SOCIAL INSTITUTIONS FOR OVERCOMING MONETARY POLICY CREDIBILITY PROBLEMS*

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I. Introduction

Macroeconomic theorists have devoted considerable attention to designing optimal rules for government policy. The arguments for why governments should set policy in terms of rules are well known. However, until recently, there has been very little formal analysis devoted to asking how macroeconomists' policy (regime) prescriptions can be adopted in a way which is credible. This seems quite important, since the case for imposing rules on the government is often based on the view that governments are constantly tempted to deviate from socially-optimal behavior. From the "time-consistency" literature, we know that even a government concerned solely with maximizing the welfare of the representative individual may be tempted to defect from the optimal precommitment rule, whenever there are externalities).[1] The rule that would be optimal if the government could perfectly precommit may be quite different from the optimal *implementable* rule. Hence it is also important to ask what kind of institutions can be designed to help implement better rules. The purpose of this note is to exposit some recent work aimed at dealing with credibility problems in policy design. To limit the scope of the paper, we will focus on monetary policy.

Three institutional devices for implementing monetary policy rules will be considered. The first method is to put the rule in place via a constitutional amendment. A second, less drastic, approach is to structure institutions in such a way as to mitigate credibility problems. This "principal agent" approach is predicated on the assumption that society has legislative devices for creating an independent monetary authority and giving it autonomy on at least a short-term basis. If unanticipated monetary policy has only short-term effects, then the ability to make a sequence of short-term commitments concerning money growth may be quite useful. In designing the incentive structure of the central bank, there turns out to be a tradeoff between mitigating credibility problems and providing for flexibility in responding to unanticipated disturbances. A third mechanism treats institutions as a device for helping society coordinate on favorable reputational equilibria.[2] In a reputational framework, the term "institution" can refer to a social convention, and need not refer to a legal entity. These three general approaches to mitigating credibility problems are not mutually exclusive.

Before proceeding, let us first state that we are going to take as given the federal government's legal monopoly over issuing paper currency, and that the currency is fiat. Because the government then has the ability to make arbitrarily large infusions of money into the system at almost any time, this case provides a particularly good example for analyzing the general problem of precommitting to a rule. There is no implicit presumption that such a system works better than a system of private monies, or a system in which states are the ones who have a monopoly over currency issue.[3]

II. Constitutional Resolutions of the Monetary Rule Implementation Problem

The main problem with passing a constitutional amendment to govern monetary policy is the lack of flexibility in dealing with unforeseen events. In principle, of course, a law can be made fully state-contingent. But it is unrealistic to think that the designers of a law will have the imagination to plan for every type of shock and the analytical brilliance to guess how to deal with shocks which have seldom or never been experienced.[4] For example, we probably have a much better idea how to respond to oil shocks now than we did in 1960. Similarly, in 1960, it would not have been easy to determine how monetary policy should operate in a world of rapidly evolving transactions technologies. In macroeconomic policy, some important contingencies may be effectively unforeseeable; to be precise, it would take so much time and resources to plan for some contingencies that the uncertainty is essentially of a qualitative nature. Of course, one could try to write the constitutional amendment in a sufficiently vague way as to try to allow for dealing with unforeseeable circumstances. But as soon as one builds in a vague contingency clause, there arises the danger that the clause will be abused.

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Aside from "qualitative" uncertainty, there is a further reason why a complicated fully state-contingent law has problems. The more complicated the law becomes, the more difficult it becomes to monitor compliance. If the contingencies are sufficiently complicated that only the government finds it worthwhile to actively monitor all the relevant information, then incentive-compatibility problems arise. [Canzoneri (1985) illustrates how private information complicates the design of a constitutional amendment].[5]

III. Mitigating Credibility Problems Through Institutional Design

In cases where a constitutional amendment is too inflexible, one would expect society to develop other mechanisms for dealing with time-consistency problems, mechanisms which represent a better compromise between the benefits of flexibility and the need to enforce commitments. One plausible mechanism for dealing with monetary policy credibility is to create an independent central bank, and to endow it with legal control over the money supply. We have already stressed that such a device may be useful even if the central bank's charter can later be revoked, provided that the revocation process takes time. In the case of the United States it seems clear that there is a tremendous amount of legislative inertia involved in making any major change in the status quo. There are committee hearings, debate, etc. Political scientists have recently begun to model how legislatures might be organized so as to build in frictions, thereby allowing for some degree of precommitment.[6] Such modelling efforts are at an early stage, but may eventually have important implications for the implementation of monetary policy. But because there is not yet a fully satisfactory theory of short-term legislative commitments, it is not possible to build anything but a crude model of how a central bank might be created to mitigate time-consistency problems.

