

Intermediate Targets and Indicators for Monetary Policy: An Introduction to the Issues

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This article is the introductory essay for a volume of papers, Intermediate Targets and Indicators for Monetary Policy: A Critical Survey, to be published by the Federal Reserve Bank of New York in December. In addition to the present essay, the volume includes a number of papers surveying the potential usefulness of various measures that have been proposed from time to time as intermediate policy targets and indicators. It also contains a critical review of some recent academic literature bearing on the "rules versus discretion" issue, together with a paper surveying the Federal Reserve's use of targets and operating guides in the postwar period.

The volume will be available from the Public Information Department of the Federal Reserve Bank of New York. Purchase information appears on page 91 of this issue of the Quarterly Review.

Over the years, a broad array of mainly financial variables has been proposed for use in formulating and implementing monetary policy. This collection of papers examines the potential value of these various measures as intermediate targets and/or indicators of monetary policy. It includes a review of the Federal Reserve's evolving approach to the use of policy targets and operating guides in the postwar period. It also contains an analysis of the recent academic literature on the theory of policy rules that is relevant to the potential usefulness of intermediate targets.

Systematic analysis of monetary tactics and strategy in light of the relationships among policy instruments, a broad array of monetary and financial variables and measures of economic performance, began to expand rapidly in the late 1950s. Over the subsequent decades the subject has generated a large body of literature. One early source of motivation for this work was monetarist criticisms of the Federal Reserve's post-Accord

procedures. In these procedures, the behavior of the money stock played, at most, only a limited role. Another impetus to the literature on monetary tactics was progress in modeling the markets for reserves and money. This work provided far greater analytical and quantitative detail on the connection between Federal Reserve actions and the response of the reserve and money aggregates than had previously been available.

Continuing controversy over the appropriate role of money stock targets sustained and intensified interest in the question of intermediate targets and their implementation in the 1960s and 1970s. Interest in the subject was especially intense in the period after the October 1979 announcement of a change in operating procedures designed to improve the implementation of targets for the monetary aggregates. By the early 1980s, signs of an emerging breakdown in the existing relationships of the money measures to the economy generated suggestions that money stock targets be

augmented or replaced by broad measures of liquid assets and credit. As the extent of the shift in the relationship of all these various measures to GNP became more apparent, however, research interest in their use as intermediate targets or indicators waned and their role in policy making diminished. More recently, as discussed in the relevant papers in this volume, some interest has been expressed by economists and policy makers in possible roles for nominal GNP and/or for market measures such as commodity prices, the yield curve, and foreign exchange rates as policy targets and/or indicators.

In general, however, confidence that there exist financial measures that can replace in part or in whole a basically judgmental, pragmatic, and eclectic approach to policy seems currently (1990) at a rather low ebb. Virtually without exception, the results reported in this volume support such a skeptical attitude. Nevertheless, as argued below, the issue is far from closed. Indeed, interest in the problem of devising and implementing "intermediate" guides for policy is likely to prove a hardy perennial in the years ahead.

Some terminology

One product of the debate on these issues has been the development of a useful and reasonably settled vocabulary to discuss them. One can imagine a spectrum of economic measures that has, at one end, the "ultimate targets" of monetary policy. These almost always include the price level and real output and sometimes also include the behavior of the balance of payments and the foreign exchange value of the dollar.

At the other end of this spectrum are the "instruments" of monetary policy. These include open market operations, the discount rate, and in earlier periods, required reserve ratios and Regulation Q ceilings on deposit interest rates. Just one step along the spectrum beyond these instruments are "operating targets," measures that can be controlled with a rather high degree of precision through manipulation of the policy instruments. Potential operating targets include measures such as nonborrowed reserves, the nonborrowed monetary base, and short-term money market rates, most notably the federal funds rate. Borrowings from the discount window clearly also constituted a potential operating target under the system of lagged reserve accounting that prevailed between 1968 and 1984, since the Trading Desk could take required reserves as predetermined within any reserve averaging period. Even under the present system of approximately contemporaneous reserve accounting, most people would probably still want to count borrowings as a potential operating target—though to achieve it in any given reserve maintenance period means that the Desk must

correctly estimate required reserves in the current period as well as market factors supplying reserves and the levels of excess reserves.

"Intermediate" measures, whether considered as "targets" or as "indicators," are variables that, as the term suggests, are intermediate between (1) the instruments and operating targets that are capable of rather tight control and (2) the ultimate target measures that can only be influenced indirectly. Measures of the money stock are perhaps the classic examples of such "intermediate" variables, but as noted, the list includes other broad financial aggregates, such as credit extended to the nonfinancial sectors, as well as market measures, such as the foreign exchange rate, that are thought to be significantly influenced by movements in the operating targets.

Some measures, as discussed in more detail in the appropriate papers, are a little harder to classify. Thus, for example, short-term interest rates are usually treated as operating targets but may also be treated as intermediate targets. Conversely, the monetary base is most often discussed as an intermediate measure but sometimes, more controversially, is viewed as a potential operating target. Nominal GNP is sometimes treated as a potential intermediate measure, at one step removed from its ultimate target components of prices and real output.

The various intermediate measures may have the potential to serve as intermediate "targets" and/or as intermediate "indicators" of monetary policy. "Targets" are, obviously enough, objectives the Federal Reserve seeks to achieve over some time period with some degree of precision and under some particular set of circumstances. The concept acquired legislative status with the 1975 congressional resolution requiring the Federal Reserve to report on its "plans and objectives with respect to the growth of the monetary and credit aggregates over the coming year," language that was repeated in the Humphrey-Hawkins legislation of 1978. The concept of an "intermediate target" seems to imply that to qualify, a measure should be (a) reasonably subject to control by the Federal Reserve through adjustment of its operating targets and (b) reasonably closely (that is, predictably) related to the ultimate targets or, in practice, at least to nominal GNP. Consequently, the papers in this volume examine the various measures considered as potential intermediate targets from both points of view.

The concept of intermediate measures as monetary "indicators" is a bit more complicated because it is sometimes taken to mean a measure of the stance of monetary policy and is sometimes interpreted as an indicator of current or future developments in the economy. In much of the earlier literature (early 1960s), the

term was interpreted in the sense of indicators of the stance of monetary policy—that is, as measures that could provide, in some sense, an index of monetary “ease” or “restraint.” The attempt to pin down such an index produced, and indeed continues to produce, a certain amount of confusion and ambiguity. Consider, for example, a situation in which the Federal Reserve is using interest rates as an operating target and has no intermediate target objective for the money stock. Suppose on entering a recession, the policy makers progressively lower their interest rate target, but, owing to the recession-induced decline in the demand for money, the money stock falls (probably along with a drop in total reserves). Measured in terms of intentionality, policy has clearly “eased,” because the declining short-term rates are, at least in large part, the direct result of policy decisions to ease. But if one believes that it is not intentionality but rather the impact of policy on the economy that matters, and if one also believes that this impact is best signaled by the money stock, then in this instance, the declining money stock indexes not an “easing” but a “tightening” of policy.

