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INTERNATIONAL MONETARY FUND¹ AND NBER

The Unending Search for Monetary Salvation

1. Introduction

The monetary problem has been solved, many times. The problem is to find a monetary system or rule that will produce aggregate price stability and stabilize the level of output around its trend. Over the centuries,² the gold standard, silver, bimetallism, the brick standard, the plywood standard, continuous redefinitions of the monetary unit,³ a variety of monetary rules including the real-bills doctrine, 100% money, constant-money-growth rules, price level or inflation targeting, fixed exchange rates, currency boards, and more, have all been offered as *the* solution to the problem. Nonetheless, “[t]he truth is, that the purchasing power of money has always been unstable” (Fisher, 1920, p. xxvi).

Surveying the literature, the domain of the monetary crank as well as many of the greatest economists,⁴ one has to ask whether we are looking for the proof of Fermat’s Last Theorem, which did after all yield to human ingenuity, or for a perpetual motion machine. A belief in efficient markets suggests it is the latter. But even though there cannot be a

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1. On leave from MIT.

2. Early writers focused more on price behavior and financial panics than on stabilizing output.

3. This approach is related to the concept known as indirect convertibility; see Schnadt and Whittaker (1995).

4. Writing about the monetary controversies of a century ago, Clapham (1945, Vol. II, p. 313) comments: “But the price fall [of the aggregate price level] and the silver troubles revived interest in the question, so that for about twenty years—from the late seventies to the late nineties—it exercised and attracted acute minds, and fogged that familiar type of simpler mind which hopes perennially for all good things from some manipulation of the currency.”

perpetual motion machine, some machines operate more efficiently than others, some monetary policies are better than others, and there has been progress in understanding the issues.

In this paper, I discuss primarily aspects of an approach which has recently received a great deal of attention, inflation targeting within the context of an independent central bank. This approach is not new: both Irving Fisher (1920) and Henry Simons (1948, original in 1935) advocated price-level targeting.

Since this panel discussion is not the occasion for a comprehensive analysis, I will merely highlight key issues, supporting the notion of inflation targeting.

2. *Central-Bank Independence and Inflation Targeting*⁵

Because the analytic case for central bank independence (CBI) begins from the inflationary bias that would otherwise be present in monetary policy, the issues of CBI and inflation targeting have been closely linked in the recent analytic and empirical literatures.⁶ However, the two issues are logically distinct: one may favor CBI and oppose inflation targeting, and perhaps also vice versa.

I start from the assumption that theory and evidence have shown that the central bank should be independent, that is, that those who set monetary policy should not be under the day-to-day control of the rest of the government.^{7,8} To be independent, a central bank needs the power to set interest rates and—within the limits of technical feasibility—determine money growth, and it should be free of any requirement to finance the government or particular sectors of the economy.

Theory points to two models of independent central banks: the conservative central banker identified by Rogoff (1985), and the central banker who is the agent in the principal-agent setup studied by Walsh (1995) and Persson and Tabellini (1993). The Bundesbank can be taken as a prototype for the Rogoff model, and the Reserve Bank of New Zealand is set up on lines implied by the principal-agent model.

5. I draw in this section on Fischer (1994), which includes a comprehensive survey of recent approaches to the issue of central bank independence and inflation targeting, and Fischer (1995b); see also Debelle and Fischer (1994).
6. Much of the earlier research is presented in Cukierman (1992). For a comprehensive recent survey see Eijffinger and de Haan (1995).
7. While the central bank is part of a country's government—hence the saying “the central bank should be independent within government, but not of government”—I will for convenience refer to “the government” as excluding the central bank.
8. This means that I assume the benefits of independent monetary policymaking outweigh—or do not preclude—the benefits of policy coordination that have been emphasized by Nordhaus (1994).

In practice, elements of both models can be found in most central banks.⁹ Central bankers are indeed conservative, and their fraternal social habits reinforce their views. In the conservative-central-banker model, independence insures that the preferences of the central bank rather than those of society prevail in circumstances where precommitment to a low-inflation policy is not possible. In addition, by creating an independent institution with more stable leadership and management than in the political ranks, the system makes it more likely that reputational considerations will affect monetary policy decisions, thus pushing the inflationary outcome in the direction of the precommitment solution.

In the conservative-central-banker model, the central banker is assumed to attempt to moderate the business cycle as well as fight inflation. In practice central bankers take the short-run trade-off between inflation and output into account, by deciding on the speed at which to reduce inflation when it is or is expected to be above target levels, and the speed at which to reflate from a recession. They thus satisfy this assumption of the Rogoff model.

The principal-agent approach puts more emphasis on defining precisely both the tasks of the central banker and the incentives that the central bank is given to achieve its goals. By clearly defining goals and incentives, the approach emphasizes the *accountability* of the central bank, the notion that there should be consequences if it fails to achieve its goals. Elements of the principal-agent approach apply to all central banks, which have various policy goals spelled out in legislation, and whose managers surely are motivated as much by the incentive to improve or maintain their reputations as by explicit penalties and rewards.

The two approaches emphasize different elements of CBI. DeBelle and Fischer (1994) introduce the distinction between *goal independence* and *instrument independence*. A central bank that has control over the levers of monetary policy has instrument independence; a central bank that sets its own policy goals has goal independence. The central banker in the Rogoff model has both goal and instrument independence. Of course, the government tries to choose the right central banker, but—as in the case of Supreme Court justices—the behavior of a central banker may be different after appointment than before. The central banker in the principal-agent approach has no goal independence but does have instrument independence.

