FEDERAL RESERVE BANK OF MINNEAPOLIS QUARTERLY REVIEW

QR

DECEMBER 2004

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The Evolution of U.S. Earnings Inequality: 1961–2002

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FEDERAL RESERVE BANK OF MINNEAPOLIS

Quarterly Review Vol. 28, No. 2

ISSN 0271-5287

This publication primarily presents economic research aimed at improving policymaking by the Federal Reserve System and other governmental authorities.

Any views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

The *Quarterly Review* is published by the Research Department of the Federal Reserve Bank of Minneapolis. Subscriptions are available free of charge. This has become an occasional publication, which is published once or twice a year. The publication, however, continues to be known as the *Quarterly Review* for citation purposes.

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Quarterly Review
Research Department
Federal Reserve Bank of Minneapolis
P. O. Box 291
Minneapolis, MN 55480-0291
(Phone 612-204-6455/Fax 612-204-5515)

Subscription requests may be sent to the circulation assistant at Barbara.drucker@mpls.frb.org; editorial comments and questions may be sent to the managing editor at Linda.white@mpls.frb.org .

Avoiding Significant Monetary Policy Mistakes

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With low inflation now a reality, the Federal Open Market Committee (FOMC) has achieved one of its primary objectives. Nevertheless, some have asked if this result is a product more of good fortune than of good policy. (See, for instance, Ihrig and Marquez 2003.) In this article, we consider a related issue of whether the FOMC policy framework is sound or, alternatively, it was rescued by good luck. In particular, we ask, Do the current policy procedures of the FOMC lead to too much risk of a bad inflation outcome? We argue that they do, and we then propose a type of inflation targeting to contain the risk.

For some time, the United States has experienced a fairly steady, low rate of inflation. However, some investigators attribute a majority of this apparent monetary policy success to surprisingly strong growth in productivity and to inexpensive imports stemming from weak foreign economies. If monetary policy played a relatively minor role, it also follows that monetary policy could have erred on the side of ease and that those errors could have been covered by favorable outcomes for productivity and foreign trade. Thus, the appropriateness of FOMC procedures cannot be judged solely on the recent record with respect to inflation.

Our approach is to consider properties of optimal policy, as determined from modern economic theory, and then determine how current procedures measure up. We conclude that current procedures put too much emphasis on short-term countercyclical policy and too little emphasis on long-term inflation control. We argue that these shortcomings could lead to significant monetary policy mistakes, because they insufficiently value both the benefits of low inflation and the costs of high inflation or rapid deflation.

A material policy mistake in our judgment would be to allow a significant rate of inflation or deflation. Such outcomes are costly, we believe, because they lead to misallocations of resources. As the rate of inflation rises, holding money relative to physical assets becomes increasingly costly, so that people expend more and more resources to economize on their money holdings. In contrast, as the rate of deflation rises, holding money relative to physical assets becomes increasingly attractive, so that capital investment is discouraged. An example of an economy suffering the costs of a more-than-moderate inflation rate might be the U.S. economy in the 1970s.[1]

*The authors thank Ben Bernanke, Ron Feldman, Bob Lucas, Ed Prescott, Art Rolnick, and Warren Weber for helpful comments. They are not responsible for any errors; nor do they necessarily agree with the authors' views.

[1] Atkeson and Kehoe (2004) find many cases of countries running small deflations without suffering contractions in output. However, they conclude that outside

In this article, we critique current monetary policy procedures and propose some changes. We first describe some properties of optimal monetary policy in a framework consisting of a general model and standard economic policy objectives. We describe our model in terms of some key economic relationships that we argue all monetary policy-making models should capture. We conceptually combine such a model with appropriate social objectives to derive properties of optimal policies. We next describe how current policy deviates from optimal policy and argue that the differences lead to a bias in favor of overly active countercyclical policy and in neglect of long-term inflation control. We conclude with a proposal to address the bias.

