Commentary: Monetary Policy at Zero Inflation

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It is always a pleasure to read one of Lars Svensson's papers on monetary policy. They are carefully reasoned, substantive, and address real world problems of monetary control. As the bibliography to his paper shows, he has done an impressive amount of theoretical and empirical work on the many facets of inflation control. The paper today summarizes a considerable part of his work. I recommend the paper to all central bankers. They will not agree with all of his conclusions, but his paper should encourage them to think about where and why they disagree, if they do.

Although I disagree with several of his conclusions, I want to emphasize a main point of agreement. I agree that the Federal Reserve should announce a zero inflation target and the procedures needed to achieve the target at lowest social cost. The Federal Reserve is too dependent on individual discretion and too slow to change. As many of Svensson's papers point out, inflation control does not mean that the central bank ignores output and employment. I would state the point differently than he does, but I believe we agree that inflation control or price stability should be achieved at the lowest social cost. We disagree on the appropriate rule, but either would be better than current procedures for the long term.

I will spend my limited time on the main topic of this session, monetary policy at low inflation. Svensson's paper discusses that topic principally in the section on the liquidity trap, and I will comment on that section and topic. I agree with the main conclusion. Zero inflation raises no major obstacle to monetary control.

To a student of economic history, the topic of this session is puzzling because for 15 years after the Civil War, U.S. monetary policy was directed at lowering the price level to restore the gold standard at the pre-Civil War parity. This was a period of substantial industrialization and growth. Policy remained effective both before and after resumption. Friedman and Schwartz (1963).

Again, in the 1920s, with low inflation preceded and followed by deflation, U.S. monetary policy remained effective. This is the period that Friedman and Schwartz praised as the "high tide" of the Federal Reserve System and that Keynes praised as an example of effective counter-cyclical policy action. Although committed to the gold exchange standard, the Federal Reserve held such a large stock of gold that it operated a discretionary policy aimed at price stability.

Economists are rarely satisfied with evidence that something works in practice. They are inclined to be more interested in whether it works in theory. In the case of monetary policy at low (or zero) inflation, the now famous theoretical conjecture is Keynes' (1936) claim that, at low inflation with market interest rates below 2 percent, monetary policy might be incapable of changing the interest rate, price level, or any other relevant variable. He gave the problem a name, liquidity trap. Krugman (1988) and Ito (1998) conjecture that Japan is now in a liquidity trap because short-term interest rates are near zero. Larry Summers (1991) argued a related proposition—that zero inflation is socially costly because it sets a lower bound for nominal interest rates. Monetary policy becomes ineffective; it cannot lower the short-term nominal rate or prevent falling prices from raising the real rate of interest. With money wages less than fully flexible, unemployment rises. The central bank is powerless to lower the short-term nominal interest rate once it reaches (or approaches) zero.

These conjectures arise in models with a single interest rate where bonds and capital are perfect substitutes. Many years ago, Karl Brunner and I (1968) presented a theoretical argument showing that a liquidity trap cannot occur if there are three distinct asset types—money, bonds, and capital. In this model, bonds and capital are not perfect substitutes. Instead of repeating that rather complicated analysis today, I will make a general argument and present some evidence from past periods of deflation—periods in which prices fell. Two of these periods had interest rates close to zero. These are the only periods with market interest rates near zero in U.S. history.

We can see the issues at work by turning to a practical problem— the recent and current mild deflation and continuing recession in Japan. Suppose that with its short-term interest rate at zero, the Bank of Japan announces that it wants the dollar exchange rate to fall by 25 percent and that it is prepared to print yen to buy dollars until that occurs. Does anyone doubt that the yen would depreciate or that the depreciation would affect spending, output, and prices in Japan?

Suppose, instead, that the Bank of Japan makes no announcement but buys dollars with the intention of depreciating the yen by 25 percent. There may be differences in the timing of responses, but the ultimate effect would be the same: monetary expansion would affect the economy. There would be no liquidity trap whatever the short-term interest rate in the market in which the central bank usually operates.[1] Two questions occur. First, how can we reconcile our standard assumption that all assets are close substitutes with this obvious contradiction? Second, does this argument imply that a liquidity trap is impossible in a multi-asset world?