This may be a terminological problem in the sense that one may want to talk about an indicator of policy intentions or an indicator of policy impact and these may not be the same thing. But the distinction between measures of intention and measures of impact, if they are in fact different, may also raise an econometric issue: how to decide which intermediate measure, if any, should be treated as “predetermined” for estimating purposes. In this example, the money stock or short-term rates?

In any case, the recent technical literature has tended to focus on intermediate “indicators” (sometimes, in this context, also called “information variables”) not as measures of the stance of policy, but as measures of the present or prospective state of the economy. This is the sense in which the term is generally used in the present volume. To be sure, there are places in the literature where the two senses of a monetary “indicator” are conflated. For example, a rise in commodity prices or a steepening of the yield curve may be taken as indicating *both* that the prospects are for rising inflation in the future *and* that policy has been “easy” or, perhaps, “too easy.”

Clearly, the main requirement for a good intermediate indicator of the state of the economy is that it be reliably (predictably) related to the current or prospective behavior of ultimate goals such as inflation and/or real output. In practice, statistical tests have often been couched in terms of the relationship of the measure to nominal GNP.

A question arises whether a measure that has proved

to be a good indicator in this sense can then be used as an intermediate *target* while still continuing to be a good *indicator*. It has sometimes been asserted that when a financial aggregate such as the money stock becomes an intermediate target, presumably chosen in part because of its good indicator properties, these properties will then be altered (for the worse?) by the very fact of its targeting by the authorities. This may or may not be a problem with respect to financial aggregates that are treated both as intermediate targets and indicators. It clearly could be a complicating issue, however, for such market measures as commodity prices, interest rates, and the foreign exchange rate. Knowledge in the market that the behavior of the measure is being used by the authorities to make policy decisions is very likely to alter that behavior. Partly for this reason, proponents of these latter measures have generally advocated them for only a single purpose: for example, commodity prices and the yield curve, simply as indicators; interest rates and the dollar, either as indicators or as operating or intermediate targets, but *not both* as indicators and as targets.

Is there a case for intermediate targets?

It is clear that a coherent monetary policy requires a decision on operating targets. It is equally clear that “indicator” measures providing advance information about the current or prospective state of the economy are, almost by definition, of value. The usefulness of intermediate monetary *targets*, however, has always been more controversial. No measure selected for such a role will ever be perfectly predictably related to the ultimate targets that matter. At least *some* uncertainty, *some* short-term instability, and *some* longer term drift in the relationship of any intermediate target to final objectives seems inevitable.

It has therefore been argued that the use of intermediate targets will result in suboptimal decisions. Policy makers will adjust their operating targets, not directly in terms of the settings most likely to achieve their ultimate objectives but, instead, in terms of the settings most likely to achieve the intermediate target. According to this line of thought, intermediate measures such as the money supply may be useful, at best, as variables that may shed light on (1) the current state of the economy, perhaps because of more prompt reporting, or (2) the economy’s prospective future state, because of leading indicator properties. On the other hand, their use as intermediate targets is likely only to produce poorer control over ultimate targets than if instruments were adjusted directly in terms of objectives for these latter targets.

The logic of this criticism of intermediate measures as *targets* seems impeccable. Nevertheless, it misses

the heart of the case for the use of such targets, a case that encompasses a much wider range of considerations. This broader case envisions a number of potential benefits from the use of intermediate targets. It has been argued, for example, that intermediate targets can usefully provide a means of communicating the central bank's intentions to the public. Moreover, such targets can provide a form of central bank accountability.

The ultimate target measures may not be well suited for these various purposes. Thus, as discussed in the paper on nominal GNP targeting, there may be real problems in having an independent central bank set or announce goals for *ultimate* targets. Equally to the point, actual economic performance over any given period is subject to many important influences in addition to monetary policy. Hence it may be quite inappropriate to judge the success of this policy by the actual performance of the economy—that is, by the ultimate target measures—given the role of nonmonetary influences. By contrast, an intermediate target—a goal for the rate of money growth, for example—can be judged in advance for its probable consistency with acceptable economic outcomes. Moreover, it can be used to judge, *ex post*, whether the central bank's day-to-day decisions have been appropriate to achieving its intermediate target objective. Moreover, the existence of an intermediate target, defined over time periods such as a year, can be useful to the central bank as an internal check on the appropriateness of the shorter term settings of its operating targets.¹

But there are other fundamental arguments for the use of intermediate targets—provided suitable targets can be found. Thus it has generally been argued that over the long run, monetary policy can only affect nominal magnitudes. Its longer run influence over real growth, real interest rates, and employment mainly reflects its success or lack of success in achieving an environment in which economic decisions can be made with a minimum of concern and uncertainty about price level instability. If this view is correct, the appeal of intermediate targets in providing a “nominal anchor” for policy decisions is fairly clear. Such targets can provide, in principle, an indication that the longer run thrust of policy will be consistent with longer run goals for price behavior. In principle, at least, any one of the various monetary and credit aggregates could, if used as intermediate targets, provide this kind of “nominal anchor” for policy—as could nominal GNP.

¹These various arguments were cited in a speech, “The Contributions and Limitations of ‘Monetary’ Analysis,” given by Paul A. Volcker in September 1976 and most recently reprinted in the 75th anniversary issue of the Federal Reserve Bank of New York's *Quarterly Review*, May 1989.

Another role that has been suggested for intermediate targets is in dealing with the potential conflict that may exist between short- and long-run optimal policy, an issue known as the “time consistency problem” in the academic literature and in more informal discussions as the “credibility problem.” A conflict between short-run and long-run optimizing can arise from the fact that in the short run, the monetary authorities can probably engineer some extra real output, at least up to a point. They can only do this, however, through an expansionary policy that yields more inflation than is built into the public's expectations. According to widely accepted theory, increases in wages and prices that are more rapid than expected will “fool” the public into supplying more labor and goods under the mistaken impression that the higher wages and prices represent higher *real* rewards.