One approach, taken in Rogoff (1985) is to simply take as given the ability of the legislature to make short-term commitments, and in particular to temporarily delegate control over the money supply to the central bank. The legislature's problem then involves designing the incentive structure of the central bank, and is analogous to a principal-agent problem. For example, it can pay for society to delegate control of the money supply to an agent whose utility function differs from the social welfare function, in particular an agent who places an exceptionally high weight on stabilizing inflation. Having delegated monetary authority to this conservative central banker, Congress may later complain that he is not setting interest rates low enough. That is because once the private sector has set its inflationary expectations (perhaps embodied in imperfectly-indexed nominal contracts), Congress genuinely wishes that the central banker would inflate more.[7] But Congress will nevertheless reappoint him, because when the public knows that the conservative central banker will be controlling next period's money supply growth, inflationary expectations will be lower than otherwise. It is not optimal, however, to appoint a central banker who is too "conservative"; the problem is that the central bank's responses to unanticipated disturbances will then be too distorted. Suppose, for example, that the central bank cares only about inflation and that the country experiences a shock causing the benefits to unanticipated inflation to be unanticipatedly high (say, the country needs to partially default on some of its nominal debt in order to have more revenue to prepare for a war). Then it might be quite costly to have the central bank fail to accommodate.

If the legislature indeed has the possibility to make short-term commitments, then there may be other ways to try to insure that the central bank faces the right incentive structure. The legislature could pass a law governing the next year's monetary targets.[8] In many countries, the head of the central bank has an implicit clause in his contract that he will be fired if there is a devaluation. [See Cooper (1971).] This type of clause, however, might be better interpreted in the context of the reputational models discussed in the next section.

We have portrayed the conservative central banker as one who places a larger weight on stabilizing inflation than does Congress. In a setting with reputation [as for example, in Barro and Gordon (1983)], it could also pay to appoint a central banker who has an exceptionally low discount rate. The basic idea is that, as Barro and Gordon show, the best attainable reputational equilibrium improves as the monetary authority's discount rate falls. Hence, if the public can coordinate on a favorable equilibrium, it pays to set up the central bank in a way such that it has a low discount rate, and thus has a large incentive to avoid actions today which will lead to inflationary reversions in the future. One way to do this might be to give the governors of the central bank long terms in office. Similarly, as noted by Tabellini (1987), the central bank's effective horizon might be extended by having overlapping terms of office. (Though in many countries, the head of the central bank controls most of the power. Perhaps there is a tradeoff between the benefits of overlapping terms and the uncertainty engendered by group decision making.) Canzoneri (1985) criticizes the above principal agent approach on the grounds that the public can never really be certain of the central bank's preferences.[9] Therefore the mechanism of appointing conservative central bankers, or of trying to manipulate the central bank's incentive structure, is not operational. But it seems likely that the principal agent approach generalizes to cases

where the public has only a probability distribution over the central banker's type, provided it can divide potential candidates into different pools, each with different distributions. Information about the candidate's type might be learned through signalling (the candidate's career choice, whether his friends are other bankers, and past statements), much in the same way a political candidate's past actions signal information about his preferences. Barro (1986) shows, in the context of a model where public uncertainty over the central banker's preferences is explicitly modeled, that society is better off (ex ante) appointing a monetary authority it thinks is likely to be able to commit to low inflation.[10]

