4. For further discussion of the effect of interest-bearing transactions balances on the monetary aggregates has typically receded during periods of recession and short recovery, we measure a "trend" of M-1 velocity growth in the last cycle to see what it would have been if the cycle had been more like those in the past:

\[
\text{Average Velocity} = \frac{\sum (\text{Velocity} \times \text{Period})}{\sum \text{Period}}
\]

5. The rapid growth of the aggregates in late 1982 and early 1983 reflects both the flow of funds into new NOW accounts and a policy adjustment in response to a downward shift in the velocity trends. The Federal Reserve seems willing to accept M-1 growth above the target range in 1983 as velocity continues to decline. If the decline persists, the target might have to be raised, though we do not understand the relationship between velocity trends and the monetary targets, then the Federal Reserve's decision to raise the targets could be misconstrued as being inflationary. If economic growth continues to accelerate, however, and velocity growth returns to historical patterns, then the Federal Reserve would have to lower M-1 growth to preserve recent success in reducing inflation. In this period of regulatory change and disinflation policy, the Federal Reserve might not be able to use M-1 targets to guide short-run, open-market operations. However, empirical evidence indicates that there has been a lag between changes in monetary policy and changes in economic activity. There should be time to adjust the long-run targets in response to large unexpected developments in velocity before they induce unintended changes in economic activity and prices.

Economist William T. Gavin does research in the areas of monetary theory and monetary policy for the Federal Reserve Bank of Cleveland. The views stated herein are those of the author and not necessarily those of the Federal Reserve Bank of Cleveland or of the Board of Governors of the Federal Reserve System.

NOTE: No issues of the Economic Commentary were published in May.

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**Table 1** Cycles in Velocity Growth

1. In retrospect, it also appears that the new accounts may have permanently reduced the growth in M-1 velocity. This should be expected if we accept the premise that the prohibition against interest payments on demand deposits was largely responsible for the divergence between growth trends of M-1 and M-2 velocity after World War II.

2. If the reduced money-supply targets were maintained over a period of years, nominal GNP would be restrained and inflation would be reduced to levels all other things being equal, it is likely that the Federal Reserve would be able to maintain a stable relationship between money and real output.

3. The velocity of M-1, small time and savings deposits, and savings deposits, time deposits open more than 24 months, and institutional money market mutual funds.

4. The product of price and quantity is real output. However, the central bank can only affect the flow of funds into new accounts and a policy adjustment in response to a downward shift in the velocity trends. The Federal Reserve seems willing to accept M-1 growth above the target range in 1983 as velocity continues to decline. If the decline persists, the target might have to be raised, though we do not understand the relationship between velocity trends and the monetary targets, then the Federal Reserve's decision to raise the targets could be misconstrued as being inflationary. If economic growth continues to accelerate, however, and velocity growth returns to historical patterns, then the Federal Reserve would have to lower M-1 growth to preserve recent success in reducing inflation. In this period of regulatory change and disinflation policy, the Federal Reserve might not be able to use M-1 targets to guide short-run, open-market operations. However, empirical evidence indicates that there has been a lag between changes in monetary policy and changes in economic activity. There should be time to adjust the long-run targets in response to large unexpected developments in velocity before they induce unintended changes in economic activity and prices.

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**Economic Commentary**

June 6, 1983

**Velocity and Monetary Targets**

by William T. Gavin

To interpret the monetary targets in 1983, we have to know where we have been and where we are going. The equation of exchange, \[ MV = PQ, \] provides a simple accounting framework for keeping track of where we have been and where we are going, and suggests where we may be going. Mis-
velocity of money is the ratio of nominal GNP to the money supply. The monetary targets are based on expectations for future velocity growth. If velocity growth deviates from the targets, the Federal Reserve would need to adjust its targets for an extended period, and if the Federal Reserve chooses to stay on a predetermined disinflation course, then the monetary targets have to be changed. This Economic Commentary examines the monetary targets in light of recent changes in the velocity of money.

Velocity of money is determined by the aggregate behavior of individual people and firms. This behavior is affected by many factors, including the length of pay periods, the uncertainty of future income and expenditure flows, and the opportunity costs of holding wealth in the form of money. Institutional factors also play an important role in determining velocity. The introduction of credit cards, for example, reduced the need to hold money for transactions purposes. Various cash-management techniques have greatly reduced the demand for money by firms. The development of social-welfare programs, such as unemployment compensation, social security, and health-care subsidies, has reduced the need to hold precautionary balances. Other special factors that influence velocity are associated with the Federal Reserve’s policy to keep inflation low. As expected inflation falls, domestic investors move out of real assets previously held as inflation hedges into nominal assets including the monetary aggregates. A lower expected inflation rate in the United States may lead wealthy individuals and multinational companies to switch from other currencies into U.S. dollars. If such dollars were held as currency or as deposits in the United States, they would tend to reduce the income velocity of money.