In the short run, there may be pressure on the central bank to seek output gains through such “surprise” inflation. But once the public comes to recognize that the policy makers are operating in a way that accelerates inflation, the public will anticipate this acceleration. Put simply, the attempt to boost output through policies that create surprise inflation will be self-defeating. Over time, the public will catch on, and the higher inflation will no longer be a “surprise.” Inflation that is anticipated will have no power to induce higher output. Thus over the longer run, the effort to induce higher output through excessively stimulative policies will fail. Output will be no higher than it otherwise would have been—trending at its potential rate over time—but the rate of inflation will be higher. Thus on balance, stimulative policies that seem attractive period by period will, over the longer run, simply result in higher inflation without any output gains—a result desired by no one.

An intermediate target, publicly announced and faithfully adhered to, could, in theory, avoid this kind of outcome. It could do so by effectively tying the hands of the authorities, preventing them from yielding to the temptation to seek short-run output gains in a process that over the longer run only guarantees higher inflation. Probably the best known prescription for using an intermediate target in this way is the constant money growth “rule” or, in some versions, money growth targets that settle down to such a rule after some period of accommodation to disequilibrium initial conditions.

Of course a monetary growth rule also has potential disadvantages. Thus while it may ensure reasonable long-run price stability, it makes no provision for accommodating shocks—whether from supply or demand—and thus may achieve long-run price stability only at the expense of unsatisfactory shorter run outcomes for both output and prices. It might be possible to design a more complex monetary growth rule that

allows money growth to adjust to such short-run disturbances, but in a predetermined way that still prevents the authorities from seeking short-run output gains at the expense of higher average inflation. However, monetary rules that embody such automatic response features may themselves create credibility problems—as discussed in the paper in this collection that reviews the “time consistency” literature.

It has to be emphasized that all these various potential virtues of intermediate targets—improved accountability, improved communication with the public, provision of a nominal anchor, and prevention of short-run decisions that serve merely to raise inflation over the longer run—can be achieved only if *suitable* target measures exist. As noted earlier, “suitable” in this context means measures that are “sufficiently” controllable and “sufficiently” stable in their relation to the ultimate objectives. But this is not an all or nothing matter. No intermediate target will be perfectly controllable, even over a year. And no measure will be related in a perfectly predictable way to the ultimate targets. At least some slippage on both counts is inevitable. On the other hand, even if there is some slippage, the benefits derived from intermediate targeting may, over the longer run, outweigh the costs that arise as a result of this slippage. Clearly it is a matter of more or less—that is, a question of *how much* slippage can be expected from the use of intermediate targets, on the one hand, and *how much* one values their potential longer run benefits on the other. Typically, individuals most concerned with long-run inflation results have tended to minimize the problems with intermediate targets, while those most concerned with the shorter run real output consequences have tended to worry most about these problems.

Evaluating the candidates

Eight papers in this volume examine individual candidates or groups of candidates—for example, the multiple measures of money and credit—as potential targets and/or indicators of policy. While the papers differ somewhat in organization and emphasis, they all touch on certain common issues. These include (1) the theoretical basis for believing that the particular measures in question might be useful targets or indicators, (2) the statistical evidence for believing a relationship to ultimate targets exists and evidence for the stability of any such relationship, (3) issues of central bank control, and (4) the question whether the measure, even if not used as a formal target, might be useful in a subordinate role. For example, the paper on interest rates considers the possibility that even if interest rates make little sense as an intermediate target, upper and lower bounds for real short-term rates might neverthe-