The liquidity trap, by assumption, makes short-term Treasury bills (or similar security) a perfect substitute for base money or bank reserves. Exchanging one for the other does nothing of interest. By assumption in standard models, bonds and real capital are perfect substitutes, so all assets are now perfect substitutes. Exchanging either money or Treasury bills for some other asset such as foreign money, domestic or foreign long-term bonds, equities, or commodities, cannot change relative prices and real wealth. In this hypothetical case,

base money plus bills is a composite good. The composite good is a perfect substitute for other assets, so increasing either money, bills, or both has no effect.

These assumptions raise a critical question. If all assets are perfect substitutes, why do we use a medium of exchange? Why is there money? My answer is that in a world without transaction and information costs, where all assets are perfect substitutes, either all assets are money or, equivalently, there is no money. This world is a useful abstraction for many purposes, but it interferes with careful consideration for the practical issue about a zero interest rate.

If assets other than bills and money are not perfect substitutes for money, a liquidity trap means only that one row and one column in the matrix of asset returns has been eliminated. All other returns remain near zero. Monetary policy remains effective if the central bank buys (or sells) any asset that does not have a zero yield. Assets with zero yield are part of the composite good.

Changing one assumption removes the theoretical basis for a liquidity trap. The changed assumption can be that bonds and real capital are not perfect substitutes, as in Brunner and Meltzer (1968) or Tobin (1969). Or, the change can be that foreign assets are not perfect substitutes for domestic assets, as in McCallum (1999). If uncovered interest rate parity does not hold in the short run, expected exchange rates do not keep expected returns to foreign and domestic assets equal. The empirical foundation for removing either of these assumptions seems strong for periods during which economies are in transition from one long-run equilibrium to another. Information costs are high under these circumstances. In the case of interest parity, most studies reject it empirically. I suspect that costs of information are a main reason for rejection.

Summers (1991) revived the argument that a zero inflation target is socially costly because it sets a lower bound for nominal interest rates. A more sophisticated version of Summers' argument uses a stochastic model with non-linearity in the transmission process when inflation is below 2 percent. Orphanides and Wieland (1998) find that there is no evidence of an operative lower bound in U.S. postwar data. They

claim that the lower bound was in effect during the 1930s, so, they conclude, monetary policy was useless for part of that decade.

As noted earlier, several periods in the nineteenth or twentieth centuries had falling prices, nominal interest rates near zero, or both. I have chosen three periods from the twentieth century, after Congress established the Federal Reserve. Aside from the 1929-33 Depression, these are the only periods of deflation since the Federal Reserve started. The three periods differ from the 1929-33 Depression in that falling prices helped to end each of the recessions. I discuss briefly why the 1929-33 decline persisted.

Historical evidence

In each of the examples I consider, prices fell raising real interest rates and real money balances through most or all of the recession. Expansive fiscal actions in each episode were usually modest or absent. Two of the recessions are considered severe, according to rankings by the National Bureau of Economic Research. In each case the economy recovered, and two of three recessions were of not more than average length.

The common feature that is relevant for the current discussion is that real money balances and real interest rates rose together. In each case there was a common cause: prices fell. In some cases, gold inflows or Federal Reserve actions increased the monetary base. In other cases, the monetary authorities were passive or restrictive through most or all of the recession. Differences of this kind are of secondary importance in the three examples (but not in the Great Depression). The dominant, common impulse in the three examples was deflation.

Two of the three episodes share a second relevant feature: the nominal interest rate on short-term Treasury bills was historically low. During the 1948-49 recession, the rate on Treasury bills was about 1 percent. In 1937-38, bill rates were close to zero. In the third case, 1920-21, short-term nominal rates remained well above zero, but the deflation was sharp and severe, so real interest rates and real money balances rose together.

1937-1938

The National Bureau of Economic Research ranks the 1937-38 recession as the third most severe recession in the years after World War I. Real GNP fell 18 percent and industrial production 32 percent in the 13 months from May 1937 to June 1938. Unemployment reached a peak of 20 percent, not very different from the 25 percent peak in 1932.