The Velocity Assumption

Annual monetary targets are based on the expectation that changes in velocity are predictable within a narrow range. Velocity is said to have a deterministic trend if there is a predictable component that depends on nothing else but time. If velocity had a deterministic trend, then it would be predictable over long time periods, historical averages would be good indicators of future velocity growth, and the Federal Reserve could set targets for the money supply well into the future. Analysts who recommend pre-announced multi-year targets for the money supply implicitly assume a deterministic trend in which all short-term velocity fluctuations are temporary and offsetting. Other analysts have argued that the trend of velocity is not deterministic, but that it is a function of many factors that can change over time. Consequently, they consider velocity to be unpredictable velocity very far into the future. The Federal Reserve has implied agreement with this latter view, setting monetary targets for only one year at a time. The Federal Reserve’s targeting procedure can be described as an “error learning” procedure in which current short-term targets are regularly reviewed and readjusted as unpredictable developments in velocity undermine past estimates. To be consistent with an undeterministic velocity trend in which the short-term fluctuations include both a cyclical component associated with the business cycle and a permanent component that changes the trend.

Monetary targeting does not require that velocity be a constant or even that it have a deterministic trend. Monetary targeting only requires that the central bank have a procedure for adjusting the targets when velocity deviates from what is expected. There are currently several methods for adjusting targets. One method is the stating of monetary targets as ranges, usually 3 percentage points wide. When the velocity prediction is more uncertain than usual, the Federal Reserve can widen the target range. A second mechanism is for adjusting targets is the mid-year review in which the Federal Open Market Committee (FOMC) can change the target range. A third mechanism is the practice of basing the annual target on the actual average level of the monthly velocity rather than the target level in the previous year’s fourth quarter (end-year base drift). A fourth mechanism is the use of multiple targets. Factors that affect velocity of one of the monetary aggregates might not affect the others. The Federal Reserve has generally employed M-1 as the primary target. In periods when M-1 velocity was exceptionally uncertain, the Federal Reserve placed more emphasis on the M-2 target. An example of each of these mechanisms in action can be seen in the Federal Reserve’s targeting experience. An unexpected decline in M-1 velocity in 1982 led the Federal Reserve to aim high in the range at the beginning of the year, to announce a desired growth rate at or above the upper limit of the range at the mid-year review, to place more emphasis on M-2 than on M-1 as of October 1982, and to accept a large overshoot in the fourth quarter as part of the base for the 1983 target.

Historical Trends

1880-1960. The long-run trend in velocity depends on the stage of development in the market economy and on factors that determine the costs and benefits of holding money. The long decline in the old M-2 velocity shown in chart 1 is attributed to economic progress. As the U.S. economy grew, the level of transaction and the cost of holding money continued to decline.

After World War II the development of close substitutes for money, credit cards, and sophisticated cash-management techniques tended to reduce the need to hold money in the form of cash. The post-World War II period was one of relative economic stability. Business cycles fluctuated less than in previous periods, and the federal government gradually increased the coverage of social-welfare programs, further reducing the need to hold precautionary balances.

Beginning in January 1934, Regulation Q prohibited the payment of interest on demand deposits. A very large amount of interest that could be paid on savings and time deposits. The prohibition of interest payments on demand deposits and the interest-rate ceilings imposed by Regulation Q meant that a rise in interest rates would increase the opportunity cost of holding money.

In the first years of Regulation Q, interest rates were so low that the regulation probably had no effect on velocity. After World War II, however, accelerating inflation led to rising interest rates. The long-term Aaa corporate bond yield approximately doubled over the 1950s and 1960s. As interest rates rose to new highs with each succeeding business cycle, the opportunity cost of holding money continued to rise.

1960-82. M-1 velocity continued to grow about 3 percent per year from 1960 until 1982, whereas M-2 velocity growth was approximately zero over the whole period. The divergence in growth rates for M-1 and M-2 reflects binding interest-rate ceilings on loans to small businesses and innovations in the market that enabled depositors to economize on M-1 balances. The growth rate of M-1 velocity in 1960-82 was approximately 3 percent. In contrast, the Federal Reserve Board’s targets for M-1 and M-2 velocity were set at 0.5 to 1 percent during this period. The divergence between growth targets for M-1 and M-2 reflects binding interest-rate ceilings on deposits.