The most important conclusion of both the theoretical and empirical

9. Svensson (1995b) shows that the two approaches can produce equivalent behavior if the Rogoff central banker is given an inflation target lower than that of society.

literatures is that a central bank *should* have instrument independence, but *should not* have goal independence.¹⁰ The central bank should be given a clearly defined goal or set of goals, and the power to achieve them, and held accountable for doing so, in the sense that there are definite consequences of failing to achieve the goals. Accountability is needed for two reasons: first, to set incentives for the central bank to meet its goals and explain its actions; and second, to provide democratic oversight of a powerful political institution.

Forms of accountability differ, with the New Zealand model making the Governor accountable to the Finance Minister in a precise way, the United States model making the Fed generally but not precisely accountable to the Congress, and the German model making the Bundesbank accountable to the public. Given the importance of reputation to individuals in public life, each approach may work; nonetheless, precise accountability to elected officials is more likely to be effective than vague general accountability. Further, accountability to elected officials helps insure that central bankers, who tend to lead sheltered lives, are exposed to public opinion and thus do not become too conservative.¹¹

CBI rests somewhat uneasily with democratic principles. It is common to draw analogies with other independent agencies within the overall government, notably the judiciary. However, central banks make politically more important day-to-day decisions, not only in affecting the next election result, but also because the choice of monetary policy has distributional consequences. Accountability, which to some extent limits the independence of the central bank, helps bring about the appropriate balance of powers between the central bank and the government.

The strongest intellectual support for CBI comes from empirical results showing that, among industrialized countries, average inflation performance is negatively related to the degree of legal independence of the central bank (see for instance Alesina and Summers, 1993). It has been argued that the relationship is not causal.¹² Rather, countries that are in effect inflation-averse, for example because of a hyperinflationary his-

10. The basis for these conclusions is set out in Fischer (1994).

11. The possibility that the central bank may be too independent, in the sense that its policies do not take output movements sufficiently into account, is analyzed in Debelle and Fischer (1994). While accountability to elected officials is desirable within a functioning democratic system, the question is more complicated in other cases. In Fischer (1995a), I argue that central banks in some of the transition economies where there is a likelihood of parliamentary populism should, for the transitional period, be given independence without accountability to elected officials. Accountability is then implicitly to public opinion or history, as in the case of the Bundesbank.

12. Posen (1995) argues that the degree of inflation aversion is determined largely by the views of the financial sector, with countries with more inflation-averse financial sectors having more-independent central banks.

tory, develop the institutions to support that aversion. This argument would suggest that educating the public about the true costs of inflation is the best way to reduce inflation. Be that as it may, unless laws are totally irrelevant to performance, anyone wanting to reduce inflation would be well advised to support actively the cause of CBI.

Strengthening support for CBI has been accompanied by the tendency to set the central bank the sole task of achieving a targeted inflation rate or range.¹³ Typically the inflation target is for an inflation range over the next year or two, or else for a path of inflation (also within a range) over several years. The choice of an inflation target raises several issues: whether it would not be better to choose a target that is more directly controllable by the central bank, such as growth of a narrow monetary aggregate; whether inflation should be the sole target, given that monetary policy affects both output and inflation in the short run, and the related question of whether to specify a nominal income target rather than an inflation target; whether to choose a *price-level* rather than an *inflation-rate* target; at what level and over what horizon to specify a target, and how to change it, if at all; and whether to choose an exchange-rate peg instead of an inflation target.

Obviously it would be best for the central bank to target a policy variable directly under its control that also closely controls an ultimate target variable, such as the inflation rate or nominal output. For some time, the hope was that monetary targeting would achieve that purpose, but as the relationship between money growth and inflation and/or output has broken down in one country after another, it has not proved possible for any country to rely solely on monetary targeting.¹⁴

The question of whether the central bank should pursue a target that is directly under its control, rather than an ultimate target of policy such as the inflation rate, touches on a key aspect of recent approaches to CBI. Much monetary policy research in the last four decades has attempted to discover an optimal monetary rule, whether it be a constant-growth-rate rule for some narrowly defined measure of money; a feedback rule, perhaps for the monetary base, as in McCallum (1994); or an interest-rate rule. Friedman (1960, p. 90) proposed that the Congress should instruct the Fed to follow the constant-growth-rate rule. By contrast, in the recent literature it is implicitly and appropriately left to the central bank to decide what monetary policy to adopt to achieve its goals: one reason for

13. Indeed, some researchers measure CBI by the extent to which the central bank is set the sole goal of price stability or low inflation (see Cukierman, 1992, Chapter 19).

14. There is nothing more common after a money demand function appears to have broken down than the demonstration that the demand for some other definition of money was stable. These ex post exercises are not impressive.

having a central bank is to centralize both the capacity and the responsibility for figuring out how best to implement monetary policy.¹⁵

Assuming that an independent central bank will have access to all the relevant knowledge about how to deploy monetary policy to achieve its targets, why give it an inflation target rather than both output and inflation targets, or the target of maximizing society's utility function? One illegitimate answer is that inflation is a monetary phenomenon, and therefore monetary policy should be aimed at inflation. That statement is correct, but it evades rather than deals with the fact that there is always a short-run trade-off between inflation and output, and that the choice of monetary policy affects output in the short run as well as inflation.