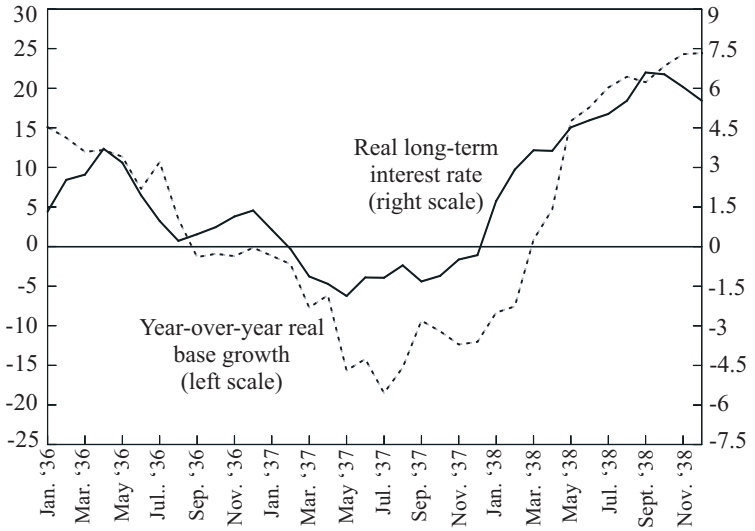
The probable causes of the recession include both fiscal and monetary actions. There was a very large reduction in the government deficit in 1937 and a very large reduction in growth of the monetary base. The main fiscal actions were the end of the soldiers' bonus payment, the enactment of a small excess profits tax to pay for part of the bonuses in fiscal 1937, and the start of Social Security tax collections in fiscal 1936. The soldiers' bonus is the largest item: $1.7 billion of current spending. It was paid in June 1936, in time for the election later that year. The bonus was paid in bonds, but the bonds could be sold for cash. By December 1936, $1.4 billion had been cashed. Gordon's quarterly data show an 18 percent average rate of increase in real GNP for the last three quarters of 1936.

The most important monetary actions were the beginning of gold sterilization at the end of 1936 and the second and third increase in reserve requirement ratios in March and May 1937. These increases completed the doubling of reserve requirement ratios between August 1936 and May 1937.

During the entire period December 1936 to December 1938 that brackets the recession, interest rates on Treasury bills remained between 0.03 percent and 0.56 percent. Long-term nominal rates on Treasury bonds were modestly higher during the recession than before or after, but the difference is small; the range is 2.55 percent to 2.83 percent.

Annualized monthly rates of price change are consistently negative from October 1937 to February 1938 and intermittently negative for the rest of 1938. To smooth the data, I used moving 12-month averages

Chart 1
Year-over-Year Real Base Growth Versus Real Long-Term Interest Rates
January 1936 - December 1938



of rates of price changes. Chart 1 compares the real interest rate to the annual growth of the monetary base.

The common element in the two series is the 12-month moving average of the rate of price change. The divergence between the two series reflects some release of sterilized gold into the monetary base in September 1937 and small volume ($38 million) of open market purchases in November, principally for seasonal reasons.

Not until February 1938, after nine months of a deep recession, did the Federal Reserve propose countercyclical action: the release of additional gold from sterilization. In April, the Roosevelt administration announced $2 billion of additional government spending for construction and relief. As part of this program, the Treasury released another $1.4 billion from sterilization and the Federal Reserve released $750 million of reserves by lowering reserve requirement ratios.

Chart 1 shows the sustained rapid increase in the real value of the monetary base beginning in February 1938. Real final sales rose in the following quarter, but inventories fell, so real GNP did not increase until the third quarter.

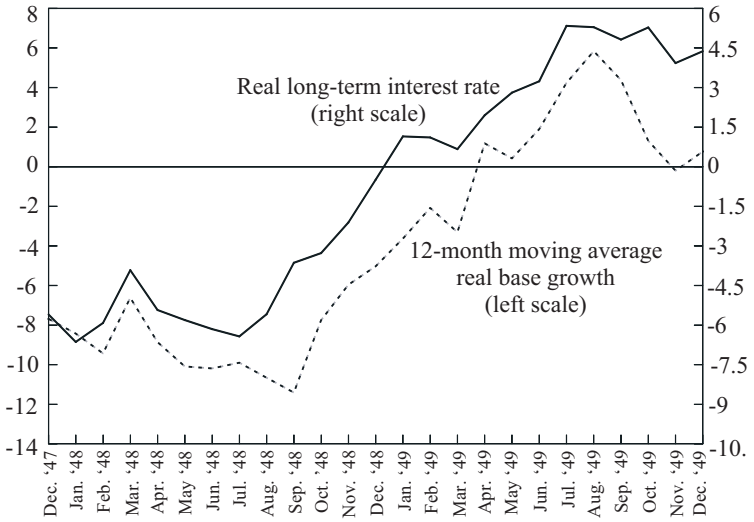
What does this episode suggest about the influence of monetary policy? In the months preceding recovery, and in the early months of expansion, the real interest rate rose from 2.9 percent in January 1938 to more than 6 percent in September through November 1938. Although nominal rates remained historically low, real rates were relatively high. In contrast, real money balances accelerated five months before the end of the recession—between February and June, growth of real balances from—7.6 percent to 17.6 percent. By the end of 1938, growth of real balances reached an almost 25 percent annual rate.