We emphasize that the criticisms voiced here are directed at the policy framework and not at policy decisions. We recognize that the framework could be flawed, but the policy could have been fine. FOMC members may have recognized the biases in current procedures and judgmentally corrected for them in making policy. In this case our proposal could be viewed as a commitment device for future FOMC members to prevent excessive inflation risk-taking. Moreover, we are of course speaking only for ourselves and not for others in the Federal Reserve; indeed, our interest is to engage others on these issues. Finally, some of our colleagues clearly recognize the danger that a series of actions designed to stabilize the economy in the short run risks compromising long-run objectives. (See, for example, Kohn 2004.)

Optimal Monetary Policy

The optimal policy-making framework consists of a model, objectives, and a policy rule that maximizes the objectives subject to the model. Although many models have been used in this framework, those suitable for monetary policy share some common properties: they are dynamic, stochastic, general equilibrium (DSGE) models, and they explain rate-of-return dominance. The models are dynamic, because the effects of monetary policy actions occur over many periods. They are stochastic, because unforeseen developments play an important role in explanations of the business cycle. They are general equilibrium, or built from theories of individual behavior, both to ensure internal consistency and to allow evaluation of policies in terms of their implications for individual well-being.

Rate-of-return dominance is central to understanding monetary policy's effects. Monetary policy largely consists of open-market operations: the exchanges of interest-bearing and non–interest-bearing public debt. A model of monetary policy then must have an explanation for why individuals are willing to hold two debt instruments with the same risk characteristics: one that pays interest and one that does not. Invariably, such explanations rely on the existence of some frictions, for example, transaction costs or legal restrictions. Consequently, open-market operations, which cause offsetting changes in the value of treasury securities and money in the private sector, temporarily alter relative prices and cause real economic effects.

Such models of money suggest that the real effects of monetary policy will be short term, because the frictions impede private adjustments to policy changes but do not prevent them from being completed over time. Hence, the long-term effects of monetary policy will be primarily on prices. Empirical evidence consistent with these models suggests that monetary policy actions (*shocks*) have their peak effects on output in roughly two quarters, but do not have their peak effects on prices for two years or longer. However, empirical evidence also suggests that the effects on output and prices are highly uncertain with respect to both timing and magnitudes. (See Bernanke 2003.)

The objectives for monetary policy should be the same as those for all other policies: to maximize the well-being of the individuals in the society, both now and in the future, where an individual's well-being depends on lifetime flows of consumption and leisure. This goal translates into seeking efficient allocations of goods and resources and acceptable distributions of income and wealth. If we assume that government tax/transfer policies can be directed at distributional concerns, we can maintain that the fundamental goal of monetary policy is economic efficiency.

Optimal policy then maximizes economic efficiency in monetary models such as those described above. Three properties of optimal policies can be deduced from this general framework:

1. An optimal monetary policy is a nonrandom rule.

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of the Great Depression virtually no evidence exists of a link between deflation and contractions. In particular, they dismiss the causation between the small deflation run in Japan in the 1990s and weakness in its output. A lack of examples of sustained, moderate deflations may reflect policy incentives. Monetary authorities have an incentive to inflate to expand the economy, while fiscal authorities have an incentive to inflate to reduce the real value of the public debt. Perhaps, in the real world, neither has an incentive to seek a moderate deflation.

2. Economic equilibria under such policies are stochastic processes.
3. The trend rate of price change in efficient equilibria is plus or minus a few percentage points around zero.

We discuss these properties in turn.

In general, optimal policy depends on past, current, and expected values of variables in the objective function.[2] But expected values depend on past and current values of all the variables in the model. Optimal policy is then a rule that indicates the value of the monetary policy instrument as a function of available economic information: the past and current values of the variables in the model. The rule should be nonrandom, because uncertainty introduced by policy impedes private decision making.[3]

That efficient equilibria are stochastic processes follows from two features of the general models. One is that the economy is subject to fundamental shocks, for example, to tastes or technology, that cannot be avoided. The other is that private agents optimally adjust to the changed economic conditions caused by the shocks.

