almost $170 billion. In other words, Japanese banks' net external short-term liabilities increased by $170 billion.

As a result, Japanese banks played an important role in the international maturity transformation. They provided long-term assets internationally by increasing their short-term liabilities. However, this transformation certainly bloated their global market share, which became a very topical issue during the period. At the same time, this transformation made their balance sheet structure highly vulnerable.

The second aspect of Japanese international capital flows was the dramatic reversal during the 1990s. What caused this dramatic reversal? In the 1990s, Japan's current account surplus increased for two reasons: the Japanese recession resulting from the collapse of the speculative bubble, and the lagged effect of the weak yen during 1989 and the first half of 1990.

Why did capital exports fall so much? I think there are several factors behind this. First, foreign investments in Japan increased during this period. I think the increase was due to the renewed interest of foreign investors in Japanese securities resulting from the lower prices in the stock market (leading foreign investors to expect some capital gains) and to the appreciating yen (leading to some exchange gains). Also, as was discussed in previous sessions, big pension funds in the United States and elsewhere intensified their diversification strategy into non-dollar denominated securities during this period. On the other hand, the collapse of the stock market and the property market reduced the ability of Japanese investors to raise low-cost funds. This situation is exactly the opposite of the situation I mentioned earlier. In addition, the appreciation of the yen increased the exchange risk of Japanese investments overseas. Furthermore, banks became very conservative, partly due to the fact that Bank for International Settlements capital adequacy requirements were installed. And as a result of these factors, there was virtually no net long-term capital export.

Japanese banks reduced their short-term liabilities in the Euromarket in a very rapid fashion. During the two-year period from 1991 to 1992, Japanese banks' position improved by $170 billion, which, as you recall, is exactly equal to the amount their liabilities increased during the previous five-year period. In other words, the position of Japanese banks was restored to what existed in 1985.

How should we assess this sharp reduction in Japan's capital export? There are strong arguments in Japan that such a reduction has an adverse impact on the global economy due to the growing needs for capital in the developing world and in the reforming economies. However, from the point of view of the international financial flows, Japan's surplus is definitely recycled; it is not hoarded in the Japanese market. The difference is whether the recycling takes the form of investment by institutional investors and business corporations, or whether it takes the form of short-term financing by Japanese banks. One point to keep in mind is that Japanese investors assume a variety of risks—trade risks, sovereign risks, exchange risks—when undertaking direct investment or portfolio investment. But in the case of interbank financing in the Euromarket, Japanese banks incur much less risk.

What will happen to this situation in coming years? I believe that Japan's current account surplus will continue at a sizable level for the coming few years. In addition, investment attitudes of Japanese investors will remain conservative because they have not recovered from the shock they suffered when the bubble burst.

Should we be satisfied with the prospect? I don't think so. When there is a global need for stable and productive capital, Japan should assume a fair share of the risk associated with international capital flow.

Turning to the last question: How can the situation be improved? I have two suggestions. One suggestion is to ask Japan to expedite the recovery from the current recessionary economic situation and to clean up the debris resulting from the bursting of the bubble. This would restore investors' confidence. My second suggestion is to urge the public sector, both national and international, to play a greater role

as catalyst or supporter of private investment. The reason is that it is very difficult to expect private investors to increase their long-term capital export. As a result, it is critical for them to be convinced that there is public sector support for their activities. And in that sense, I strongly hope that the Japanese government, and also international financial institutions, can play a useful role. I think that this will help smooth the flow of international capital at a time when there is a great need for smooth and productive capital flows.

Overview

Hans Tietmeyer

I would like to contribute some observations on the structural changes in the capital markets and their implications for monetary policy. My remarks deal with the situation in Germany but also touch on questions arising from European monetary integration. Before that, I would like to sum up briefly what I consider to be the essential trends in the financial markets and the monetary policy issues resulting from them. The numerous changes experienced by the financial markets in the past few years can be divided into three distinct trends.