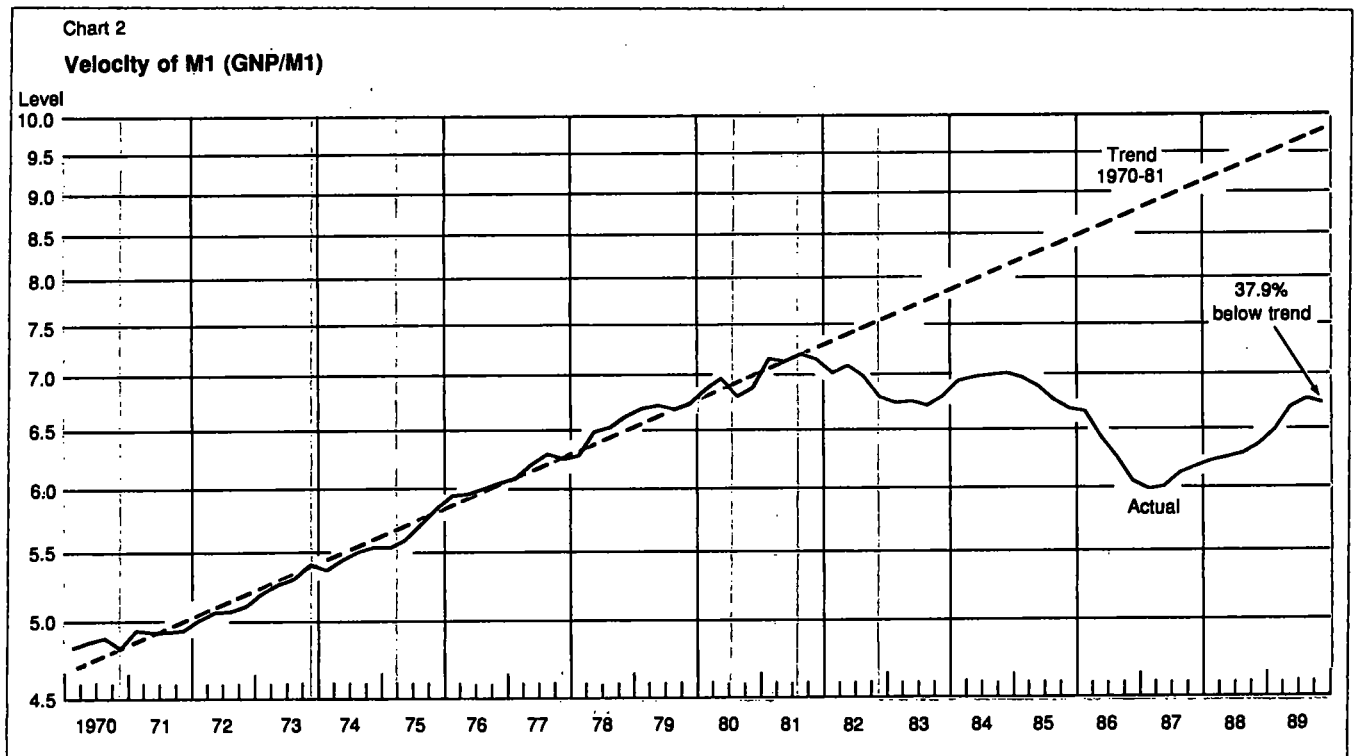
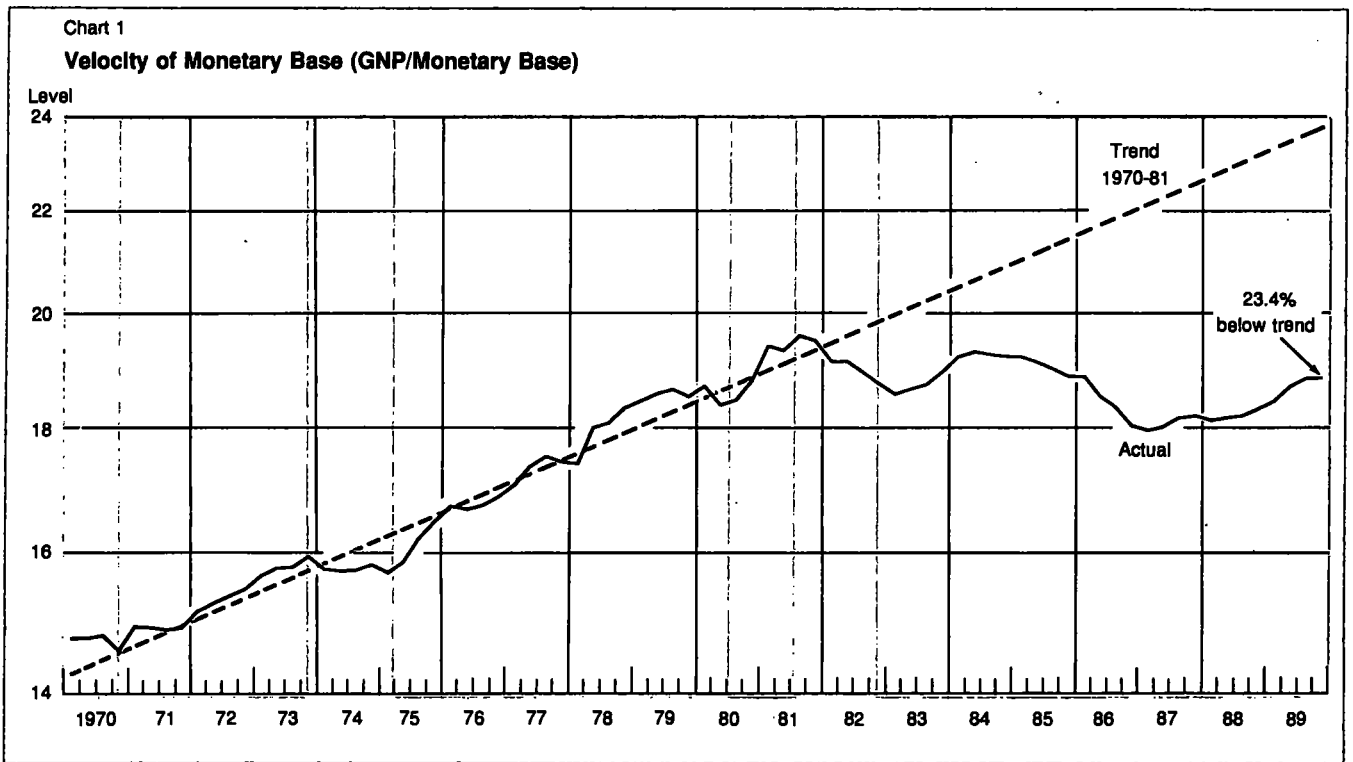
less be useful as “constraints” on settings for an interest rate operating target.

As noted earlier, the most frequently advocated measures for intermediate targeting over the past three decades have been the various measures of the money stock and the monetary base, and more recently, liquid assets and various credit measures. The statistical results for these measures form a vast literature varying in method, sophistication, periods covered, and conclusions. This literature is summarized and evaluated in some detail in the individual papers in this volume. It may be useful here, however, to give some crude sense of the problems that developed for these measures in the 1980s.

Charts 1 to 6 show the departure from trends of the GNP velocities of a number of potential intermediate target measures in the 1980s. These departures are clearly large in all cases—greatest for M1, the monetary base, and nonfinancial credit; less for M2, M3, and liquid assets. These departures from past experience are fairly easy to explain in some cases. Thus the velocity of narrow money (and the monetary base) almost certainly fell because of declines in inflation, nominal interest rates, and hence the opportunity cost of holding these measures. Explanations in the case of the broader measures that internalize the effects of market interest rate movements seem less clear.

In any case, the same pattern of major departures from earlier postwar relationships is evident in Table 1, showing regressions of growth in nominal GNP on current and lagged growth in these various financial measures. As the error measures suggest, equations estimated on data from 1960 to 1979 do a very poor job in estimating GNP growth in the 1980s. And as Table 2 shows, similar equations estimated over data from 1981 to 1989 have almost no explanatory power, with coefficients that are not significant (indeed usually negative!) for all measures except the monetary base. This kind of result makes clear the reasons for the growing disillusionment in recent years with the potential of these measures as intermediate targets or indicators.

The other property required of a potential intermediate target (as opposed to *indicator*) is of course controllability, and that poses a different set of problems. Some of the broader measures, such as total liquid assets and aggregate credit, are clearly not closely related to Federal Reserve operating targets. They can perhaps only be controlled indirectly—that is, by first controlling GNP! The narrower measures such as M1 and M2 have clearly retained substantial interest rate sensitivity for horizons out to a year or so because many of their component own-rates respond only slowly to changes in market rates. As a result, growth in such measures may be rather sensitive to changes