A more fundamental criticism of the principal agent model is based on the view that it is unrealistic to assume that a central government has any way to delegate its legal control over money supply creation, even for very short periods. According to this line of reasoning, the central bank is a mere veil, and if it ever takes actions which are genuinely at odds with the government's interests, then it will be immediately overruled. Any apparent observed deviation between the central bank's actions and the government's short-term interests is merely an illusion, and can be explained by the type of reputational argument considered in the next section. One cannot dismiss this argument lightly, although it seems realistic to assume that there are frictions in the legislative process as discussed above. To explain legislative inertia in reversing central bank decisions, it does seem necessary to explicitly incorporate the redistributive effects of unanticipated monetary policy (say, as might occur between debtors and creditors). If there were ever complete unanimity in the legislature concerning the decision to reverse a Central Bank decision, then presumably there would be no parties anxious to make use of their rights to stall the legislative process. A fully satisfactory development of the principal agent approach awaits further research.

Much of the above discussion is directed at institutional relationships which exist in the United States today. Some other countries have relatively similar central bank structures [See Alesina (1988)], but there are many countries which do not have an independent central bank. Indeed, the advent of central banking is a relatively recent phenomenon; as of 1930 only 10 countries had government-owned central banks [See Aufricht (1965)]. Obviously, whether or not creating a central bank is an appropriate response to the problem of monetary credibility depends on a country's political system, and the types of legislative commitments possible. The monetary policy rule also matters. In an era when countries followed the gold standard, it may not have been necessary to develop such an elaborate mechanism for overcoming credibility problems. The same would be true today for countries which peg their exchange rates.

Finally, it is possible to extend the principal agent approach to simultaneously model other government institutions; see for example, Alesina and Tabellini (1986).

IV. Enforcing Rules Through Reputation

Within the context of reputational models of monetary policy, the existence of monetary institutions has a very different interpretation from that given in section III, one which does not require the institutions to have any legal independence. In the context of a "pure" reputation model of rule enforcement, monetary institutions evolve to help the public coordinate its expectations on an optimal (optimal perfect) equilibrium.

In preceding sections, we have assumed that the government cannot credibly adopt the optimal monetary policy rule unless it finds some way to legally bind itself. However, under certain conditions, the government's concern for its reputation may be enough to cause it to adopt the rule it said it would. There are a number of alternative approaches to showing how reputation can ameliorate the government's credibility problems.[11] In brief, each of the different approaches has in common the ability to explain why the monetary authorities might rationally believe that by resisting the temptation to enjoy the short-run benefits of unanticipated inflation, they can succeed in holding down expectations of future inflation. (This result obtains even in a model where monetary infusions have their full impact on the price level after just one period.)

The great elegance and importance of the reputation approach is that it is applicable to a wide variety of legal environments. The problem with relying on reputation to enforce a macroeconomic rule is that reputation can be quite fragile. In models where reputation is based on trigger-strategy beliefs, there are typically a continuum of equilibria, including the equilibrium where reputation never develops. There would seem to be a substantial coordination problem inherent in getting society to focus on the best attainable equilibrium. There are other reputational models where the central bank resists inflation in order to preserve some doubt in the public's mind that it might actually care only about

inflation. The problem with multiplicity of equilibria is less severe in these models but the equilibrium can still be quite sensitive to the public's beliefs concerning the central bank's possible types.

In the context of reputational models, one can make a (strained) argument than monetary institutions are useful in coordinating the public's beliefs, even if the central bank is a mere veil for the Congress. Note that the coordination problem exists not only during periods where inflation is low, but during punishment periods where inflation is high. To coordinate the public's expectations, the government has not only to announce that inflation will be low, but to say what will happen if it cheats. (In Germany, the ravages of the hyperinflation and the revaluation of 1948 may serve to coordinate expectations. The "trigger-strategy" reputation model has a certain appeal in this case.) Reputational models do provide an interesting strategic rationale for the widespread (among economists) belief that the monetary authorities should adopt simple rules. A rule must be simple in order to allow the public to easily monitor its compliance, and know when a punishment period must begin. Also, it seems likely that reputation provides a more flexible method of dealing with qualitative uncertainty than would a constitutional amendment.