I draw three conclusions for the monetary actions at the time. First, low nominal interest rates misled the Federal Reserve, on this occasion as on others, into believing that monetary policy was expansive. Second, although short-term interest rates stayed at or near zero, monetary policy was not powerless. Desterilizing gold to increase the monetary base raised nominal and real money balances and increased spending. Third, the financial system was not in a liquidity trap. Channels other than the short-term interest rate transmitted monetary expansion to output and the price level.

1948-1949

The 1948-49 recession provides a second example refuting the liquidity trap and the small or vanishing effect of monetary policy at low nominal interest rates. The Federal Reserve pegged nominal long-term interest rates below the 2.5 percent ceiling in effect from 1942 to 1951. Despite the pegging policy, the monetary base fell through most of 1948. The principal reason is that the Treasury used its budget surplus to retire debt held by the Reserve Banks. The monetary base fell as a consequence of the Treasury's actions. Although the Federal Reserve complained about being an engine of inflation, prices fell in half the months of 1948 and 1949.

Chart 2
12-Month Moving Average Real Base Growth Versus Real Long-term Interest Rate
December 1947–December 1949



The National Bureau of Economic Research dates the end of the expansion in November 1948 and the recession trough in October 1949. The 12-month moving average rate of inflation fell from above 9 percent in June and July 1948 to negative values in May 1949. It remained negative for the rest of that year.

During most of the recession, the Federal Reserve was more concerned about a return of inflation than about the recession. The nominal rate on Treasury bills remained between 1.02 percent and 1.17 percent throughout the recession.

Chart 2 compares annual growth of the real monetary base to the real interest rate in the two years that include the recession. Data are compiled as in Chart 1. As before, the high positive correlation reflects the common effect of the rate of price change on the two series. The high correlation and parallel movement show that until late in 1949, when

the recession was almost over, the Federal Reserve took few actions to increase base growth.

Real base growth fell to -11 percent in September 1948, two months before the cyclical peak. Thereafter, base growth rose but did not become positive until April 1949, six months before the trough. The peak rate of base growth is close to 6 percent in August 1949, two months before the end of the recession. At that time the real long-term interest rate was above 5 percent.

Once again, the movement of real base growth is consistent with the beginning and end of recession; the movement of real interest rates is not. Once again, low nominal short-term interest rates do not appear to have weakened the effect of monetary policy. And, once again, there appears to be more to the transmission process than is contained in standard models with one interest rate and all assets, foreign and domestic, perfect substitutes.