First, the industrialized countries have largely (and in most cases completely) liberalized their international capital transactions. In addition, and this applies particularly to Europe, borders have been opened for financial services, and restrictions on establishment have been reduced. As a consequence, international financial interdependence has increased dramatically. It is an indicator of this trend that the volume of international bonds outstanding, measured in terms of the GNP of the industrialized countries, has multiplied in the past two decades. The rapid expansion in foreign exchange market transactions points in the same direction. Not least, international ***net*** capital flows have also risen sharply. Current account deficits and surpluses of a size that would have appeared unimaginable not too long ago have now become sustainable for longer periods of time.

The second major phenomenon among recent capital market trends is represented by the innovations in and the deregulation of financial activities. Even more than the liberalization of capital movements, the

wave of deregulation has reflected a reorientation in terms of policy stance. Deregulation in the financial sector has been conceived as a counterpart of supply-side reforms in general economic policy.

As a result of innovations and deregulation, financial market structures have changed in many respects. For example, the banks' customers have been offered interest-bearing cash deposits. In addition, issuing facilities have replaced bank loans (securitization and disintermediation). Furthermore, bonds with special terms of issue, such as variable interest rates, have become widespread.

Above all we are experiencing a strong expansion of the markets for derivative financial instruments (such as futures, options, swaps, and synthetic bonds or shares). Technological advances in telecommunications and computers have played a part in this development. They have lowered information and transaction costs for financial products. The improved possibilities of hedging against interest and exchange rate risks, such as are offered by derivatives, have, in turn, given fresh impetus to the globalization of asset holdings.

The third new trend can be seen in the fact that the importance of institutional investors in national markets and international capital transactions has grown considerably. The report of the G-10 deputies on International Capital Movements and Foreign Exchange Markets, published in the spring of this year, sheds some light on this. According to the report, the total cross-border securities holdings of residents of the United States, Europe, and Japan in 1991 came to an estimated $2.5 trillion. As stated in the report, institutional investors (such as pension funds, insurance companies, mutual funds, trust funds, and hedge funds) accounted for most of the rapid increase in these investments.

It is typical of these operators that they are generally subject to less stringent regulatory standards and supervision than banks. In addition, some of them seem to have a relatively strong tendency to incur open or insufficiently covered foreign exchange positions and to change them rapidly afterwards.

As a consequence of the far-reaching transformation process, the

financial markets have doubtless become more efficient. Costs for borrowers have declined, earnings for investors have risen, and the markets have thus been given additional growth stimuli. However, the financial markets have also become more fragile. The stock market crash of 1987, the European exchange market turbulences of 1992, and the European currency unrest since then have shown that under present conditions it does not take much to trigger off enormous shifts in capital, which may bring about serious disadvantages (in the form of uncertainties for investment and trade) for the countries directly concerned as well as for the world at large. Such undesirable consequences would be carried to an extreme, if disturbances in the financial sector and subsequent exchange rate effects ultimately led to protectionist trade measures. The tail would wag the dog.

Stability of the financial markets must therefore be a primary objective of general economic policy. However, there is a widely held consensus that deliberalization and re-regulation would be inappropriate reactions. Instead, we must persevere in combining economic freedom with appropriate supervisory provisions. Much has already been achieved here under the auspices of the Basle Committee, but more needs to be done. In this respect, disclosure requirements can be helpful in strengthening the internal control mechanisms in the markets. That said, the stability of the financial markets is crucially dependent on gearing monetary, fiscal, and wage policies in all countries strictly toward achieving the generally accepted objective of noninflationary economic growth.

It is also true, however, that the changes in the financial markets have generally made it more difficult for monetary policymakers to fulfill their stability mandate. Several factors are responsible for this.