Important implications follow from the property that equilibria are stochastic processes. One is that under an optimal monetary policy some fluctuation in economic activity is the norm—smoothness in real growth is not expected. More important is that active stabilization policy can lower welfare, because it can interfere with efficient private responses to unavoidable shocks.

In fact, the potential contribution of monetary stabilization policy to economic welfare is limited in general equilibrium models. (See, for example, Kiley 2003 and Lucas 2003.) The cost of business cycles can be large, but the cost is primarily due to the shocks. Researchers find empirically that the contribution of technology shocks to business cycles is on the order of 75 percent. (See Aiyagari 1994.) Since agents respond optimally to the changed conditions caused by technology shocks, monetary policy cannot contribute much to the adjustment in these cases.

Finally, under an optimal policy, the trend of prices should be in a narrow range around zero. The range seems bounded by the Friedman rule from below and by a positive nominal interest rate constraint from above.[4]

The Friedman rule seeks to remove the inefficiency of agents using resources to economize on cash balances when those balances can be provided essentially for free by the government. Thus, the Friedman rule implies a zero nominal interest rate on safe, liquid assets, or a rate of deflation equal to the real interest rate on safe, liquid assets. This rate of deflation would likely be on the order of 2 to 3 percent per year.

The positive nominal interest rate constraint is driven by an economic stabilization concern. If nominal interest rates on safe, liquid assets were zero and the economy were hit by a negative demand shock, monetary policy might not be able to counter the fall in demand. Policy cannot lower nominal interest rates below zero.

This constraint is taken to imply a positive trend rate of inflation—even though a zero inflation rate would seem to be consistent with a positive nominal interest rate. That is because the nominal rate is essentially the sum of expected inflation and a positive real interest rate. However, the actual outcome is a distribution. So, the positive nominal interest rate constraint is interpreted to mean an acceptably low probability of a zero nominal rate. Based on historical fluctuations in interest rates, this constraint translates to a positive trend rate of inflation around 2 percent per year.

Empirical evidence also supports the goal of approximate price stability for monetary policy. First, the evidence suggests that over periods of five or more years, the growth in money is a major determinant of inflation. (See, for example, Geweke 1982, McCandless and Weber 1995, and Leeper and Roush 2003.) Hence, over the medium to long term, monetary policy can contribute importantly to price stability. Second, the evidence suggests that economies grow best in low-inflation environments.[5] Over time, the trend growth in economies clearly dominates fluctuations around the trend in determining levels of income and welfare.[6] Thus, economic efficiency is best served by raising the trend of output,

[2]Giannoni and Woodford (2002) derive this result under some reasonable conditions.

[3]Although the rule is not random, future values of the policy instrument in general will be unknown, because future values of the arguments of the rule are unknown.

[4]In the context of a sticky-price general equilibrium model, Kim and Miller (2004) find that the optimal inflation rate is marginally above zero. The optimal rate is shown to balance the value of efficiency under the Friedman rule with the value of stability provided by a positive nominal interest rate.

[5]Empirical studies cannot determine a precise long-term inflation–real growth trade-off. However, they tend to indicate that economies do poorly under high rates of inflation or deflation. In addition, DSGE models that imply an optimal rate of price change close to zero are not easily rejected by the data. See, for example, Kim 2003.

[6]Prescott (1986) and Lucas (1987) make this point, but multidecade plots of output also make it clear.

rather than by reducing its variance. Monetary policy can contribute to this objective by creating a low-inflation environment.