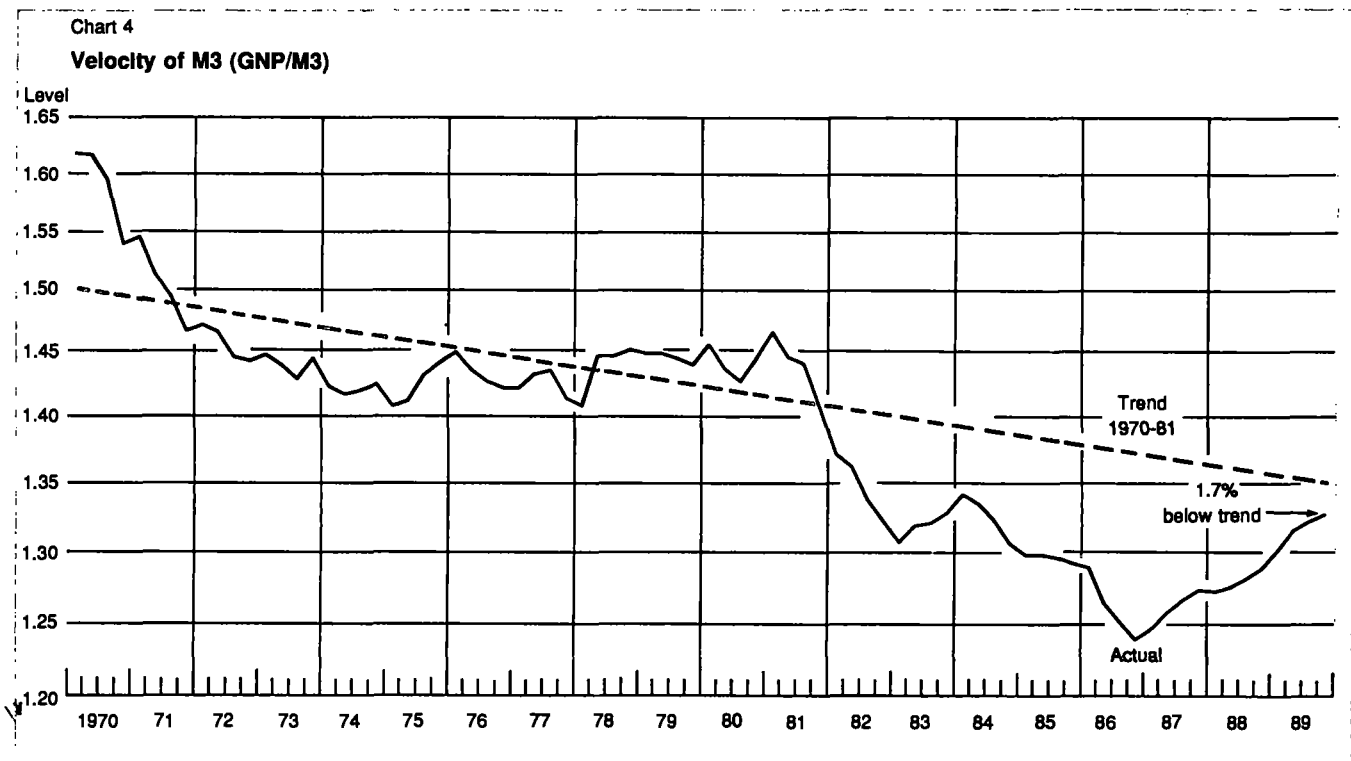
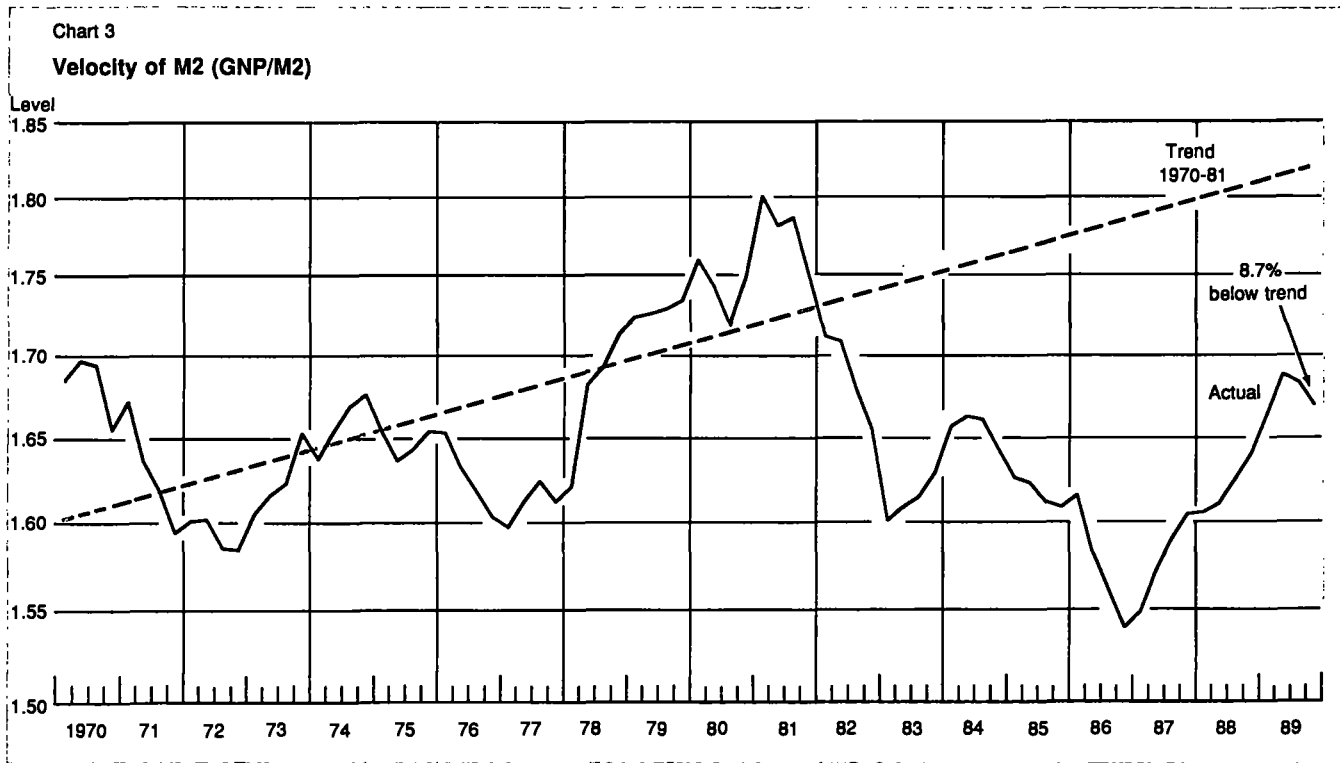


Chart 5
Velocity of L (GNP/L)