Fundamentally, both the conservative-central-banker and the principal-agent approaches do either directly or implicitly assume that the central bank will pursue both targets.¹⁶ In the principal-agent approach, the target inflation rate is affected by the state of the economy, implying for instance that supply shocks affect the target inflation rate.¹⁷ For instance, in New Zealand, the inflation target is automatically adjusted for changes in the terms of trade and for indirect taxes; this means that inflation occurring as a result of these shocks is accommodated, so as to reduce their effects on output.

The most powerful argument for inflation targeting, with adjustments for shocks, rather than the targeting of two variables is that accountability is enhanced when a central bank is given a single rather than multiple targets. However, output and inflation targets can be combined in a single indicator or target, with nominal GDP as good an indicator as any.¹⁸ There are two main difficulties with nominal income targeting: first, and more fundamentally, nominal GDP data appear with a lag and are frequently revised; and these data appear to be of little direct interest to the public. The data revision problem is a severe one.

The case for inflation targeting rather than nominal income targeting is that the inflation rate is of direct concern to economic agents, and that inflation performance is easier to monitor than nominal income performance. Inflation targeting gives the right monetary policy response to demand shocks, namely, that monetary policy should be tightened in response to shocks that would tend to increase both output and infla-

15. This does not mean that economists should not continue their research on these topics; only that they should not expect to have their results enshrined in legislation.

16. As explained above, the conservative central banker in the Rogoff approach is assumed to take both output and inflation goals into account.

17. This can be seen clearly in the formulation in Persson and Tabellini (1993).

18. Hall and Mankiw (1994) argue that nominal income targeting would be a good monetary rule, but that it could be improved upon in ways they specify.

tion. Because a supply shock leads to higher prices and lower output, monetary policy would tend to tighten less in response to an adverse supply shock under nominal income targeting than it would under inflation targeting. Thus nominal income targeting tends to imply a better automatic response of monetary policy to supply shocks. This advantage is offset to the extent that inflation targeting makes special provision for supply shocks, as it does in different ways in Britain, Canada, and New Zealand. I judge that inflation targeting is preferable to nominal income targeting, provided the target is adjusted for supply shocks.

What of the choice between a target inflation rate and a target price-level path? When policy targets a price-level path, it has to offset past inflationary shocks by a period of below-average inflation, in order to return to the targeted path. As shown in Fischer (1994), inflation targeting tends to produce more certainty about the price level in the near future, at the expense of greater uncertainty about the price level in the distant future. Equivalently, the inflation rate would fluctuate more in the short run under price-level targeting, as policy strives to come back to the chosen price path. For instance, under price-level targeting, the Bundesbank would today, as it approaches the 2% inflation rate, still be required to reduce inflation below its 2% target range for as far and as long as it takes to undo the effects of the above-average inflation of the period since 1990. If the goal is to encourage long-term nominal contracting, then price-level targeting would be preferable. However, since the great bulk of nominal contracts are short-term, since the task of monetary policy would be made much more demanding under price-level targeting, and since the benefits of long-term nominal contracting are equivalently obtained by permitting indexation, inflation targeting is preferable to price-level targeting.

Inflation targets are specified in two ways. The first is to state a long-term target inflation rate, but not a path for the rate. For instance, the Bundesbank has a baseline inflation target of about 2%, but it does not specify the path by which it intends to return to target when inflation exceeds two percent. The central banks with more formal inflation targets typically specify a range for inflation over the next few years. The range can be reset from time to time. Presumably the target will only be credible if the range is consistent with other policies that are likely to be followed by the government. While the need for credibility limits the range of targets the central bank can set, the central bank has at the same time to recognize that its own decisions will affect the likely behavior of both the government and the private sector.

The question of an exchange-rate peg is taken up in the next section.

3. Exchange-Rate Pegging

The discussion of inflation targeting would be relevant even in a fixed-exchange-rate system, in which the basis of monetary policy for the world or the anchor currency country has to be specified. The question of whether to return to a fixed-rate system, or one with target ranges among the major currencies, continues to be actively debated by researchers such as Williamson (1994). Although events may cause opinions on exchange-rate regimes to change rapidly, any move towards target zones among the yen, dollar, and deutsche mark, or the more ambitious goal of a world money, is almost certainly a long way off, despite the growing likelihood that some European countries will enter a monetary union before the beginning of the next century.

For many countries a choice has to be made among fixed and floating rates as well as a variety of intermediate regimes such as a crawling peg or crawling peg with bands. Credibility aside, and for a given fiscal policy, the choice between fixed and floating rates depends on the extent of price flexibility and on the predominant source of shocks facing the economy. An economy whose shocks are mainly nominal should prefer a fixed rate, allowing the money supply to adapt to disturbances. An economy which is likely to face significant real shocks, including changes in short- and long-term capital inflows, will gain in those cases from allowing the exchange rate to take some of the burden of adjustment, and thus from a flexible rate. Similarly, if the fiscal policy is unsustainable and unstable, then the case for a fixed rate is less persuasive.¹⁹

The exchange-rate regime may be transitional. For instance, high-inflation economies may use a *temporary* fixed rate as a key nominal anchor in a coordinated disinflation program. Provided that the fundamentals are right (particularly, that fiscal policy is consistent with a low inflation rate and that the exchange rate is not overvalued),²⁰ an exchange-rate peg can help bring inflation down more rapidly than in a floating-rate regime in which the fundamentals are left to work their way through the wage-price system. Depending on the process of wage determination in the country, it may be possible also to coordinate a decline in wage inflation with the stabilization program. Because inflation in such programs does not come down to zero immediately, the real exchange rate is likely to appreciate at the start of the program; the initial value of the exchange rate needs to take this appreciation into account.