In a number of countries, financial innovations and deregulation have distorted the intermediate targets used in the conduct of monetary policy and have altered the transmission mechanisms of monetary policy to the real economy. This concerns especially those countries which maintained a comprehensively regulated financial framework for an extended period of time and chose the Big-Bang style of deregulation:

In the countries concerned, the interest-bearing portion of the banks' liabilities has increased sharply. In addition, near-money investment outside the banking system has risen quickly. Under these conditions, the reasons for holding liquid assets are no longer clearly definable. As a result, the demand for money in relation to interest rates and expenditure has become unstable in these cases, thus undermining the rationale for using monetary aggregates as monetary policy targets.

These difficulties have led in a number of countries to policies based on a broad range of indicators. It seems to be fair to say that these countries have lived in a period of monetary experimentation in recent years. The results, at least, have not been convincing so far. It has become general knowledge that in many countries innovations and deregulation have coincided with temporarily overly expansive monetary policies. The effects of misguided monetary policies have made themselves felt in the inflation and deflation of asset prices and the related cyclical problems.

The asset price cycles, in turn, have had additional distorting repercussions on the monetary aggregates. Owing to falling asset prices, banks in the United States, Japan, and some European countries accumulated substantial amounts of nonperforming loans. As a consequence, the banks concerned were obliged to restrain their lending activities (credit crunch); they had to adjust to their deteriorated capital positions and also to difficulties in attracting deposits. The subsequently reinforced disintermediation of lending has additionally impaired the reliability of the monetary aggregates as leading indicators of expenditure and inflation.

Another major change in the framework for the conduct of monetary policy is the increased potential for putting exchange rates under pressure. Countries which are exposed to capital inflows may therefore be confronted to a much greater degree than before with the problems of intervention-induced inflationary impulses. It should be noted that in the seven months from June through December 1992, official net deutsche mark sales by European central banks amounted to no less than DM 284 billion, of which DM 188 billion were used to defend exchange rate mechanism (ERM) currencies (as stated in

the already mentioned G-10 report). A substantial part of these interventions affected monetary conditions in Germany, especially when such operations involved the Bundesbank. In the course of 1993, the ERM central banks effected further substantial deutsche mark sales. In June/July 1993 alone, approximately DM 110 billion were sold in support of ERM currencies, with about DM 60 billion having to be provided by the Bundesbank for intramarginal and compulsory interventions, which had a corresponding impact on monetary conditions in Germany.

In particular, experience of exchange market pressure has shown that strengthening monetary policy is much more difficult in countries where large amounts of private and public debt are incurred at variable interest rates. It is true that a high indebtedness at floating rates increases the efficiency of monetary policy in terms of restraining the economy, because rising interest rates would affect not only new borrowing but debts outstanding as well. However, such efficiency gains conflict with the deployment of monetary policy for defending exchange rates, such as may become necessary, in particular if the country participates in a fixed exchange rate mechanism like the ERM. In other words, in an environment of variable interest rates, a restrictive monetary policy may have such an impact on the domestic economy that its application for defending exchange rates collides with cyclical policy requirements. According to a recent internal report of the European Community (EC) Committee of Governors, the United Kingdom appears to be the country most affected by this dilemma within the European Community.

It should also be emphasized that the expansion of the Euromarket and other offshore centers poses problems for those countries which deploy the instrument of minimum reserves. Particularly in phases of structural changes, minimum reserves can exercise an important function as an automatic constraint on money creation. To achieve this, the minimum reserve ratios have to be sufficiently restrictive. However, the higher the minimum reserve ratios, the more the banks will be tempted to evade their obligations by shifting parts of their business activities to reserve-free subsidiaries abroad.

In some respects, German monetary policy has been less affected

by the changes in the financial markets than other countries. Since the transition to money supply targeting in 1974, the financial infrastructure in Germany has not changed so profoundly as in many other countries. Liberalization of capital transactions and most of the deregulation of financial markets were carried out much earlier. The abolition of interest rate controls in 1967 was the major final step in this development. Since that time, German investors may resort to time deposits with money-market-related interest rates, and it has also become possible to meet borrowers' demands for interest rate flexibility.