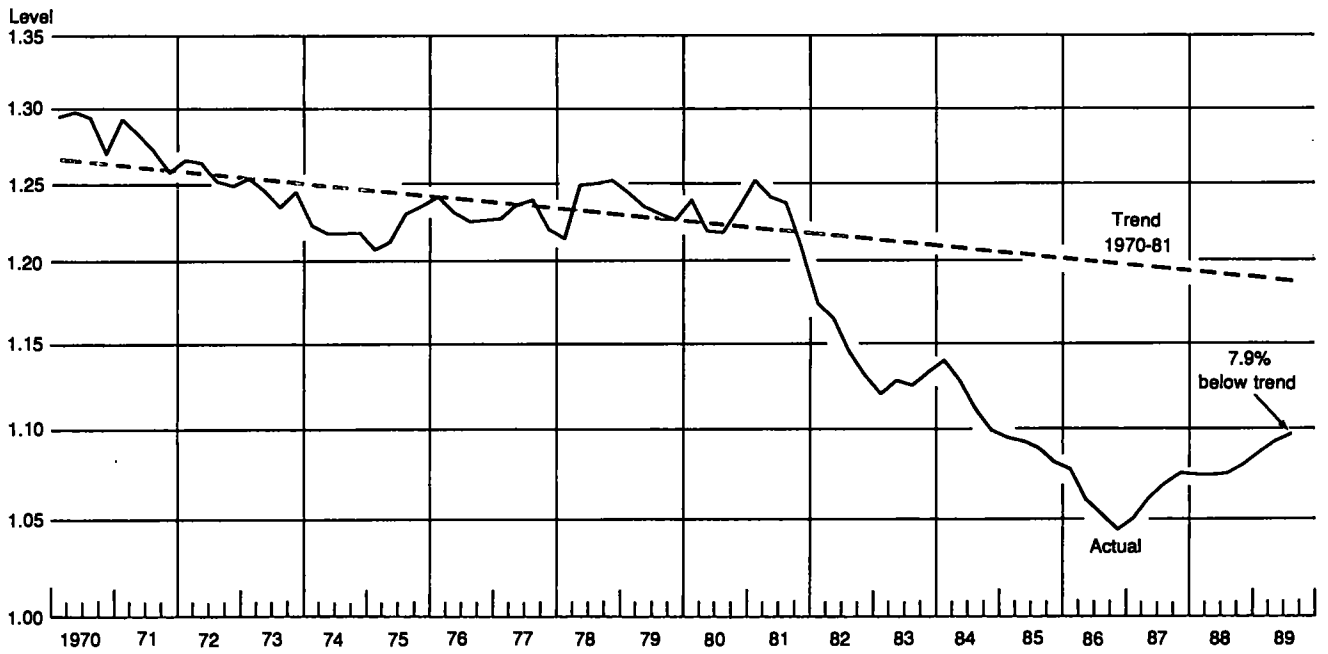
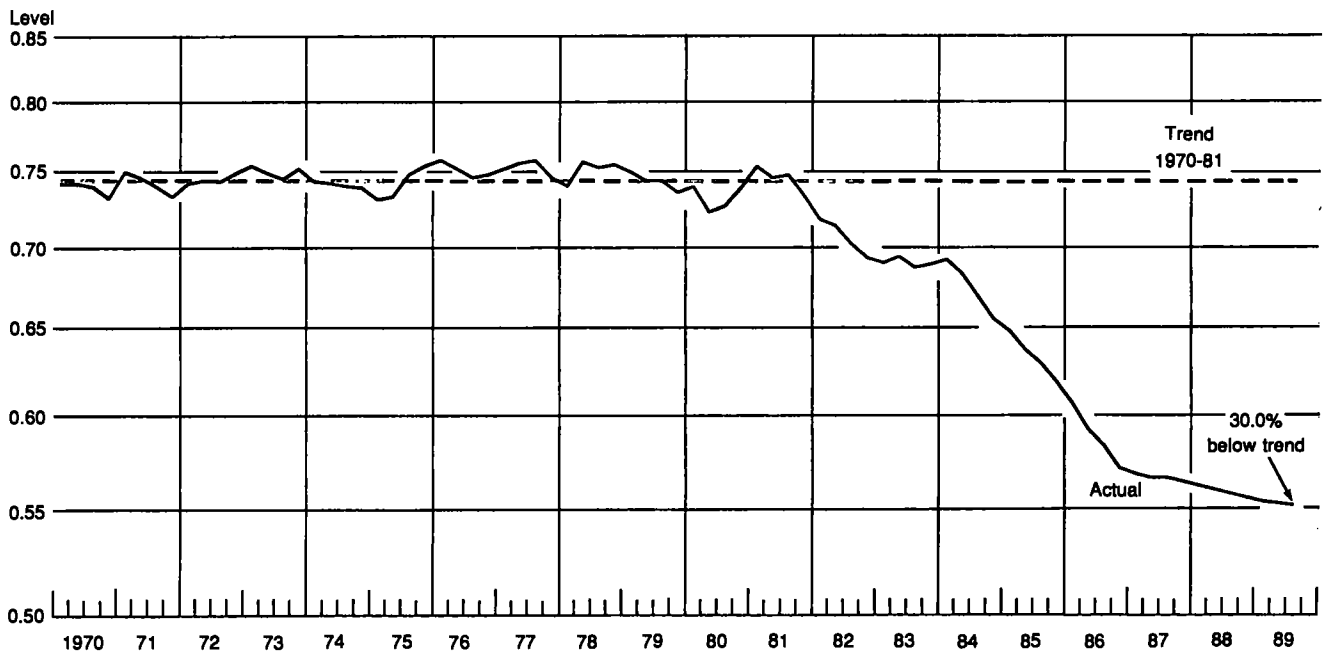


Chart 6
Velocity of Nonfinancial Debt (GNP/Debt)



in interest rate operating targets. That very sensitivity is itself a problem, however. Thus it makes the GNP outcome associated with any successfully-achieved growth rate target for the aggregate quite sensitive to shifts in the demand for goods and services—at least over periods out to a year or so. Use of such targets, therefore, either will imply a wide range of uncertainty about the GNP outcome associated with a given money growth rate or will make it seem desirable to define targets in terms of broad ranges of growth rates. This latter approach, however, clearly weakens the usefulness of such targets for many of the purposes they are designed to serve.

The breakdown in earlier relationships between financial aggregates and nominal GNP in the 1980s has led a number of academic writers to suggest that the velocity problem could be “solved” by targeting nominal GNP directly. Such an approach has some attractive features. A long-run nominal GNP growth rule set in light of the expected trend growth in real output would establish a “nominal anchor” for policy. Adhered to as a “rule,” with or without automatic feedback mechanisms, it would solve the short run/long run inconsistency problem and would satisfy the other objectives of an intermediate target. In the short run, adherence to a nominal GNP target would automatically offset both the price and the real effects of demand shifts and would split the impact of supply shifts between real output and prices.

Unfortunately, the nominal GNP approach appears to

have equally large problems. First, it “solves” the velocity problem only on the assumption that there exists a way of accurately achieving a nominal GNP target with the means at the disposal of the central bank. Obviously the method of choice would *not* be through intermediate money targets, for that would simply reintroduce the velocity problem. A different option would be to aim at GNP targets through constant resetting of an interest rate operating target. Clearly success with such an approach is far from assured.