19. However, it may be that adoption of a fixed-rate regime helps constrain fiscal policy.

20. In transition economies, one useful guide to the appropriate nominal exchange rate is the dollar value of wages.

It is difficult to tell in the abstract whether an exchange-rate peg adds credibility to the anti-inflationary stance of monetary policy. The peg may be more or less credible, depending on the country's policies and on its ability and willingness to defend the peg.²¹ The fixed exchange rate is likely to strengthen the hand of the central bank and give it an additional reason to resist the fiscal authority's importuning, and it may concentrate the minds of the central bank and the government on the goal of preserving the exchange rate, and thereby add coherence to policy. It is clear though that there are very few countries where political forces will not ultimately call into question a pegged rate that is causing severe difficulties. Sweden in 1993 defended almost to the death, but 500% interest rates were not credible. Even within the EMS in 1993, where several governments undoubtedly wanted to avoid devaluation, the existing system gave way. Because no fixed-rate arrangement has persisted forever in the absence of a common currency, and because the financial stakes for market participants are high, the markets will always be on guard against the possibility of a devaluation.

Nonetheless, at a time when monetary policy has lost credibility, and when the central bank has to establish a new policy, a fixed-exchange-rate regime may be the clearest way for the central bank to signal its seriousness and thereby try to gain or regain credibility. There is no other policy that can be so well monitored by the public, especially if the central bank publishes its monetary and reserve data on a timely basis. At the extreme, this could take the form of establishing a currency board, as was done in the case of Argentina and Hong Kong (both pegged to the dollar) and Estonia (pegged to the deutsche mark).²² Under the currency-board approach, the exchange rate is fixed, and the monetary base is fully covered by foreign-currency reserves.²³

Inflation targeting is not ruled out in a fixed- or crawling-peg regime. Indeed, in stabilization programs, the exchange-rate peg or crawl may be

21. Svensson (1994), writing after the 1993 exchange crises in the ERM and the Nordic countries, argues that "fixed exchange rates are not a shortcut to price stability. Monetary stability and credibility have to be built at home . . ." (p. 447). While credibility has indeed to be built through domestic policy, I do not see the record as establishing that an exchange-rate peg does not assist in achieving price stability.

22. Bennett (1994) describes these three currency boards and presents a very useful overall evaluation of this approach to monetary policy.

23. In the strictest of currency-board systems, there is no central bank and the stock of base money is determined purely by the balance of payments. This is also the case in the Hume specie-flow mechanism that provides the simplest theory of the automatic operation of the gold standard: a current-account surplus leads to an expansion of the money supply, and a deficit leads to a reduction in the money supply; money stock movements accordingly equilibrate the current account. The situation is more complicated when the capital account has to be taken into consideration.

a crucial part of a coordinated anti-inflation program. However, it has to be recognized that in the face of shocks—such as unexpected capital inflows—the two targets may turn out to be inconsistent if they are specified too tightly. That is one reason it is advisable in some cases to put a band around the exchange rate if the inflation target is the prime goal of policy.

In several well-known episodes, it has turned out to be difficult for the government to exit from a fixed-exchange-rate arrangement without a crisis. The most obvious recent episode is that of Mexico. The political economy of getting off a peg is complicated, for the longer the government stays with an inappropriate peg, the more costly it is to devalue. There is no precise rule for when to give up an exchange-rate peg or make it more flexible, but it has to be done once it is clear that the exchange rate is significantly overvalued—and the best indication of overvaluation is the actual or predicted state of the current account.²⁴ We do not yet have simple indicators of the sustainability of deficits,²⁵ but the theory that has been used to examine the sustainability of fiscal deficits²⁶ can be transferred to current-account deficit sustainability, with the proviso that a host of additional factors, including the maturity structure of the debt and the possibility of changes in market sentiment, need to be taken into account and imply wide confidence bands around the central estimate. Despite the difficulty of finding a precise criterion for when to move off a peg, many countries, among them Israel in 1986 and Poland in 1990, have succeeded in moving away from a transitional fixed rate without a serious crisis.

4. *The Bottom Line*

The inflation targeting approach within the context of an independent but accountable central bank is a significant new entry in the unending quest for monetary salvation. The inflation performance of the three countries that have been implementing inflation targeting most precisely—Canada, New Zealand, and the United Kingdom—has been very impressive in the last few years. However, judgment on the suc-

24. There is also the rule of thumb: "You know the exchange rate is overvalued when the Finance Minister directs you to one obscure price index according to which the real exchange rate is not overvalued."

25. The issue is discussed in some of the papers in Williamson (1994).

26. See, for instance, Wilcox (1989). The analysis would also have to include the possibility of an attack on the reserves, as in the basic Krugman (1979) model. See Calvo (1995) for discussion of these issues.

cess of this approach must await testing in the difficult circumstances of an overheating economy.²⁷

It is clear, furthermore, that monetary policy cannot ensure good macroeconomic performance unless fiscal policy operates in a reasonable way. Mas (1994) argues that CBI is not the key to monetary stability; rather, the key is insuring fiscal discipline. The argument could be stated provocatively as the proposition that a balanced-budget amendment is more useful for preserving the value of money than is the establishment of an independent central bank.²⁸ As is well known, the empirical evidence shows that, for developing countries, measures of the extent of the legal independence of the central bank are positively related with inflation, a result that may in part reflect the fiscal problem to which Mas refers.