There is yet another reason why the behavior of the monetary aggregates in Germany has been less affected by the general trend toward innovations and deregulation. The Bundesbank has always paid attention to preventing reforms of the financial markets from rocking the foundations of monetary policy.

For example, the Bundesbank did not overcome its reservations about the issue of floating-rate notes and of commercial paper until 1985. In addition, such innovative instruments have not been of major importance in Germany so far. Bonds with variable interest rates account for less than 10 percent of total domestic bonds in circulation. Much the same is true of commercial paper. Although the German commercial paper market has been expanding rapidly, the stock of such paper comes to only about 3 percent of the short-term time deposits in the banking system. All this suggests that there has been no urgent demand for these innovations.

The Bundesbank has also been extremely cautious with regard to the efficiency of the minimum reserve instrument. In order to make it more difficult to evade the minimum reserve obligation, short-term bank bonds (with maturities of less than two years) are included in the reserve requirements. For the same reason, the Bundesbank has so far been opposed to the launching of money market funds.

All in all, it appears that the Bundesbank's concept of monetary policy is still appropriate. It is noteworthy in particular that German unification has not altered the demand-for-money relationship. The Bank for International Settlements confirmed this appraisal in its most

recent annual report. I quote from page 141: "It was widely accepted in the past that in contrast to money demand relationships in many other countries, the demand for **M3** in Germany was stable. Recent investigations suggest that, perhaps surprisingly, this is still the case. . . . The high rate of growth of **M3** in the 1990-92 period thus appears to be well explained by the strength of output in western Germany following unification and by persistent inflationary pressures, rather than a structural shift in the demand-for-money relationship."

I have to admit, however, that more recently special factors have somewhat overstated the expansion of our target aggregate. In the wake of meanwhile rather low long-term interest rates, the growth of **M3** was slightly affected by a shift of financial assets from nonmonetary investment to savings and time deposits. Nevertheless, according to our analysis, the ***longer-tern*** relationships between interest rates, **M3,** and total expenditure continue to be reasonably stable.

The stability of the demand-for-money relationship and the underlying minor importance of financial innovations in Germany are of course also attributable to the previously high purchasing-power stability of the deutsche mark. Thus, a speedy restoration of price stability in Germany is not least in the interest of safeguarding our monetary policy strategy.

On the other hand, the possibility of sudden large-scale international capital flows actually poses a considerable risk to the success of German monetary policy. As already mentioned, the year 1992 has taught us some lessons in this respect. It is widely agreed that a strengthening of monetary cooperation and crisis management, important though it is, cannot be the major response for coping with such problems. What is desirable, and indeed necessary, is a joint effort by all countries concerned to implement required adjustment measures speedily and to establish the preconditions for long-term price stability. This is particularly crucial for countries which are interconnected through fixed exchange rates. Germany, as the anchor country of the ERM, of course bears a special responsibility in the fight for domestic stability, since otherwise, the stability of the whole system would be at stake. Consequently, the scope for monetary policy cooperation in stabilizing exchange rates finds its limits in the anchor country's

domestic policy requirements.

International cooperation is of primary importance, though, wherever a "level playing field" is required. In the area of monetary policy, it remains to be seen if an internationally agreed "middle ground" with regard to minimum reserves can be found. At any rate, the Bundesbank for one has recently reduced its reserve requirements with this intention.

Monetary policy would also benefit if the stability of the international financial system were further strengthened by means of appropriate and coordinated supervisory measures (which, as mentioned before, should not replace market forces but, on the contrary, enhance their disciplinary role, for example, by improving transparency). Each step toward improved prudential standards counteracts the danger of systemic solvency strains and thus protects central banks against political pressure to grant generous liquidity injections. Let me add, however, that such monetary policy risks are less serious in Germany than in some other countries. The German universal banking system has been well able so far to master solvency problems itself. In addition, there is an institutional separation in Germany between monetary policy on the one hand, and banking supervision on the other. This protects the Bundesbank from internal conflicts of aims between monetary policy requirements and potential solvency problems of the banks.