A second difficulty is that to get a handle on final objectives with a nominal GNP target, you need to have a predictable relationship between nominal GNP and output in the short-run—that is, you need to be able to predict the price/output split resulting from a given GNP result, at least to the extent that you have short-run output objectives. But of course this problem is shared with other potential intermediate targets such as money growth rates.

A third difficulty is that a fixed nominal GNP rule could, under quite plausible conditions examined in the GNP paper in this volume, generate problems of dynamic instability in the path of real output in the face of supply shocks and, apparently, in the face of prior misses in hitting the nominal GNP objective. Such problems can be avoided by resetting, on a discretionary basis, the nominal GNP target year by year. But this approach would create a very uncomfortable situation for a central bank that is “independent within the government.” Year-by-year settings of GNP targets

Table 1

Summary Statistics from Reduced Form Equations

1960-II to 1979-IV

	\bar{R}^2	SEE	DW	Actual-Predicted for 1980-89		
				Average Error	Average Absolute Error	RMSE
Y = 2.49 + 1.18M1 (2.39) (6.29)	0.34	3.66	2.05	-4.13	5.72	6.16
Y = 1.43 + 0.85M2 (0.99) (5.19)	0.24	3.92	1.86	-0.38	3.55	4.48
Y = 1.57 + 0.75M3 (1.07) (5.07)	0.23	3.94	1.86	-0.55	3.40	4.49
Y = 0.37 + 0.93L (0.25) (5.69)	0.30	3.78	2.01	-0.97†	3.67†	4.54†
Y = 1.00 + 0.87Debt (0.59) (4.54)	0.29	3.80	2.08	-2.65†	4.35†	4.77†
Y = 2.72 + 0.98Base (2.34) (5.33)	0.27	3.85	1.92	-2.40	3.99	4.41

Notes: All equations regress the growth rate of nominal GNP on the current and four lagged growth rates of the financial aggregate. Figures in parentheses are “t” values. L represents the Federal Reserve Board’s measure of liquid assets.

†1980-I to 1989-III

would come very close to setting year-by-year targets for real growth and inflation. Such a situation could well create pressures for precisely the kind of short-term optimization that produces the worst of all possible worlds over the long run—that is, it would seem to maximize the risks of creating the kind of “time consistency” problem cited earlier. Overall, it seems quite possible that as a practical matter, discretionary nominal GNP targeting could result in worse inflation outcomes than might exist in the absence of any intermediate target at all. In summary, the nominal GNP route appears, on closer examination, to be no panacea for the problems created by the velocity instabilities of the 1980s.

The remaining measures examined in this volume, commodity prices, the yield curve, and the foreign exchange value of the dollar, have generally been proposed as intermediate indicators that might be used to guide settings of the operating targets, rather than as intermediate targets themselves. Because these markets are often regarded as efficient in incorporating relevant economic information, they could perhaps signal changes in the economic outlook very quickly.

In the case of commodity prices, it seems likely that these prices could in fact be targeted through direct open market operations in commodity markets. Indeed, that is just what a “commodity standard,” whether defined in terms of a basket of commodities or a single commodity such as gold, would involve. Instead of such

operations, it has been suggested merely that commodity prices may represent sensitive advance indicators of changes in general inflation rates that can be used to signal the need to tighten or ease the conventional operating targets.

The results surveyed in the paper on commodity prices included in this volume suggest that movements in commodity price indexes do have a marginal contribution, but only a marginal contribution, to make in forecasting inflation. As leading indicators of turning points in broad movements in the overall inflation rate, commodity price measures, suitably averaged and smoothed, do have some predictive value. But they have also at times given false signals of turning points in the general inflation rate. In the case of correct signals, moreover, their lead times tend to be rather variable and there appears to be little relation between the *magnitude* of commodity price movements and the magnitudes of subsequent movements in overall inflation. On balance, it appears that commodity prices may be reasonable additions to the items the central bank “looks at” when it surveys the prospects for inflation. They do not, however, add much to more conventional methods of assessing the outlook for inflation.

Another market measure that has been proposed as an indicator but not as a target of monetary policy is the yield curve. In this case, the question whether the measure is to be thought of as an indicator of the stance of policy or an indicator of the future course of the economy is somewhat ambiguous. And this ambiguity is directly related to the theoretical assumptions underlying the attention sometimes given to the yield curve for either or both of these roles. Belief in the indicator properties of the yield curve appears to rest on the expectations theory of the yield curve—the view that longer term rates should be regarded as (weighted) averages of the market’s expectations of the future course of successive short rates. While this theory has considerable intuitive appeal, empirical tests of its validity over the years have produced mixed results.

Even if the expectations theory of the yield curve is accepted as correct, moreover, the theoretical implications of particular yield curve configurations, as interpretations both of monetary policy and of prospective economic performance, appear to be ambiguous. This ambiguity stems in part from another widely accepted theoretical premise—that nominal interest rates reflect the sum of a real rate and an inflation premium that allows for the expected rate of inflation over the life of the instrument. Thus an upward rising yield curve, for example, could imply either that the market expects real short-term rates to rise in the future or that it expects the rate of inflation to rise.

Against this background, the paper on the yield curve

Table 2

Summary Statistics from Reduced Form Equations
1981-I to 1989-IV

	R ²	SEE	DW
Y = 5.85 + 0.16M1 (4.17) (1.03)	0.06	3.67	1.36
Y = 7.21 + 0.01M2 (2.88) (-0.02)	0.02	3.76	1.31
Y = 8.05 + 0.06M3 (3.16) (-0.21)	0	3.79	1.33
Y = 9.46 + 0.21L (3.33) (-0.21)	0.06†	3.69†	1.38†
Y = 10.80 + 0.30Debt (2.85) (-0.90)	0.07†	3.66†	1.51†
Y = 0.37 + .99Base (0.12) (2.56)	0.16	3.48	1.51

Notes: All equations regress the growth rate of nominal GNP on the current and four lagged growth rates of the financial aggregate. Figures in parentheses are “t” values. L represents the Federal Reserve Board’s measure of liquid assets.

†1981-I to 1989-III

in this volume points out that it would be very hard for a central bank to interpret the significance of, for example, a steepening of the yield curve on the basis of theoretical considerations alone. Such a steepening could mean that the market expects inflation to accelerate, which the central bank could interpret as a need to tighten. Alternatively, it could mean that the market expects a rise in the productivity of capital and hence a rise in real short-term rates and an acceleration of real growth. This cause of a steepening in the yield curve might or might not imply a need to change the settings of operating targets depending on circumstances. A third possibility is that the steepening reflects a market judgment about the future of monetary policy itself—that is, that policy is expected to tighten, real short rates to rise, and therefore, quite possibly, real growth to slow. So a central bank looking at a change in the yield curve must try to sort out its possible meanings and then must decide what implications, if any, the change may have for policy.