The pegging of the exchange rate, by providing a visible nominal anchor, can also play an important role in reducing inflation and inflationary expectations. This is particularly the case for an economy seeking to stabilize from a situation of extreme disorder and where central bank credibility is low. To be effective, such a strategy must start from an appropriately valued rate, and be accompanied by strong fundamentals (especially on the fiscal front) and the willingness of the government to change the rate when needed.

While the right monetary arrangements can certainly help bring price stability, every arrangement will be tested at some point, and there is as yet no arrangement that makes it possible to keep inflation low at low cost in all circumstances.

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27. Svensson (1995a) examines the Swedish experience with inflation targeting, which has been less successful and less credible.

28. This is not a proposition I accept.

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Comment

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I shall address several issues raised by these three very interesting papers using as much as possible a unified framework, which is a stripped-down version of Rogoff's (1985) model. Consider an economy described by the following supply function:

$$y_t = \pi_t - \pi_t^e + \epsilon_t, \quad (1)$$

where y is output; π is inflation, π^e is (rationally) expected inflation, and ϵ is an i.i.d. shock with zero mean and variance σ_ϵ^2 .

The loss function of the policymaker in every period is

$$L = \frac{1}{2} \pi_t^2 + \frac{b}{2} (y_t - K)^2, \quad (2)$$

where $b > 0$ and $K > 0$. Thus, according to (2), the policymaker targets a level of output (K) greater than the "market" level, normalized at zero, in (1). This wedge creates a time-inconsistency problem.¹

The policymaker controls inflation directly, and the timing within period is as follows. First expectations are formed;² then the shock ϵ is realized and publicly observed; then the policymaker chooses π .

Consider first the case where the policymaker chooses policy period by period, without following any prespecified policy rule. This situation is typically referred to as "discretion." The solution is obtained as follows. Substitute (1) into (2); minimize with respect to π_t , taking π_t^e as given; in fact, π_t^e is not under the control of the policymaker. In the first order condition impose rational expectations. Solve and obtain

$$\pi_t = bK - \frac{b}{1+b} \epsilon_t, \quad (3)$$

$$\pi_t^e = bK, \quad (4)$$

1. The reader is referred to the literature, and in particular to Barro and Gordon (1983), for a discussion of the motivation of this wedge.
2. The most useful rationalization of this model is a wage contract model à la Fischer (1977), where nominal wages are signed and cannot be adjusted within the period. Thus, expectation formation is equivalent to nominal-wage setting, in a model where the real-wage target is constant.

$$y_t = \frac{1}{1+b} \epsilon_t. \quad (5)$$

This solution embodies an inflation bias, bK . In fact, the average and the expected inflation are positive (i.e., above the target level of zero), but the average output is zero, which is the (normalized) market level. Even though discretionary monetary policy introduces an inflation bias, it achieves some stabilization. In fact, from (5) it follows that

$$\text{var}(y) = \frac{1}{(1+b)^2} \sigma_\epsilon^2. \quad (6)$$

Thus, the variance of output is lower than σ_ϵ^2 ; policy reduces output variability. Note that the higher is b (the cost of deviations from the output target relative to the same cost for inflation), the higher is the inflation bias, but the lower is the output variability.

Suppose now that the policymaker can make a precommitment to follow a prespecified policy rule, credibly announced in advance, at the beginning of the period. In this case the *optimal* policy is

$$\pi_t^* = -\frac{b}{1+b} \epsilon_t. \quad (7)$$

With this rule, contingent on the realization of the shock, the inflation bias is eliminated but output stabilization is maintained. In fact, with (7) we have

$$\pi_t^e = E(\pi_t) = 0, \quad (8)$$

$$E(y) = 0, \quad (9)$$

$$\text{var}(y) = \frac{1}{(1+b)^2} \sigma_\epsilon^2. \quad (10)$$

The optimal rule (7) is, however, time-inconsistent, in view of the well-known argument put forward by Kydland and Prescott (1977) and Barro and Gordon (1983). That is, if the public expects this rule, ex post the policymaker has an incentive to deviate from it, create a burst of unexpected inflation, and increase output.

A useful question, for future reference, is the following. Suppose that one has to choose between "discretion" and a "simple" rule, that is, a zero-inflation rule with no stabilization. For reasons discussed below, in

fact, a contingent, complicated rule may be too difficult to implement and monitor. Which of these two alternatives leads to lower costs? The answer is that discretion is superior to the simple, no-inflation rule if and only if³

$$\sigma_{\varepsilon}^2 \geq K^2 (1 + b). \quad (11)$$

The intuition is clear: the higher is σ_{ε}^2 (which determines the need for stabilization) relative to b and K (which determines the inflation bias), the more attractive is discretion relative to a simple rule.

Much of the discussion of this panel can be viewed as an argument about how to improve upon the discretionary outcome, in the following ways:⁴

1. *Rogoff's "conservative" central banker.* Rogoff noted that the policymaker can improve his welfare, and society's welfare if they coincide, by appointing an agent, i.e., a *central banker*, who is more inflation-averse, i.e., has a lower b in his objective function, than the policymaker himself. Monetary policy is then delegated to the central banker, and the latter is completely independent. Independence means that the agent cannot be dismissed *ex post*, when he has to choose policy. The crucial idea is that it is institutionally harder to dismiss a "conservative" central banker than it is for the policymaker to simply renege on a policy announcement made without the independent conservative agent.⁵ Finally, note that this model implies that, *ceteris paribus*, more independent central banks should be associated with lower average inflation *and* higher output variability, since independent, conservative central bankers have lower b 's.
2. *Walsh's contracting solution.* In an ingenious paper (Walsh, 1995), which underlies his contribution to this panel, Walsh explores a different avenue. He argues that rather than delegating to an agent with different preferences, the social planner should write a contract with an agent with undistorted preferences. This contract should specify a penalty if certain targets are not reached. The paper shows that with the appropriate contract it is possible to obtain the first best policy as in (7). In fact, in contrast with Rogoff's way of thinking, it is easier to support the first best policy if the agent does not have distorted preferences. Under certain conditions, the contract is actually quite

3. See Alesina (1988) for more details on the derivation.

4. One way of enforcing the optimal rule is by virtue of "reputation" in a repeated game. This argument is not developed here.