At present, the implications of the changes in the capital markets for monetary policy are also an important subject with regard to the process of European monetary integration. Under the Maastricht Treaty, the planned European System of Central Banks will be established when the third stage of economic and monetary union comes into force, and will then immediately assume full responsibility for monetary policy in the participating countries. At the beginning of 1994, when the second stage of European Monetary Union (EMU) comes into force, a special cooperation agency, the European Monetary Institute, will start its activities. The Institute will primarily have to deal with preparing the ground for a stability-oriented European monetary policy by harmonizing the statistics and the institutional structures (such as the payment systems) and by discussing the

guidelines and the required instruments for conducting monetary policy in the envisaged monetary union.

The question of whether monetary aggregates could serve as intermediate targets at the European level as well will have to be examined thoroughly and objectively. The Bundesbank has already submitted a paper for that purpose. It is, of course, ultimately an empirical question how well the stability of the demand-for-money relationship, as a precondition of such an approach, will be ensured in the third stage. A definitive answer, therefore, cannot yet be given. Existing studies on the stability of the demand-for-money relationship in Europe, however, have had quite satisfactory results. The outcome is in many cases even more favorable for the European Community as a whole than for individual countries. Within the envisaged monetary union, the stability of the demand-for-money relationship would probably even improve, because inflation-induced innovations, which play a major role in some EC countries, will increasingly recede into the background, if the European System of Central Banks complies with its stability mandate.

Although operational problems arising from a European money supply concept cannot be ruled out, it is not least the shortage of convincing alternatives which argues in favor of such an approach. In view of the size of the economic area concerned, a policy which, instead, sets exchange rate targets seems hardly a reasonable option for Europe. On the contrary, a basically floating exchange rate vis-à-vis third currencies appears to be more appropriate. A European policy of money supply targeting would thus be less exposed to disturbing external influences. In principle, such a policy would therefore appear to be even more appropriate for the European System of Central Banks than for today's national central banks.

An interest-rate orientation, as the underlying principle of European monetary policy, would also be very problematic. A policy of fixing interest rates would run the risk of having procyclical effects on economic development, owing to the time lags between interest rate changes and their effects on economic activity. The political risks involved would be even more serious. An interest-rate orientation would increase the danger of central banks tending toward monetary

policy pragmatism and becoming more responsive to political influences.

There are some other reasons still which argue in favor of a European strategy of money supply targeting. Although from the outset the European System of Central Banks will have a clear mandate to defend the value of money, it will not be able to point to any successes of its own as regards monetary stability and policy credibility. A clearly defined strategy that can be verified, such as the money supply approach, would therefore help the European System of Central Banks to win confidence in the markets.

Money supply targets could also facilitate decisionmaking within the European System of Central Banks. They would make the relationship between interest rate policy and the final objectives of monetary policy more transparent. This aspect will be of particular importance in Europe, since the members of the decisionmaking body will be influenced by very different national backgrounds.

You have probably gathered from my remarks that, with regard to Europe, we consider the German monetary policy concept as exportable, so to speak. In this sense, let me also quote Wim Duisenberg, the president of the central bank of the Netherlands, who recently said: "It would . . . appear wise if the policy strategy of the European Central Bank were to be modeled closely upon current German monetary policy practice." This appraisal has all the more significance since Mr. Duisenberg is at present also the chairman of the EC's Committee of Governors.

After the recent turmoil in the European Monetary System (EMS) and the decision temporarily to widen the ERM margins from +2.25 percent and +6 percent to +15 percent (except for the Netherlands, which intends to continue to maintain the present margins of +2.25 percent vis-à-vis the deutsche mark), one may, of course, wonder whether the prospects mapped out by the Maastricht Treaty are still realistic. However, at the time of their decision on August 1, the EC member states expressly declared that they intend to abide by the commitments of the Maastricht Treaty, and now that all twelve member states have taken the requisite ratification decisions, the

Treaty can be expected formally to enter into force this autumn, unless the German Constitutional Court at the last moment prohibits the lodging of the German deed of ratification—a turn of events which I do not consider to be very likely. The other EMS regulations and the parity grid likewise basically remain in effect.