Despite these interpretive ambiguities at the theoretical level, the yield curve paper gives some fairly concrete results. It suggests, for example, that the Federal Reserve does have significant power to affect the yield curve by changing the federal funds rate as an operating measure. Since no one proposes the yield curve as a *target*, however, this is of rather limited significance. But the paper goes on to suggest that the yield curve, simply as an empirical matter, has proved to have significant forecasting value for both real output and inflation, even in the presence of other forecasting variables such as short-term interest rates, the leading indicators, and the consensus of economists' forecasts.

One has to wonder, however, how this forecasting value might be affected if the yield curve were to become a major forecasting tool for the authorities and if the market were to become aware of such a development and were to respond accordingly. A kind of "two-person game" situation between the market and the authorities might greatly distort the behavior of the yield curve relative to what it would be in the absence of a belief in its indicator significance.

Finally, the increasing sensitivity of the U.S. economy to international developments has led to growing interest in the use of the foreign exchange value of the dollar as a guide for U.S. monetary policy. However, the paper on this topic emphasizes that, because of important differences between exchange rates and more traditional variables, the systematic use of the dollar's value in U.S. monetary policy operations is likely to be highly problematic and would almost certainly raise considerations beyond those traditionally incorporated in U.S. policy deliberations. In particular, manipulation of policy instruments to regularly counter or "target"

dollar movements could be destabilizing for the U.S. economy under a wide range of circumstances and could require a significant degree of international policy coordination.

The paper does suggest that exchange rates can play a useful role as policy indicators but generally only under fairly limited circumstances. At times, for example, foreign exchange market conditions have proved helpful in gauging market perceptions and the likely reactions to policy changes. Beyond these circumstances, however, the evidence raises considerable doubts about the reliability of exchange rates as regular indicators of underlying inflation pressures or the monetary policy stance. Accordingly, on present knowledge, the case for upgrading the role of the dollar in U.S. monetary policy formulation appears questionable.

A future for intermediate targets?

The cumulative effect of the papers included in this volume is to leave one impressed with the limitations of *all* the various measures, certainly as intermediate targets and, for the most part, even simply as indicators. But if all potential intermediate targets have problems, it is also important to recall the many ways in which policy conducted without *any* such target is itself less than satisfying.

In practice, conducting policy without reference to intermediate targets means setting operating targets directly in line with changing assessments of the likely outcomes for the ultimate goal variables. Perhaps most often, this will mean adjusting some money market rate in line with changing projections of the future behavior, under assumed paths for such a rate, of prices and real output.

The difficulties of this approach to policy making are numerous. Perhaps the most obvious problem is the need to assess correctly the *future* state of the economy under alternative assumptions about settings of the operating targets. Note that it is the future state of the economy that matters given the universally acknowledged existence of significant lags in the impact of policy on output and prices. While there is substantial evidence that experienced macro forecasters can improve significantly on naive extrapolative procedures in projecting the future, it is also clear that forecasting remains as much an art as a science. Macro forecasting normally reflects a blend of reliance on econometric models, interpretation of incoming information (both statistical and "anecdotal") on the current state of the economy, and the selective use of an array of leading indicator measures. While such forecasting is clearly useful—indeed, absolutely necessary given the lags of policy's impact—it is also obviously fallible. As a further complication, policy

decisions must be based on *multiple* forecasts, implicit or explicit, that are conditional on multiple alternative settings of the operating variables under consideration.

The well-known limitations on the ability to forecast raise the risk, moreover, that policy makers will find themselves putting undue weight on the *current* state of the economy despite the acknowledged importance of lags in the process. And of course absent intermediate targets, policy-making procedures do not readily lend themselves to an "objective," quantitative way of communicating the intentions of policy to the public or of evaluating its success after the fact. Even more serious, an approach that relies on setting operating targets in light of projected future economic outcomes fails to provide a "nominal anchor" for policy and does nothing to solve the conflict between period-by-period and long-run optimizing in policy making.

So we have a real tension here. On the one hand, intermediate targets, if suitable ones exist, have the potential for improving the overall performance of monetary policy, especially over the longer run. But, to repeat, "suitable" means not merely controllable, but sufficiently tightly related to ultimate goals that slippages can be ignored and thus the forecasting problem bypassed. The experience of the 1980s has left serious doubts that such "suitable" target measures do in fact exist. Faced with this tension, the Federal Reserve has in practice compromised. It has continued to set intermediate targets for money and credit aggregates — as, indeed, it is required to do by law — but it has defined these targets in terms of rather wide ranges (generally 4 percentage points for annual growth rates). Moreover, on occasion the Federal Reserve has felt free to allow even these wide ranges to be violated when it has appeared likely that the targets could be achieved only at the expense of inferior economic outcomes — or at least outcomes that are "inferior" within the one-year time horizon of the current targeting process. The target measures have been given more attention when at the top or bottom of their ranges, with particular atten-

tion focused on the behavior of M2. In summary, intermediate targets have continued to exist, but only as rather wide ranges and without any clearly defined means of connecting them with day-to-day or month-to-month operational decisions.

Even under these circumstances, the extant intermediate targets have had some value in providing a "nominal anchor" — though one that tends to drag a bit — and have provided a means of connecting, if somewhat loosely, short- to intermediate-run objectives with the longer run objectives for price performance. Nevertheless, it is apparent that their usefulness for these purposes falls far short of what, at least in theory, could be provided by more formal adherence to a *satisfactory* intermediate target.

The broad appeal of the intermediate target concept is such that interest in it seems bound to persist. Research on the subject has continued, both within and without the Federal Reserve System. In particular, some economists at the Federal Reserve Board have developed evidence to suggest that long-run M2 velocity may have retained enough stability to make M2 behavior a useful indicator of the longer run behavior of inflation. In the meanwhile, it is possible that after the major shocks to the monetary aggregates (and possibly also to broad credit measures) from financial innovation and deregulation in the 1980s, these aggregates may settle down to a pattern of behavior that, if changed from earlier decades, has nevertheless again become predictable enough to be useful.

The future role of intermediate targets in the policy-making process is certainly likely to depend in part on such potential developments. But given the short-run slippages that would inevitably persist between intermediate targets and ultimate objectives even under the best of circumstances, the future role of intermediate targets probably also depends on the weight that is given to the objective of long-run price stability. It is in the context of such an objective that the potential usefulness of intermediate targets is particularly clear.