Current Policy Making Compared to Optimal

Were policy made according to this conceptual framework with ideal models and objectives, there would be no bias that favored countercyclical policies and risked inflation above its desired rate. The policies would be optimal. However, the framework used in practice is different from the conceptual one. To focus on the important shortcomings of the framework used in practice and describe how they lead to bias, we provide a bridge between it and the optimal framework. In the bridge, we substitute total output, or gross domestic product (GDP), in the objective function as a proxy for individual consumption and leisure. The bridge objective function is assumed to incorporate three features:

1. It has an infinitely long horizon reflecting society's concern for its members now and into the indefinite future.
2. In each period *t,* some combination of maximizing the growth rate of output and minimizing its variance is optimal.
3. Inflation is not explicitly in the objective function, because it is not in the ideal one. It affects society's welfare only to the extent that in some periods it affects output, or affects consumption and leisure in the ideal framework.

An example of an objective function with these three features is

$$\min\{\textstyle\sum_t [\delta^t * E_0 (x_t - g)^2]\}$$

where x is the growth rate of real GDP, g is an unsustainably high target growth rate,[7] E_0 is the expectations operator conditional on information as of the original period $t = 0$, and δ is a social discount factor.

Characteristics of optimal monetary policies can be surmised based on the bridge objective function and a model that generates the following generally accepted empirical findings on the effects of monetary policy actions:

- In the short term, output temporarily responds.
- Over the medium to long term, prices permanently change.
- Over the long term, more-than-modest inflation or deflation leads to reduced efficiency and lower output.

Optimal policy then will aim for approximate price stability in the long term, while attempting some output stabilization in the short term.

Two fundamental problems are immediately apparent with this stylized bridge framework. And these problems pertain to practical applications, as well. One is that output is not a close proxy for the utility of consumption and leisure. The other is that macroeconometric models frequently associated with this framework do not include a long-term negative effect of inflation on output. Thus, if policymakers used a framework with these two problems, they would be encouraged to attempt too much output stabilization.

The bridge objective function, like objective functions used in practice, implies that an optimal path for real GDP should be steep and smooth. This is not an implication from DSGE models in which the utility of consumption and leisure is explicit. Policies can raise the mean of output and lower its variance and still make people worse off. (See, for example, Miller 1993.) Thus, fluctuations can be efficient, and attempts to smooth them can make people worse off. (See, for example, Kiley 2003, Lucas 2003, and our previous discussion.)

Because of technical complexities and policy-making constraints, the bridge framework is simplified for actual policy. For instance, the macroeconometric models used in practice, such as the FRB/US model developed by the staff of the Federal Reserve Board of Governors, imply no ill effects of inflation on output. In terms of the bridge framework, they imply that the only effects of an expansionary policy on output are positive and temporary. Thus, policymakers who cared about real outcomes and who viewed the effects of policy from one of these models would find that higher inflation was associated with better real outcomes and would tend to tolerate a lot of inflation. Put another way, the models do not imply that the economy grows best when inflation is within a few percentage points of zero.

Further deviations from the optimal framework occur in practice. The most important one is the use of short-term macroeconomic forecasts. Forecasts are required because the modelers are separate from the policymak-

[7] A high value of g corresponds to "the more, the better." It implies that policy-maker indifference curves have the right shape.

ers, and forecasts best convey the model's implications of the effects of alternative policy choices. The forecasts generally do not extend beyond eight quarters, because the uncertainty bands around the forecasts grow extremely large by this horizon. Their use creates two problems. One is that the use of forecasts can lead to the appropriate choice of policies only when there is no uncertainty about policy effects.[8] No one denies that there is uncertainty about the magnitude and timing of the effects of monetary policy. In general, ignoring that uncertainty leads to policies that are too active: policies for which the policy instrument responds too much to new information. Ignoring uncertainty makes policymakers overly confident about the efficacy of their actions.

The other problem with using short-term forecasts is that the short horizon allows barely enough time to elapse for the inflation effect of policy to show up, and it does not allow enough time at all for inflation to affect output. (This concern is similar, but not identical, to that expressed earlier about these models' imperviousness to the costs of inflation.) It is standard for models in use that policy first affects output. Then changes in the *output gap,* the difference between potential and actual output, eventually feed through to affect inflation. Thus, the effect of policy actions on inflation is not fully realized even by eight quarters out.