Even so, the conditions for monetary policy in Europe have undoubtedly changed as a result of the decision taken on August 1. For one thing, owing to the limited floating of exchange rates, the individual countries now have more room for maneuver on interest rate movements. Such increased flexibility is certainly a gain, since the inflationary risks in the individual countries currently differ. For instance, the Bundesbank, in pursuing its domestic anti-inflation policies in the next few months, will not need to pay as much attention as hitherto to the direct implications for interest rate policy in neighboring countries, although of course a major appreciation of the deutsche mark within Europe is undesirable in the light of German exporters' need to remain competitive. Conversely, the other central banks in the EMS can now carry out interest rate reductions which seem desirable in domestic terms without immediately being faced with intervention commitments and reserve losses.

However, at least in the present situation (complicated as it is by the consequences of German reunification), this gain in flexibility is accompanied by a substantial risk. For a number of countries, the temporary widening of margins involves a temptation prematurely to break off their domestic efforts to achieve price stabilization and, instead, to seek salvation in competitive depreciations. A development of this kind would not only jeopardize the progress made so far toward convergence in Europe, it might actually endanger the longer-term viability of the single European market. So far, admittedly, this risk has not assumed concrete shape. The exchange rate changes of the last two and one-half weeks have been relatively small up to now.

The next few months will show whether the European countries take due advantage of the new latitude that they have temporarily gained. You may rest assured that the Bundesbank will abide by the anti-inflationary policy stance it has pursued hitherto. That does not rule out the possibility of further small steps of interest rate policy,

provided that the trend in the money stock permits it, and that the inflation rate, as expected, declines slightly in the near future. But we in the Bundesbank regard an anticyclical monetary policy neither as acceptable in terms of anti-inflation policy nor as efficient in terms of business cycle policy. The German interest rate level is already exceptionally low anyway in real terms. Long-term interest rates, in particular, are distinctly below the multiyear average in nominal and real terms alike. That reflects a substantial measure of confidence in German anti-inflation policy, which the Bundesbank has no intention of endangering. After all, credibility is a central bank's most important asset.

I very much hope that our European partners, too, know that and take it to heart. The EMS can link up with its earlier successes in the fight against inflation only if all those concerned try harder to ensure the long-term credibility of their anti-inflation policies. The European Monetary Union, which is the longer-run objective, has a chance only if the European Monetary System returns to discipline and more convergent anti-inflation policies before long.

Editor's Note: Hans Tietmeyer prepared this paper for delivery at the Federal Reserve Bank of Kansas City's Symposium on "Changing Capital Markets: Implications for Monetary Policy," Jackson Hole, Wyoming, August 1993. Although Dr. Tietmeyer was unable to be present, his paper was distributed at the symposium and is being published with the proceedings.

The Participants

DAVID M. AHEARN
Bloomberg Business News

JOHNNY AKERHOLM
Department Head
Central Bank Policy Department
Bank of Finland

M. AKBAR AKHTAR
Vice President and
Assistant Director of Research
Federal Reserve Bank
of New York

LINCOLN ANDERSON
Chief Economist
Fidelity Investments

WAYNE D. ANGELL
Governor
Board of Governors of the
Federal Reserve System

KENNETH H. BACON
The Wall Street Journal

STEVEN BECKNER
Market News Service

JACK H. BEEBE
Senior Vice President and
Director of Research
Federal Reserve Bank
of San Francisco

LUIS MIGUEL BELEZA
Governor
Bank of Portugal

RICHARD B. BERNER
Senior Vice President and
Chief Economist
Mellon Bank

JOHN BERRY
The Washington Post

ROGER E. BRINNER
Executive Research Director and
Group Vice President
DRI/McGraw Hill