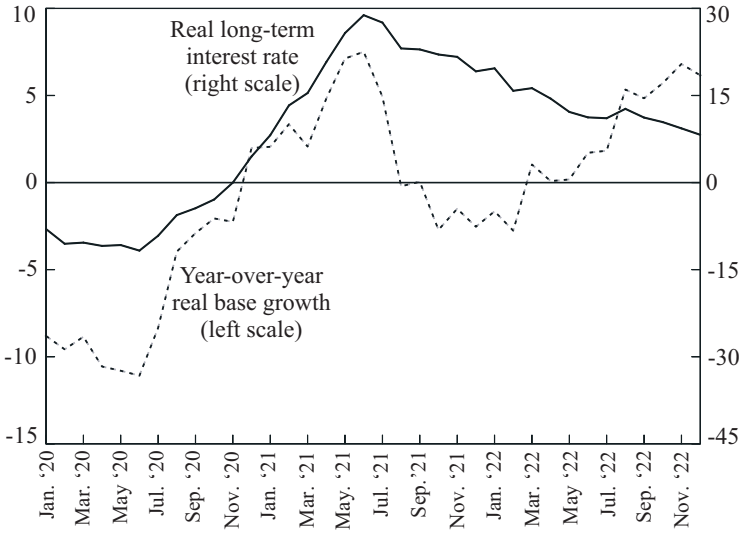
1920-1921

The third episode is the recession from January 1920 to July 1921.[2] The National Bureau of Economic Research ends the expansion in January 1920 and puts the last month of recession in June 1921. The Federal Reserve undertook larger policy actions, so nominal interest rates and nominal base growth reflect these actions. Inflationary policies in much of Europe and restrictive policy in the United States brought an inflow of gold. The base and interest rate changes reflect these influences also.

Nevertheless, real base growth and real interest rates are positively correlated during the recession. Both are negative at the start of the recession, turn positive about a year later, and reach a peak at the end of the recession. Judged by base growth, monetary actions are countercyclical in the first half of 1921. Judged by real interest rates, these actions are procyclical.

Chart 3 shows these data. The long-term nominal rate remains without a narrow range but is higher at the trough of the recession than at

Chart 3
Year-over-year Real Base Growth
Versus Real Long-term Interest Rate
January 1920–December 1922

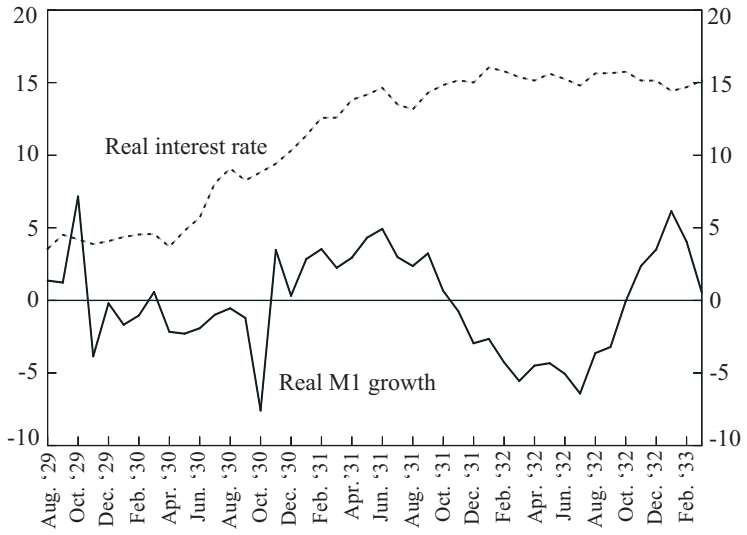


the previous peak. The dominant influence on real rates and real base growth during the recession is the decline in inflation followed by deflation.

As in the previous two episodes, interest rates give a misleading signal about the thrust of policy. Real base growth gives a more correct signal. In this recession, the deflation is severe; the peak annualized rate reached 17 percent, and it was above 10 percent for ten consecutive months. The real long-term interest rate $(I-\pi)(1+\pi)$, is above 25 percent at the end of the recession. The economy recovered despite, not because of, the level of real interest rates.

The three historical periods raise doubts about the central role assigned to a single short-term interest rate in the monetary process. They suggest an important role for real balances. I return to these issues briefly in the conclusion.

Chart 4
Real M1 Growth and Real Interest Rate
August 1929–March 1933



The Great Depression

The only other period of large, sustained U.S. deflation after 1914 is 1929 to 1933, the Great Depression. The real interest rate rose from 5 percent to 15 percent and remained near 15 percent through the last two years of the recession. Real base growth rose once bank runs began late in 1930, but this is, of course, misleading. Chart 4 shows, growth of real balances—measured here by M_1—is very different in this period than in other deflationary periods. The principal difference is that monetary contraction was strong enough to offset the deflation on real balances.

Furthermore, although the economy recovered in 1933, sustained recovery did not begin until 1934. In January 1934, President Roosevelt devalued the dollar against gold by almost 60 percent. Gold flows to the United States rose, increasing the monetary base and the money

stock. The main difference between 1929-33 and the other periods is that from 1929 to 1933, the Federal Reserve permitted nominal money growth to fall so much that real balances fell for much of the period despite the severe deflation. Once money growth resumed, growth of real balances contributed to a sustained expansion that lasted until the 1937-38 recession discussed earlier.