5. This is the response to a recently raised criticism by McCallum (1995).

simple; under more general conditions the contract becomes more complicated.

3. *Fischer's "legislative" approach.* In his very clear contribution to the panel, Fischer argues that Rogoff's independent central banker is not sufficiently accountable to elected politicians, and thus, ultimately, to the "people." He also worries that the contracting approach may not provide enough accountability because with this arrangement the central bank has much room to maneuver, since it has to target two variables, inflation and output. Fischer argues that the goal of monetary policy should be chosen by elected politicians; the central bank should have only instrument independence, namely, it should be free to choose the best course of action given the goal. As a goal for monetary policy Fischer suggests an inflation target, with escape clauses for supply shocks. Presumably the role of these escape clauses is to approximate the optimal rule (7).
4. *Posen's "irrelevance" proposition.* In his creative contribution Posen argues that all these institutional arrangements are irrelevant: you are going to get the monetary policy most desired by the financial community, which is the critical constituency that influences the central bank. In Rogoff's terminology, it may very well be the case that the b in the central banker's objective function is low, relative to society's preferences; but this is not because of institutional design: it is because this is the b of the financial community. Observed central bank independence is just the means of achieving what the financial community wants.

I shall start with Posen's contribution, because if he is right, much of the discussion of this panel on the pros and cons of central bank independence is somewhat irrelevant.

I think that Posen's idea of studying the determinants of central bank independence is very fruitful. However, I have some problems with the implementation and the conclusions that he draws from his results. I want to make three points on Posen's paper. First, I am not sure what his index really measures. This index is meant to capture the degree of inflation aversion of the financial community and its access to policymakers. It is based upon four assertions:

1. Financial sectors having universal banking should express stronger anti-inflationary sentiments than those without.
2. Financial sectors less under the regulatory power of the central bank should express stronger opposition to inflation.

3. Where a party system is less fractionalized, financial opposition to inflation should be more effective.
4. Financial opposition to inflation should be more effective in federal systems of government.

I find that an index based upon these hypotheses is far too removed from what Posen is trying to measure to be reliable. For instance: I can think of several reasons why an index of party fractionalization should affect inflation; most of these reasons have nothing to do with the financial community's preferences for inflation. In particular, consider models of non-cooperative behavior of political parties in a fractionalized parliament: that would lead to delays in implementing fiscal adjustment policies that might lead to higher inflation. We have both theoretical work and empirical work which supports this claim.⁶ I actually find this alternative explanation of why this component of the index affects inflation much more convincing than the one proposed by Posen. On point 4, I note that there is a literature on whether fiscal discipline is enhanced or not by federalist institutions.⁷ There are several possible channels linking federalist arrangements to macroeconomic policies. I do not find the one emphasized by Posen the most direct and obvious. Finally, I am not an expert on universal banking, but I find the two first points, particularly the second one, a bit too speculative to build firmly upon them. In summary, Posen's results suggest that an index which measures some unclear combination of institutional features is highly correlated with central bank independence and with inflation. I am not sure what to make of it.

The second point is that even if it were true that financial aversion to inflation explained the degree of central bank independence, it is not clear that we should not advise countries to set up independent central banks. In other words, suppose that we have to advise a new democracy or a reforming country concerning what it should do about its central bank. Should we say that whatever this country does is irrelevant, since all that matters are the preferences of the financial community? I do not think so. I think that, given a choice, the probability of policy mistakes is reduced if monetary policy is one step removed from day-to-day politics.

The third point is that it is certainly true that central banks can not displease too much certain key constituencies. This is a good point. But this does not mean that institutions are irrelevant. This means that if a

6. For instance Alesina and Drazen (1991) and Spolaore (1993) on the theory, and Grilli, Masciandaro, and Tabellini (1991), amongst others, for empirical evidence.

7. For a survey, see Hughes and Smith (1991).

central bank goes too far in displeasing the political constituency which supports independence, the independence will be removed. I do not think that institutions are irrelevant and that one should go straight from individual preferences to policy outcomes regardless of what the institutions are. On the other hand, it would be a mistake to think that central bank independence is the “*deus ex machina*” which solves every monetary problem. No serious scholar has ever claimed that. Nevertheless, I am not ready to dismiss central bank independence as an irrelevant institutional feature. My view is that Posen’s work is an exploration of what reinforces central bank independence, but not an argument which dismisses the usefulness of this institution.

Let me then turn to Walsh’s contribution. What should we think of the “independence approach” versus the “contracting approach”? The contracting approach is quite ingenious. In the original formulation of Walsh the basic idea was that it is relatively easy by means of a contract to enforce the optimal rule as in (7), thus eliminating the trade-off between inflation and stabilization. However, I have two concerns about this approach. First, in real-world situations, the contract may not be that simple. The New Zealand case, which is the one which goes the furthest in the direction of the contracting approach, is a good example. There are several escape clauses in the no-inflation contract, and it is not obvious how the dismissal clause is applicable and when. Perhaps it is for this reason that the market has reacted less than one might have anticipated to the change in the institutional positions of the central bank. Complicated contracts may be difficult to enforce, create confusion, and may defeat the purpose of transparency and stability for monetary policy.