ALAN BUDD
Chief Economic Adviser
Her Majesty's Treasury

ARIEL BUIRA
Director of International
Organizations and Agreements
Bank of Mexico

MELVIN L. BURSTEIN
Executive Vice President
and General Counsel
Federal Reserve Bank
of Minneapolis

ROBERT H. CHANDROSS
Senior Vice President and
Chief Economist
Republic National Bank
of New York

ANTHONY L. COLEBY
Executive Director
Bank of England

JOSEPH R. COYNE
Assistant to the Board
Board of Governors of the
Federal Reserve System

HENRY R. CZERWINSKI
First Vice President
Federal Reserve Bank
of Kansas City

J. DEWEY DAANE
Frank K. Houston Professor
of Finance, Emeritus
Vanderbilt University

HENNING DALGAARD
Assistant Governor
Danmarks Nationalbank

MICHAEL R. DARBY
Professor, John E. Anderson
Graduate School of Management
University of California
at Los Angeles

STEVEN A. DAVIES
The Bond Buyer

THOMAS E. DAVIS
Senior Vice President and
Director of Research
Federal Reserve Bank
of Kansas City

STELLA DAWSON
Reuters, Ltd.

RUTH DE KRIVOY
President
Central Bank of Venezuela

RIMMER DE VRIES
Managing Director
Morgan Guaranty Trust Company

WILLIAM G. DEWALD
Senior Vice President and
Director of Research
Federal Reserve Bank of St. Louis

BURTON A. DOLE, JR.
Chairman and President
Puritan-Bennett Corporation

JACOB S. DREYER
Vice President and
Chief Economist
Investment Company Institute

ROBERT P. FORRESTAL
President
Federal Reserve Bank of Atlanta

LYLE E. GRAMLEY
Consulting Economist
Mortgage Bankers Association

STEVEN GREENHOUSE
The New York Times

STEPHEN GRENVILLE
Assistant Governor
Reserve Bank of Australia

ROGER GUFFEY
Retired President
Federal Reserve Bank
of Kansas City

CRAIG S. HAKKIO
Assistant Vice President
and Economist
Federal Reserve Bank
of Kansas City

DAVID D. HALE
Senior Vice President
and Chief Economist
Kemper Financial Services, Inc.

KATHLEEN HAYS
Investor's Business Daily

JOHN G. HEIMANN
Chairman, Global Financial
Institutions Group
Merrill Lynch & Co., Inc.

JUAN E. HERRERA
Vice President
Central Bank of Chile

BRYON HIGGINS
Vice President and Economist
Federal Reserve Bank
of Kansas City

THOMAS M. HOENIG
President
Federal Reserve Bank
of Kansas City

RICHARD B. HOEY
Chief Economist
The Dreyfus Corporation

ANDRÉ ICARD
Director General
Research Department
Bank of France

HENRY KAUFMAN
President
Henry Kaufman & Company

SILAS KEEHN
President
Federal Reserve Bank of Chicago

EDWARD W. KELLEY, JR.
Governor
Board of Governors of the
Federal Reserve System

MICHAEL W. KERAN
Vice President and
Chief Economist
Prudential Insurance Company

J. KONING
Executive Director
De Nederlandsche Bank, N.V.

CATHY KRISTIANSEN
Knight-Ridder Financial News

LAWRENCE KUDLOW
Chief Economist
and Senior Managing Director
Bear Stearns & Company, Inc.

MICKEY D. LEVY
Chief Financial Economist
NationsBank

JOHN LIPSKY
Chief Economist and
Managing Director
Salomon Brothers, Inc.

