Opening Remarks

Alan Greenspan

I should like as a backdrop to this conference on the challenges confronting monetary policy to focus on certain aspects of one of the issues that will be more broadly discussed later this morning: asset pricing and macroeconomic performance.

As the value of assets and liabilities have risen relative to income, we have been confronted with the potential for our economies to exhibit larger and perhaps more abrupt responses to changes in factors affecting the balance sheets of households and businesses. As a result, our analytic tools are going to have to increasingly focus on changes in asset values and resulting balance sheet variations if we are to understand these important economic forces. Central bankers, in particular, are going to have to be able to ascertain how changes in the balance sheets of economic actors influence real economic activity and, hence, affect appropriate macroeconomic policies.

At root, all asset values rest on perceptions of the future. A motor vehicle assembly plant is a pile of junk if no participants in a market economy perceive it capable of turning out cars and trucks of use to consumers and profit to producers. Likewise, the scrap value at the end of the plant's service life will be positive only if it is convertible into usable products.

The value ascribed to any asset is a discounted value of future expected returns, even if no market participant consciously makes that calculation. In principle, forward discounting lies behind the valuation of all assets, from an apple that is about to be consumed to a hydroelectric plant with a hundred-year life expectancy.

On such judgments of value rest much of our economic system. Doubtless, valuations are shaped in part, perhaps in large part, by the economic process itself. But history suggests that they also reflect waves of optimism and pessimism that can be touched off by seemingly small exogenous events.

This morning, I plan to address some of the problems that arise in evaluating the prices of equities. I should like to first focus on some significant difficulties of profit accounting that impede judgments about prospective earnings. In particular, there are some difficulties that have become more severe as a consequence of the recent acceleration of technologies, which, in turn, are markedly altering patterns of economic organization and production. And then I will discuss a different set of forces that mold the development of discount factors, which, together with earnings projections, produce estimates of market value.

First, the rapid shift in the composition of gross domestic product toward idea-based value added is muddying our measures of current earnings and, hence, our projections of future earnings.

The key definitional question that must be confronted is, What is capital outlay? Conversely, What is an expense that, by definition, is consumed in the process of production and deemed an intermediate product? This issue is most immediately evident in accounting for software outlays, but it is rapidly expanding to a much broader range of activities.

Software that is embedded in capital equipment, and some that is stand-alone, is currently being capitalized and, consequently, amortized against current and future earnings. But a substantial portion of software spending is expected, even though the equity prices of the

purchasing companies are clearly valuing the software outlays as contributing to earnings over their useful economic lives—the relevant criterion for capitalizing an asset.

There has always been a fuzzy dividing line between what is expensed and what is capitalized. This has historically bedeviled the accounting for research and development, for example. But the major technological advances of recent years have exposed a wide swath of rapidly growing outlays that, arguably, should be capitalized so that the returns they produce would be more accurately reflected as earnings over time. Indeed, there is even an argument for capitalizing new ideas, such as different ways of organizing production, that enhance the value of a firm without any associated outlays. Some analysts judge the size of undercapitalized outlays as quite large.[1]

The important point, however, is that decisions about which items to expense will have important consequences for reported earnings. In general, if the trend of expensed items that should be capitalized is rising faster than reported earnings, switching to capitalizing these items will almost always accelerate the growth in earnings. The reverse, of course, is also true.

But the new technologies, and the productivity and bull stock market they have fostered, are also accentuating some accounting difficulties that tend to bias up reported earnings. One is the apparent overestimate of earnings that occurs as a result of the distortion in the accounting for stock options. The combination of not charging their fair value against income, and the practice of periodically repricing those options that fall significantly out of the money[2], serves to understate ongoing labor compensation charges against corporate earnings. This distortion, all else equal, has overstated growth of reported profits according to Fed staff calculations by 1 to 2 percentage points annually during the past five years. Similarly, the rise in stock prices, which reduces corporate contributions to pension funds, is also augmenting reported profits. These upward adjustments in reported earnings, of course, are a consequence of rising stock prices and, hence, may not be of the same dimension in the future.

