
FRBSF WEEKLY LETTER

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Ending Inflation

It now is widely recognized in the United States that price stability is the most appropriate long-term goal of monetary policy. Last year, Representative Stephen Neal proposed that this goal be recognized formally in legislation that would instruct the Federal Reserve to lower the inflation rate to zero within five years and maintain constant prices thereafter. This proposal was endorsed by Federal Reserve Chairman Alan Greenspan and a number of Reserve Bank Presidents (Parry 1990).

But in addition to the long-term goal of price stability, the Fed also has the goal of averting or minimizing the effects of downturns in economic activity. These objectives call for differing, and sometimes conflicting, policy actions, which raises the issue of which should take precedence at any particular time. Currently the Fed decides this issue on a discretionary basis, responding to a wide range of indicators of economic and financial activity and of inflation.

Many economists argue that a discretionary approach produces an inflationary bias in policy, as the goal of price stability tends to be sacrificed to short-term stabilization goals. These economists recommend abandoning discretion in favor of a monetary policy rule that explicitly binds policymakers to actions that stabilize prices. Proponents of discretion respond that, although rules may enhance price stability, they would be likely to involve unacceptably large losses of economic output when inflation was being reduced or when inflation shocks were encountered.

In this *Letter*, we assess the merits of a type of policy rule that was designed to address the concerns of both camps in this debate—ensuring price stability while attempting to limit disruptions of economic activity.

Targets

Choosing a policy target is the first step in moving away from discretion and toward a rules-based approach to monetary policy. Economists

disagree over which variable would be the most effective target mainly because of differences in their views of the structure of the economy.

Traditionally, the money supply has been considered an appealing target because inflation is caused by excessive monetary growth in the long run. Moreover, the money stock is closely related to the actions the central bank takes to implement policy. These considerations were instrumental in the Federal Reserve's decision to establish target ranges for several monetary aggregates beginning in the mid-1970s.

In the last decade, however, the relation between the money supply, on the one hand, and economic activity and prices, on the other, has become unstable, and thus difficult to predict in the short to intermediate run. This instability, which apparently is related to the deregulation of the financial system, has greatly limited the usefulness of money as a target. As a result, although the Fed still establishes monetary ranges, they no longer play the key role in policy.

Problems with the stability of the monetary aggregates have led to increased interest among economists in nominal GNP as a policy target. This variable measures the current dollar value of economic output (in other words, real GNP times the aggregate price level). Given this definition, it would be easy to calculate the path of nominal GNP that would be consistent with long-run price stability, so long as real GNP had a predictable long-run trend.

However, there is some debate over whether real GNP follows such a trend. Until the 1980s, it was widely believed that real GNP did have a stable trend that was determined by gradually evolving movements in the labor force and productivity. Recently, however, a number of researchers have argued that real GNP does not have a stationary trend, but rather is buffeted by technological and labor supply shocks that permanently alter its level. If this "real business cycle" view is correct,

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the price level could drift over time under nominal GNP targeting. Statistical tests cannot distinguish very well between these two hypotheses, casting doubt on the effectiveness of nominal GNP as a target in stabilizing prices.

In part because of this concern, some economists have argued that the Fed should target prices directly. Regardless of how real GNP behaves, direct price-level targeting could avoid long-term price-level drift. But the effectiveness of this target also is subject to debate, because of differing views of the flexibility of prices. Proponents of price-level targeting believe that prices are relatively flexible—a critical feature of the real business cycle theory.

Keynesian economists, on the other hand, believe that prices are “sticky,” so that policy has its principal immediate effects on output, and only later affects prices. Hence, attempts by the central bank to achieve a predetermined path for prices might involve high short-run volatility in output. Moreover, many of these economists downplay the role of disruptions to an otherwise stable trend in real GNP, and thus believe that nominal GNP makes more sense as a target than prices.

Operational rules

Even if the appropriate policy target were readily apparent, such knowledge would not suffice to establish a rules-based monetary policy procedure. Most target variables cannot be directly controlled by the central bank. Thus, a policy rule also must be chosen that defines the actions the central bank will take in response to movements in the variable it targets. Those actions are defined in terms of movements in a variable called the policy instrument, which must be under the direct control of the central bank.

McCallum (1988) has proposed specific monetary policy rules that merit consideration. These rules have nominal GNP or the price level as the policy target, and the monetary base as the instrument. They are operational, in the sense that they specify precisely how the central bank should change the monetary base in response to nominal GNP or the price level.