Policymakers have tended to deal with the deficiency in their models and methods by putting an inflation target directly into their objectives. So, they view their choices as a trade-off between output and inflation. The trouble is that their models always imply that higher output can be achieved at only a small cost in terms of higher inflation. Thus, the models favor policy activism.

Policy analysts, such as Lars Svensson, address the awkwardness of inflation being beneficial in policymaking models by assuming that the objective is to minimize the variance of output plus the expected squared deviation of inflation from a target rate. (See Svensson 2002.) Hence, analysts assume that policymakers are not concerned with the average real growth rate. A defense is that since monetary policy cannot affect real growth, there is no reason to include it in the objective function. This assumption amounts to setting g in the bridge objective function equal to $E_0(x)$ and making the latter independent of policy. A comparison of the policy that maximizes this objective function to the one that maximizes welfare reveals two ways the macro proxy biases policy to too much activism.[9] First, it causes policy to respond too much to new information about real growth and inflation. A welfare-maximizing policy will distinguish among types of shocks and only react to some. A policy that maximizes a macroeconomic objective function makes no such distinction and will react to all shocks. Second, it biases policy in favor of accepting too much inflation. To see this, suppose that the target for inflation in a Svensson-like objective function is the welfare-maximizing rate. Then, the inflation rate that maximizes the Svensson-like objective function is a weighted average of that rate and a higher rate needed for economic stability. This bias is caused by the absence of an economic efficiency term in the objective function. In these ways, Svensson-like objective functions lead to too much activism.

In sum, shortcuts used in applying the optimal policy framework encourage policymakers to give too much emphasis to short-term output stabilization and too little emphasis to long-term price stabilization. The objectives are stated in terms of output stabilization instead of the utility of consumption and leisure. The models imply no long-term negative effects of inflation on output. Moreover, the results from the models that are shown to policymakers usually consist of forecasts with short horizons that are conditioned on alternative policies and for which the uncertainty about policy effects is ignored.

Policymakers who based their decisions on this framework would be encouraged to take actions to stabilize output over the short term. Over time, there is a risk that policy would be a sequence of short-term countercyclical actions for which little, if any, weight would be given to the long-term price stabilization objective. Thus, the practical shortcomings of the policy-making framework warrant some constraint of policymakers' actions.[10]

Our analysis suggests that monetary policy must seek a low average inflation rate. However, many policies can result in a low average inflation rate, and our analysis is silent about which one to choose. We make our choice based on a perceived need to conduct some countercyclical policy. Thus, our proposal offers a means to achieve the low inflation objective, while allowing for some limited countercyclical policy.

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[8]We are referring to uncertainty about the coefficients in the model. The conclusion that irresolvable uncertainty of this type implies less active policies is due to Brainard (1967).

[9]Kim and Miller (2004) conduct the analysis described here.

[10]Some, such as Goodfriend (1993) and Bernanke (2004), argue that constraint of policymakers' actions is required to reduce the risk of unstable inflation expectations. Our proposed policy would meet this requirement.

A Proposal to Improve Policy

Before we discuss mechanisms to limit countercyclical policy actions, we must explain why monetary policy has any countercyclical role. We have argued that economic fluctuations need not imply inefficient outcomes and that active stabilization policy can lower welfare. Yet, we believe that active output stabilization will remain an objective of monetary policy for the foreseeable future. One reason is that the public and the government currently demand it. The Fed would have to build a case and sell it to the public before it could relegate countercyclical policy to a secondary role. Another reason is that over time many FOMC members have accepted the efficacy of countercyclical policy.[11] We have argued that the economy operates best over time when the inflation rate is within a few percentage points above or below zero. So, as long as countercyclical policy does not push inflation outside of this range, we do not believe it will do much harm.[12]

In principle, monetary policy could achieve its long-term inflation objective quite simply. Policymakers, for example, could attempt to achieve long-term price stability by aiming for it period-by-period or by following a constant money growth rule that produces the desired trend in prices but not stability period-by-period. Either of these rules would allow achievement of the long-term policy goal, while not leaving any room for deliberate countercyclical actions.