Nonetheless, it is reasonable to surmise that undercapitalized expenses have been rising sufficiently faster than reported earnings to have more than offset the factors that have temporarily augmented reported earnings. It does not seem likely, however, even should all of the appropriate accounting adjustments to earnings be made, that such adjustments can be the central explanation of the extraordinary increase in stock prices over the past five years.

However we calculate profits and capital, shifts in the stock market value of firms will doubtless continue to remain important influences on our economies. It is, thus, incumbent on us to improve our understanding of the process by which projections of future earnings are translated into asset market value.

Even our most sophisticated analytic techniques have difficulty dealing with the interactions among time preference, risk aversion, and uncertainty and with the implications of these interactions for the risk premiums that are embedded in asset prices. It is our failure to anticipate changes in this discounting process that much of our inability to accurately forecast economic events lies. For example, the dramatic changes in information technology that have enabled businesses to embrace the techniques of just-in-time inventory management appear to have reduced that part of the business cycle that is attributable to inventory fluctuations and, accordingly, may well have been a factor in the apparent decline in equity premiums that has characterized the latter part of the 1990s. Whether the decline in these premiums themselves may foster activities that could result in wider business cycles, as some maintain, is an open question.

As model builders know, all economic channels of influence are not of equal power to engender growth or contraction. Of crucial importance, and still most elusive, is arguably the behavior of asset markets. More broadly, there is an increasing need to integrate into our macro models more complete descriptions of the responses of households and businesses to risk—behaviors that are generally modeled separately under the rubric of portfolio risk management.

The translation of value judgments into market prices is, of course,

rooted in how people discount uncertain future outcomes. An individual's degree of risk aversion may vary through time and possibly be subject to herd instincts. Nonetheless, certain stable magnitudes are inferable from the process of discounting of future claims and values.

One of the most enduring is that interest rates, as far back as we can measure, appear trendless, despite vast changes in technology, life expectancy, and economic organization. British long-term government interest rates, for example, mostly ranged between 3 percent and 6 percent from the early eighteenth century to the early twentieth century, and are around 5 percent today. Indeed, scattered evidence dating back to ancient Rome and before reflects the same order of interest rate magnitude, not a 1 percent interest rate nor 200 percent.

This suggests that the rate of preference underlying interest rates, like so many other aspects of human nature, has not materially changed over the generations. But while time preference may appear to be relatively stable over history, perceptions of risk and uncertainty, which couple with time preference to create discount factors, obviously vary widely, as does liquidity preference, itself a function of uncertainty.

The impact of increasing uncertainty and risk aversion was no more evident than in the crisis that gripped financial markets last autumn, following the Russian default.

That episode of investor fright has largely dissipated. But left unanswered is the question of why such episodes erupt in the first place.

It has become evident time and again that when events are unexpected, more complex, and move more rapidly than is the norm, human beings become less able to cope. The failure to be able to comprehend external events almost invariably induces fear and, hence, disengagement from an activity, whether it is entering a dark room or taking positions in markets. And attempts to disengage from

markets that are net long—the most general case—means bids are hit and prices fall.

Modern quantitative approaches to risk measurement and risk management take as their starting point historical experience with market price fluctuations, which is statistically summarized in probability distributions. We live in what is, for the most part, a stable economic system, where market imbalances that produce unusual outcomes almost always give rise to continuous and inevitable moves back toward longer run equilibrium. However, the violence of the responses to what seemed to be relatively mild imbalances in Southeast Asia in 1997 and throughout the global economy in August and September of 1998 has illustrated yet again that the adjustments in asset markets can be discontinuous, especially when investors hold highly leveraged positions and when views about long-term equilibria are not firmly held.

Enough investors usually adopt strategies that take account of longer run tendencies to foster the propensity for convergence toward equilibrium. But from time to time, this process has broken down as investors suffer an abrupt collapse of comprehension of, and confidence in, future economic events. It is almost as though, like a dam under mounting water pressure, confidence appears normal until the moment it is breached.