Conclusion

Neither the historical data nor my discussion of the liquidity trap explains the process by which monetary changes affect the price level. The analytic argument tells us only that policy will remain effective at low inflation rates provided all assets are not perfect substitutes. The data suggest that this has been true in the recessions examined. Experiences in 1920-21, 1937-38, and 1947-48 show that expansion of the monetary base in real terms is consistent with recovery in each of these cases, despite high and, at times, rising real rates of interest and, in some cases, a zero nominal interest rate.

The 1929-33 experience is not a contradiction. It is quite the opposite. That experience suggests that contractive monetary actions were effective. The price level continued to fall, and the economy continued to contract as money and real balances fell. The economy responded to monetary policy. The policy actions, not the responses, were perverse.

There are two main explanations of the role of money during these (and other) periods. The more familiar of the two is that the change in real money balances measures (approximately) the gap between actual and desired real balances. The economy adjusts to this gap by spending to reduce real balances, when real balances are larger than desired, or increasing real balances by reducing spending when real balances are less than desired. This so-called real balance effect is generally considered small. Real balances are a small part of real wealth in developed countries, so it would take an improbably large response to support his explanation as the principal explanation of the data.

An alternative views the gap between desired and actual real balances as a measure of the relative price adjustment required to restore

full equilibrium. As in Friedman (1956), the demand for real balances depends not on a single interest rate but on many different interest rates, or more generally, on the prices of assets relative to the prices of new production of the same assets. These relative prices settle down as the economy adjusts to an equilibrium at which all assets sell at replacement cost. In a full, general equilibrium prices of bonds and real capital, domestic and foreign assets, new and used houses and automobiles and many other relative prices can be usefully summarized by a single interest rate. In transitional this is not so and, so long as it is not so, the demand for real balances differ from long-run desired real balances.

Several examples from recent work suggest that many economists use less than perfect substitution to explain monetary transmission. Taylor (1995) emphasizes the role of exchange rates, Bernanke and Gertler (1995) use bank lending, and Meltzer (1995) uses the relative prices of assets and output and uncertainty about the persistence of observed changes. These factors supplement interest rates in the transmission of monetary and other impulses.

What inference can be drawn from the difference between actual and desired real balances? Svensson and Gerlach (1999) and Svensson (1999) find that this difference is informative for the European Central Bank. But, they say, there is no reason for central banks to set a money growth target. I don't understand the relation between these statements.

One way to describe part of the central banker's task is that the central bank seeks to adjust actual to desired money balances. The difference between desired and actual money balances is a measure of the excess supply of money, the amount by which prices and other nominal variables must change to restore equilibrium in markets for assets and output. Changes in nominal money growth increase or decrease this difference.

Central banks could facilitate this adjustment by changing the nominal interest rate in response to permanent changes in the excess supply of money. As the experiences discussed here suggest, in periods of

deflation, persistent changes in money balances have given useful information to help them in their risk. At or below zero inflation, and elsewhere, the growth of money balances offers useful information to central bankers who pay attention.

A liquidity trap is a theoretical curiosity for a world in which costs of information are zero. In such a world, money would have no rule, and central bankers would have other jobs. This audience need not worry about those possibilities. For my part, I worry more about what the data show about central bankers. In the experiences considered, the Federal Reserve was convinced that low nominal interest rates showed that policy was easy. They either did nothing, delayed acting, or allowed nominal money growth to fall. Contrary to the liquidity trap proposition, falling prices (or devaluation of the dollar in 1934) did far more than central bank actions to revive the economy.

Author's Note: An earlier version of major parts of this paper is in Meltzer (1999). I thank Bennett McCallum and Randolph Stempski for their contributions.

Endnotes

[1]McCallum (1999) develops a similar argument within a general equilibrium model and shows that monetary policy remains potent in simulations with that model provided domestic and foreign assets are less than perfect substitutes.

[2]For this period, the monetary base is high-powered money from Friedman and Schwartz (1963). The price index is not seasonally adjusted, but I use annual moving averages.

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