Another appealing feature of these rules is that their implementation does not depend upon any

particular economic model. Thus they sidestep the theoretical debates about the “right” structure of the economy. The rules involve adjusting monetary policy to observed misses of a variable from its target value, and do not depend upon any forecast that would require a particular macroeconomic model to be used.

In particular, these rules have two components. First, they specify a long-run equilibrium growth rate for the monetary base that is estimated to be consistent with price stability. This component allows the base to expand enough to accommodate the (noninflationary) trend rate of expansion of economic output (that is, in this component, growth in the base is equal to growth of potential GNP plus trend growth of the velocity of the base).

Second, the rules specify responses to deviations between the actual and desired values of the target variable. For example, if nominal GNP is above its target in any quarter, the nominal GNP rule calls for the Fed to reduce the growth rate of the monetary base by some fraction of the target miss. The strength of this response could be raised or lowered depending on how aggressively the central bank wished to pursue its target. Presumably, a more aggressive response would tend to involve more precise control of the target variable in the short run, but possibly with more volatility in economic activity, while a more gradual response would produce the opposite result. Thus the McCallum rules can be tailored to the objectives of the central bank. However, even with a gradual response, the rules are designed to ensure price stability in the long run.

The choice of the monetary base as the policy instrument is controversial. The advantage of this variable is that it can be accurately controlled by the Fed. Moreover, data on it are widely available, so that the public can easily observe the central bank's adherence to its rule, and thus hold the central bank accountable for its actions. The disadvantage of the of the base is that its relationship to nominal GNP has been less stable since the deregulation of the financial system.

Two features of the McCallum rules tend to mitigate this problem. First, they include a term that gradually adjusts the equilibrium base growth rate for changes in the relationship between the base and nominal GNP. Second,

the structure of the rules ensures that changes in that relationship automatically are offset by policy. For example, if nominal GNP rises above its target because of an unexpected change in that relationship, the rule will require the Fed to reduce growth in the base until nominal GNP is brought back on target. Instability in the base could therefore cause temporary problems for monetary policy, but eventually they would be corrected under the rule.

Would the McCallum rules work?

Given the uncertainties about the structure of the economy, it would be risky to adopt a rule unless it were likely to work well in a variety of different economic environments. Do McCallum's rules satisfy this criterion? In a study for the Bank's *Economic Review* (Judd and Motley 1991), we analyzed this issue by conducting counterfactual simulations of how the economy would have evolved if the Fed had used the rules in the past.

We conducted these tests in the context of several models that incorporated the various features of the economy that are crucial for the performance of alternative rules. Thus we tested models with fixed prices, flexible prices, a stationary, and a nonstationary trend in real GNP. To measure the uncertainty associated with using the rules, we conducted repeated (stochastic) simulations for each rule under alternative sets of shocks, and constructed ranges of outcomes (confidence intervals) for the economy.

We found that the nominal GNP rule was successful at achieving price level targets in all of the models tested. Moreover, that rule appears capable of holding prices close to the target level even in the face of the kinds of unexpected developments typically experienced in the U.S. economy. The price-level rule, by contrast, produced wide swings in real GNP and prices in the model that assumed sticky prices. Given the uncertainty about which model is most appropriate, this result argues for nominal GNP, and against prices, as the target.

Using the nominal GNP rule, we simulated the possible effects of moving from the 4½ percent inflation rate in 1990 to zero inflation in 1995

as specified under the Neal Amendment. The results suggest that this rule had a high chance of success under all the models. Moreover, none of the models suggested that the disinflationary process would increase the probability of a recession significantly compared with that experienced over the past 35 years under actual policy. Under the most likely outcome, annual real GNP growth would not fall below 1½ percent.

We did find one problem with the nominal GNP rule. It raised the short-run volatility of real GNP relative to that observed under current discretionary policies. However, it is important to bear in mind that our estimates may represent upper bounds on the detrimental effects on income volatility of following the rule. Adopting a rule should enhance Fed credibility, which would reduce uncertainty in the economy and could have beneficial effects on volatility.

Overall, the McCallum-type nominal GNP rule shows promise as a way to eliminate inflation without greatly increasing the chances of a recession. The rule also could ensure price stability thereafter, possibly at the expense of more volatility in real GNP. Whether this rule seems worth trying depends on the importance placed on achieving and maintaining zero inflation compared with the risk that the economy would be more volatile.

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