The problem with trying to stabilize prices period-by-period is that it could lead to wild fluctuations in interest rates and consequently in output. (See Kim 2003.) As Friedman put it, monetary policy affects inflation with long and variable lags. (See Friedman 1970.) Its effect is small at first and builds over time. Large changes in policy would be required to bring about a given change in inflation in the period ahead. This would lead to ever larger changes in prices in future periods. In turn, this could require ever larger changes in policy in future periods to stick to the price stability objective.

In contrast, a constant money growth rule would produce the desired long-term objective of price stability, and such a rule would be feasible.[13] However, we believe that it gives too little weight to output stabilization to satisfy many government officials or the public. Note that it does allow some automatic output stabilization. Pursuing constant growth in money requires a reduction in interest rates when the economy is weak and an increase in interest rates when the economy is strong. However, interest rates would respond only to developments in the economy and could not be used to preempt undesirable outcomes.

The mechanism we prefer is a form of inflation targeting. Although two methods of achieving this end have been proposed, we believe under best practices, there is little difference between the two. One method is adoption of a nominal anchor, and the other is inflation-expectations targeting.

Each method requires the establishment of a range for a specified variable. If the variable is within its range, policy is free to stabilize output. However, policy is constrained to not let the variable move outside its range. For nominal anchoring, the variable is an observed nominal variable, such as a measure of money. For inflation-expectations targeting, the variable is a prediction of inflation over some multiyear horizon.

Under best practices, a nominal anchor should have a stable long-term relationship with inflation. Ideally, the anchor would provide policymakers with a reliable signal: if the anchor stays within its range, then inflation down the road will stay within its desired range. Policymakers then could attend to smoothing the real economy as long as the anchor was within its range.

Under best practices, the inflation-expectations measure must be objectively formed. It is important that the expectations not be open to manipulation. If the expectations were subjective forecasts made by staff, policymakers could evade the ranges by instructing staff to change their forecasts. Thus, the forecasts should be explicitly model-based and reproducible.

Model-based forecasts of inflation can be expressed in general as complicated functions of current and lagged values of all the variables in the models. However, for long-term inflation forecasts, the complicated functions can probably be replaced with little loss by simple func-

[11] Their belief likely stems from implications of mainstream monetary models. Most of these models show that monetary policy can be effective in smoothing the economy. Moreover, some models imply that stabilization policy is optimal when wages and prices are sticky. These models indicate that marginal efficiency conditions will be violated and that monetary policy can improve the outcome. However, sticky wages and prices are not derived from fundamentals, such as limited information or costs to acquiring it.

[12] We believe that at times economic stabilization can take precedence over an inflation target. Our view is based on a theory implying that the economy occasionally can veer into pervasive weakness or depression and that at these times policy action can help redirect it. In the literature, these situations are called *coordination failures* and are generated in economies characterized by multiple equilibria. In a sense, the economy occasionally falls into a bad equilibrium, and policy can move it to a good one. (See, for example, Aiyagari 1988 and Chatterjee and Corbae 2003.)

[13] For constant money growth rules to lead to predictable inflation outcomes, money velocity must be stationary. We recognize that it has not been. However, across countries and across time, inflation and money growth are closely connected. See, for example, McCandless and Weber 1995.

tions of a few variables. (See Williams 2003.) Thus, a range around inflation forecasts corresponds to a region around a few variables. This region is similar to a range around a nominal anchor and would be the same if only one variable were sufficient to forecast long-term inflation.

Summary

We have argued that monetary policy should adopt a form of inflation targeting. Policymakers should be reminded of their long-term inflation objective whenever they make policy. We believe that because of the inadequacies of current models and methodologies, countercyclical policy actions should be constrained. The important practical step in adopting an inflation targeting strategy is to find a small set of observable variables that bear a stable long-term relationship with inflation. We believe this is an important issue for research.

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