CARA LOWN
Visiting Professor
Princeton University

BRUCE K. MacLAURY
President
The Brookings Institution

LAWRENCE MALKIN
International Herald Tribune

WILLIAM J. McDONOUGH
President
Federal Reserve Bank
of New York

WILLIAM L. McQUILLAN
President and CEO
City National Bank
Greeley, Nebraska

THOMAS C. MELZER
President
Federal Reserve Bank of St. Louis

JAN MICHIELSEN
Adviser to the Board
of Governors and Head
of the Foreign Department
National Bank of Belgium

DONALD P. MORGAN
Senior Economist
Federal Reserve Bank
of Kansas City

PETER W.E. NICHOLL
Deputy Governor
Reserve Bank of New Zealand

ROB NORTON
Fortune Magazine

GERALD P. O'DRISCOLL, JR.
Vice President
Federal Reserve Bank of Dallas

SCOTT E. PARDEE
Chairman
Yamaichi International
(America) Inc.

FAI-NAN PERNG
General Manager
Foreign Exchange Department
Central Bank of China

MICHAEL PROWSE
Financial Times

GEORG RICH
Director
Swiss National Bank

NORMAN ROBERTSON
Carnegie-Mellon University

LEONARD J. SANTOW
Managing Director
Griggs & Santow, Inc.

KUNMO SAWAMOTO
Director, Institute for Monetary
and Economic Studies
Bank of Japan

KARL A. SCHELD
Senior Vice President and
Director of Research
Federal Reserve Bank of Chicago

WOLFGANG SCHILL
Economist
Deutsche Bundesbank

GORDON H. SELLON, JR.
Assistant Vice President
and Economist
Federal Reserve Bank
of Kansas City

SAMUEL C. SHIEH
Governor
Central Bank of China

THOMAS D. SIMPSON
Associate Director
Division of Research and Statistics
Board of Governors of the
Federal Reserve System

RALPH W. SMITH, JR.
Assistant Director
Division of International Finance
Board of Governors of the
Federal Reserve System

MARK S. SNIDERMAN
Vice President and
Associate Director of Research
Federal Reserve Bank
of Cleveland

DIETMAR SPRANZ
Executive Director
Austrian National Bank

JERZY STOPYRA
Director, Monetary and
Credit Policy Department
National Bank of Poland

KJELL STORVIK
Deputy Governor
Norges Bank

MASAHIRO SUGITA
General Manager in the Americas
Bank of Japan

YOSHIO SUZUKI
Chief Counselor
Nomura Research Institute, Ltd.

RICHARD F. SYRON
President
Federal Reserve Bank of Boston

THOMAS D. THOMSON
Executive Vice President
for Central Bank Functions
Federal Reserve Bank
of San Francisco

ALBERT M. WOJNILOWER
Senior Adviser
First Boston Investment
Management Group

JAMES D. WOLFENSOHN
President and CEO
James D. Wolfensohn, Inc.

PAMELA WOODALL
The Economist

SEYMOUR ZUCKER
Business Week

Federal Reserve Bank of Kansas City
Symposium Series

For a free copy of the proceedings of this symposium, or any of the Bank's previous symposiums listed below, write the Public Affairs Department, Federal Reserve Bank of Kansas City, 925 Grand Boulevard, Kansas City, Missouri 64198-0001.

- ❑ Changing Capital Markets: Implications for Monetary Policy ***(1993)***
- ❑ Policies for Long-Run Economic Growth ***(1992)***
- ❑ Policy Implications of Trade and Currency Zones ***(1991)***
- ❑ Central Banking Issues in Emerging Market-Oriented Economies ***(1990)***
- ❑ Monetary Policy Issues in the 1990s ***(1989)***
- ❑ Financial Market Volatility ***(1988)***
- ❑ Restructuring the Financial System ***(1987)***
- ❑ Debt, Financial Stability, and Public Policy ***(1986)***
- ❑ Competing in the World Marketplace: The Challenge for American Agriculture ***(1985)***
- ❑ The U.S. Dollar — Recent Developments, Outlook, and Policy Options ***(1985)***
- ❑ Price Stability and Public Policy ***(1984)***
- ❑ Industrial Change and Public Policy ***(1983)***
- ❑ Monetary Policy Issues in the 1980s ***(1982)***
- ❑ Modeling Agriculture for Policy Analysis in the 1980s ***(1981)***