Second, and perhaps more importantly, this approach views policy-makers as social planners, maximizing social welfare.⁸ In reality, policy-makers’ incentives may be influenced by opportunistic or partisan incentives. In election years politicians may want to avoid recessions at almost any cost. Also, different parties may want to follow different monetary policies when in office, and these different policy preferences can create policy uncertainty associated with elections (Alesina, 1987). I would like to see this contracting approach tackle the issue of what happens when the “principal” is not a social planner, but somebody who resembles a real-world politician.

In a recent paper Gatti and I (Alesina and Gatti, 1995) make some progress in this direction by analyzing the choice of a Rogoff-type conservative central banker in the context of a partisan model of monetary

8. Presumably this approach can be turned into one with a median voter maximizing median welfare.

policy. Suppose that you have two parties which alternate in office and have different b 's in their loss function, as in (2). In general it is in the interest of the two competing parties to compromise and select a "middle of the road" independent central banker. An independent agent insulates monetary policy from the uncertainty associated with changes of governments and thus changes of preferences over monetary policy. Note that the selected Central Banker is more "conservative" than the average b of the two parties, because of the Rogoff's argument. This result rationalizes the empirical evidence by Alesina and Summers (1993), who find that, contrary to the prediction of Rogoff's model, independent central banks in OECD countries seem to be associated with low average inflation but *not* higher output or unemployment variability. The idea is that even though a conservative, independent central banker stabilizes output less, he insulates monetary policy and expectations from political uncertainty. In summary, the point is that Rogoff's independent central banker looks even better when politics is taken into account. It would be interesting to explore the contracting approach in this direction.

This last observation leads me to Fischer's contribution. He makes a useful distinction between goal and instrument independence. The goals of monetary policy should be decided by the legislature; the central bank should be independent in the choice of instruments to reach these goals. He argues that the appropriate goal is an inflation target, presumably in the range of 0–2%, with escape clauses for supply shocks.

I have a few comments and questions. First, what happens if the politicians do not choose the correct policy rule? Presumably the central bank will have to follow the "wrong" rule. Second, what happens if different governments choose different rules? It would be impossible for the central bank to insulate monetary policy from political uncertainty. Third, and perhaps more importantly, I am a bit concerned about these "escape clauses." How do we agree on how to measure supply shocks and the appropriate monetary response? What if the central bank justifies missing the inflation target because of unexpected (and even unobservable) shocks? I am a bit worried about legislating what is an acceptable supply shock and how all this uncertainty would be resolved in practice.

Let me rephrase the same argument using the model sketched above. One view, mine, is that in order to be workable, escape clauses have to be very limited and be applicable only in truly exceptional circumstances. In this case, Fischer's rule becomes very close to the simple, no-inflation rule of the above model. This simple rule is superior to discretion only if condition (10) holds. Thus, Fischer's rule must be based on

the view that the benefits of monetary stabilization are relatively small. The alternative view, which I have some difficulties with, is that these escape clauses can be used extensively, so that the resulting rule approximates fairly closely the optimal rule in (7).

My sense is that if one looks at the difficulties of implementing complicated contracts and agreeing on escape clauses, the simple Rogoff solution is not so bad after all. This is, appoint an inflation-averse central banker and let him deal with the choice of when to abandon the inflation target—one presumes rarely. Accountability is safeguarded by three arguments. First, central bankers know that their independence would be reduced or taken away if they move too far away from society's preferences. Second, central bankers are, indeed, appointed by elected politicians. Third, you may actually have provisions to remove central bankers in exceptional circumstances.⁹

I want to conclude with two unrelated observations. The first is a comment on the evidence to which both Posen and Fischer alluded, that more independent central banks have experienced higher costs in reducing inflation. This observation is often meant to cast doubts on the benefits of independence. I have some problems with this argument. With an independent central bank you have lower average inflation and lower variance of inflation. As a result you may have a flatter short-run Phillips curve. This argument is perfectly consistent with Lucas's (1973) argument or with a menu costs model. With a flatter short-run Phillips curve disinflation is more costly, but offsetting negative output shocks is also less costly in terms of inflation, precisely because the short-run Phillips curve is flatter. Also, independent central banks have to disinflate less often, because their average inflation is lower.

The second and final point is that I totally agree with Fischer's observation that independent central banks can do very little to control inflation if the fiscal authorities are out of control. As Fischer argues, the role of fiscal authorities may explain the different results on the effects of central bank independence on inflation in OECD countries and in LDCs.

Much has been written about monetary institutions, in recent years; much less about fiscal institutions. The topic of fiscal institutions would be an excellent one for the next *NBER Macroeconomics Annual*.

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9. See Lohmann (1992) for a discussion of this point.

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Discussion

Responding to Alesina's comments on the construction of the effective FOI index, Adam Posen agreed that fractionalization and federalism might influence inflation through mechanisms other than the one explored in his paper; he indicated that in future work he would consider alternative reasons why the various components of the FOI index might affect inflation. With respect to the issue of whether institutions matter, given the array of political forces, Posen suggested that the time span under consideration is very important. The literature on central bank independence (CBI) looks at correlations over periods from 10 to 40 years in length. Over such long periods, it seems most reasonable that social preferences and political forces determine inflation rates, whereas over one business cycle or electoral cycle institutions may well have an

effect. Stanley Fischer disagreed with Posen's conclusion that the financial sector's opposition to inflation completely determines inflation outcomes. He conceded that the issue is quite complicated but argued that law and the institutions chosen by society can make a difference for inflation performance.