Risk aversion in such an instance rises dramatically, and deliberate trading strategies are replaced by risk fear-induced disengagement. Yield spreads on relatively risky assets widen dramatically. In the more extreme manifestation, the inability to differentiate among degrees of risk drives trading strategies to ever-more-liquid instruments so investors can immediately reverse decisions at minimum cost should that be required. As a consequence, even among riskless assets, such as U.S. Treasury securities, liquidity premiums rise sharply as investors seek the heavily traded "on-the-run" issues—a behavior that was so evident last fall.

History tells us that sharp reversals in confidence happen abruptly, most often with little advance notice. These reversals can be self-

reinforcing processes that can compress sizable adjustments into a very short time period. Panic market reactions are characterized by dramatic shifts in behavior to minimize short-term losses. Claims on far-distant future values are discounted to insignificance. What is so intriguing is that this type of behavior has characterized human interaction with little appreciable difference over the generations. Whether Dutch tulip bulbs or Russian equities, the market price patterns remain much the same.

We can readily describe this process, but, to date, economists have been unable to anticipate sharp reversals in confidence. Collapsing confidence is generally described as a bursting bubble, an event incontrovertibly evident only in retrospect. To anticipate a bubble about to burst requires the forecast of a plunge in the prices of assets previously set by the judgments of millions of investors, many of whom are highly knowledgeable about the prospects for the specific companies that make up our broad stock price indexes.

If episodic recurrences of ruptured confidence are integral to the way our economy and our financial markets work now and in the future, it has significant implications for risk management and, by implication, macroeconomic modeling and monetary policy.

Probability distributions that are estimated largely, or exclusively, over cycles excluding periods of panic will underestimate the probability of extreme price movements because they fail to capture a secondary peak at the extreme negative tail that reflects the probability of occurrence of a panic. Furthermore, joint distributions estimated over periods without panics will misestimate the degree of correlation between asset returns during panics. Under these circumstances, fear and disengagement by investors often result in simultaneous declines in the values of private obligations, as investors no longer realistically differentiate among degrees of risk and liquidity, and increases in the values of riskless government securities. Consequently, the benefits of portfolio diversification will tend to be overestimated when the rare panic periods are not taken into account.

As we make progress, hopefully, toward understanding asset-pricing

mechanisms, we need also to upgrade our insights into the effect of changing asset values on GDP—the so-called wealth effect.

Although many aspects of this issue deserve attention, let me cite a few open questions of particular importance. Efforts to differentiate between realized and unrealized gains, and the propensity to leverage both, may afford a deeper understanding of the consequences of asset price change. And differentiating between gains that arise from enhanced profitability and those that reflect changes in discount factors may also be useful. The former may be more likely to be sustained, given the tendencies of discount factors to revert back to historic norms.

Moreover, it is evident that borrowings against capital gains on homes influence consumer outlays beyond the effects of gains from financial assets. Preliminary work at the Federal Reserve suggests that the extraction of equity from housing has played an important role in recent years. However, stock market values and capital gains on homes are correlated and, hence, their separate effects are difficult to identify. This is an area that clearly warrants further examination.

Finally, in the business sector, questions remain about the influence of equity prices on investment spending. In particular, Do all equity price movements—whether related to fundamentals or not—have the same effect on investment spending?

In conclusion, the issues that I have touched on this morning are of increasing importance for monetary policy. We no longer have the luxury to look primarily to the flow of goods and services, as conventionally estimated, when evaluating the macroeconomic environment in which monetary policy must function. There are important—but extremely difficult—questions surrounding the behavior of asset prices and the implications of this behavior for the decisions of households and businesses. Accordingly, we have little choice but to confront the challenges posed by these questions if we are to understand better the effect of changes in balance sheets on the economy and, hence, indirectly, on monetary policy.

Endnotes

[1] For example, Erik Brynjolfsson and Shinkyo Yang, "The Intangible Costs and Benefits of Computer Investments: Evidence from the Financial Markets," MIT Sloan School, mimeo, April 1999.

[2] The Financial Accounting Standards Board (FASB) will require that the cost of repricing of options be charged against income later this year.