Posen also addressed Alesina's comment about the cost of disinflation. He argued that in his paper he controlled for various initial conditions (inherited inflation, wage stickiness) but still found a positive correlation of CBI and the cost of disinflation—contradicting the view that more independent central banks have the advantage of greater credibility. Fischer agreed that it was surprising that countries with independent central banks do not appear to have a low sacrifice ratio, and noted the Bundesbank as an example.

Alesina had remarked in his discussion that the ability of Posen's FOI index to explain variation in inflation does not mean that countries would get no benefits from having independent central banks. Ben Friedman disagreed with this comment, noting that the point of Posen's regressions was precisely to test whether CBI had any marginal effect upon inflation. Since the regressions show no explanatory power for CBI in the presence of FOI—indeed, the coefficient on CBI is of the wrong sign—one should conclude that there is little marginal benefit to be had from an independent central bank that does not have financial sector support to fight inflation.

Friedman also questioned the repeated use of New Zealand in the central bank contracting literature. He suggested that the relevant paragraphs of the contract between the Governor of the New Zealand Reserve Bank and the government be included in an appendix to Walsh's paper. Friedman said that he believed that in New Zealand, failure to meet the inflation target is neither necessary nor sufficient for dismissal of the Governor. The contract makes clear that the Governor need not be fired if there are "extenuating circumstances" explaining why the Bank did not meet the target; Friedman suggested that there is likely some implicit agreement between the Minister of Finance and the Governor which underlies the contract. In response, Carl Walsh said that in other work he had provided a more formal analysis of the legislation. He noted that the Reserve Act is quite clear that the Minister of Finance may recommend the Governor's dismissal if the short-run targets are not achieved. Friedman and Posen pointed out that the contract specifies that the Minister of Finance can propose dismissal but is not required to do so.

Aaron Tornell argued that there is no one-to-one relationship between

CBI and inflationary performance. He cited the example of sub-Saharan Africa, where several countries have established independent central banks. Although these countries had good inflation performance prior to 1994, after the collapse of their fixed exchange rates their inflation rates rose to above 20%. He concluded that exchange-rate regimes and fiscal conditions make a big difference to inflation performance, whether the central bank is independent or not.

Ken West asked whether the literature on CBI had overturned the consensus view that the costs of anticipated inflation were small. Martin Feldstein disagreed that such a consensus had ever existed, emphasizing the important interactions of even anticipated inflation with the tax laws and other institutional arrangements.

Several participants elaborated on the issue of which target, if any, should be chosen for monetary policy. Feldstein pointed out that, despite the theoretical advantages of nominal GDP targeting, the public does not understand what nominal GDP is (a point also made by Stan Fischer), or would confuse it with real GDP. To avoid responsibility for controlling GDP, central banks prefer inflation targeting, even if in justifying themselves they must deny the existence of a short-run Phillips curve. However, the advantages of transparency and directness are not all on the side of inflation targeting, as inflation targeting will not work without "escape clauses" for supply shocks, which in themselves create difficult communication problems. Because of the difficulty of writing, communicating, and enforcing escape clauses, Feldstein suggested that it would be preferable to educate the public about the concept of nominal GDP and then go ahead with a nominal GDP target for monetary policy. Fischer remarked that he did not believe that it was so very difficult to write escape clauses: Since the central bankers need outside credibility, they cannot consistently abuse the escape clauses; hence, public debate and public opinion would effectively impose additional constraints on the inflation-targeting, independent central bank.

On the same topic, Greg Mankiw argued that price-level targeting is preferable to inflation targeting, since the main goal of price stability is to encourage correct long-term financial planning. Because (as Cecchetti's paper showed) there are sizable forecasting errors in inflation, if deviations from the inflation target were treated *ex post* as "bygones," a large random-walk element would be introduced into the price level.

Still on the issue of targeting, Carlos Vegh remarked that inflation targeting would be a much better regime in a low-inflation country than in a high-inflation country. The reason is that under inflation targeting the central bank does not have to make its desired settings for its policy

instruments explicit in the short run. In a country suffering from hyperinflation, such a lack of concreteness about what the nominal anchors are would likely exacerbate the instability of the system.

Mariano Tommasi remarked that, according to most economists, the problem to which CBI is the solution is the inflationary bias that arises in a Barro–Gordon-type model. He suggested that this model had been overemphasized in these analyses: First, empirical work shows that the Barro–Gordon model performs poorly in predicting inflation across countries. Second, the inflation problems of high-inflation countries like Peru or Bolivia—where CBI might be most efficacious—do not in general come from the government’s attempts to exploit a Phillips curve. Tommasi said he thought that future research should combine Posen’s attempt to identify the real causes of inflation and Walsh’s work on designing optimal institutions.

Ben Friedman suggested that the research agenda now was to move towards putting these discussions into a real-world context. He acknowledged that Fischer’s paper was an attempt in this direction, but still more needed to be done. To illustrate what he meant by “real-world context,” Friedman gave an example of a legislator who argued for price stability in the abstract while vigorously opposing the anti-inflationary shifts in monetary policy in 1994. Fischer responded that politicians were asking for CBI precisely because they understood that at times they could not control their own desire to cut interest rates and overstimulate the economy.