In a reputation model, an "institution" can simply be a social convention. Kotlikoff, Persson and Svensson suggest that the selling of laws from one generation to the next might provide an alternative convention for supporting a trigger-strategy equilibrium. In their overlapping generations model, each generation sells a law governing macro-policy (the law prescribes the optimal precommitment rule) to the succeeding generation. A generation which fails to obey the law will have nothing to sell, given the particular "trigger-strategy" expectations assumed.[12]

It is quite plausible to argue that reputation must ultimately be what sustains any rule, even one put in place by a constitutional amendment. According to this view, the only thing which prevents the Constitution from being revoked is that people believe that revoking the Constitution would lead to a very uncertain and probably bad situation. (Indeed, in England, there is no formal written constitution. Parliamentary precedent and common law serve much the same function.) This reputation view of a constitution has considerable appeal, though it would be extreme to suppose that a state might consider withdrawing from the Union rather than going along with a monetary policy rule. (Though in some countries, this notion is not so absurd.) Perhaps there is a hierarchy of reputational factors. By linking obedience to a monetary rule to a host of other precommitments, with the total package being upheld by reputation, society may be able to achieve degrees of precommitment beyond what can be achieved when reputations for upholding different laws are not linked.

V. Conclusions

In situations where time-consistency problems pose a real problem for implementing optimal macroeconomic policy rules, one would expect society to evolve institutions which help mitigate the problem.. There has been some recent research investigating the nature of these institutions, research which may be divided into two broad classes. One class treats institutions as legal entities and investigates their design along the lines of a principal-agent problem. Another model treats institutions, broadly defined, as social conventions for coordinating society's expectations on favorable equilibria.

These two approaches are not mutually exclusive. If the government does have ways to make legal precommitments, event just short-term ones, then such precommitments can be useful in situations where reputation, even if operative, is insufficient to enforce the optimal rule.

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ENDNOTES

[1]See for example, Fischer (1986).

[2]The details of how reputation can be formally modelled is well beyond the scope of this paper; see, however, Rogoff (1988).

[3]One can argue that the credibility problems and inflationary bias inherent in a system where the federal government has a monopoly over currency issue are substantially mitigated in a system where states have control. Currency competition places a built-in check on each state’s incentive to unilaterally inflate, and thus the time-consistent rate of inflation is lower with state monies than with a single federal money. This argument can be presented formally in a manner analogous to Rogoff (1985a).

[4]See Rogoff (1985b). Kreps (1984 [“Corporate Culture”]) motivates why complete contingent contracts are not observed at a microeconomic level; he argues that reputation provides a more flexible mechanism than contracts for dealing with unforeseeable events. In the particular case of monetary policy, which we are only using as a generic example of government policy, this argument is somewhat less persuasive. A rule aimed at stabilizing say, the CPI, might work tolerably well under a wide variety of circumstances. Even so, it seems possible that there could be great benefits to suspending the rule in wartime. Trying to build this contingency into the law leads to complicated issues concerning how the postwar money supply should be set, and exactly what constitutes a war.

[5]There is one further caveat concerning a constitutional amendment. If the amendment is only to govern one aspect of macroeconomic policy then, in writing the law, one must take careful account of side effects. For example, if one severely limits the ability of the government to use one particular type of distortionary tax, then it will become more tempted to use other distortionary taxes. (Higher tariffs might be substituted for the inflation tax.) Ignoring this effect could cause one to design a law which makes society worse off: this is a standard result when the government is restricted to adopting second-best policies. Note that the ability to precommit is always valuable, but finding the proper method for exploiting any type of precommitment possibility requires a general equilibrium analysis.

[6]See, for example, Weingast and Marshall (JPE, 1988).

[7]Barro and Gordon (1983) argue that unanticipated inflation may solve a coordination problem if employment is too low due to income taxation.

[8]Canzoneri's preferred model involves assuming that the central bank has private information about its forecast of the money demand disturbances. This model is discussed in Rogoff (1988), and contrasted with the case where the public does not know the central bank's preference function.

[9]This result is also obtained by Backus and Driffill (1985). Both the Barro and the Backus-Driffill models allow for only two types, but similar results hold in the model of Rogoff (1988), which allows for a continuum of types.

[10]When it is not possible to write a fully state-contingent law, then it is in general desirable to leave the central bank some flexibility in hitting its targets, even though this may introduce some inflationary bias; see Rogoff (1985b). The law may specify price-level targets instead of monetary targets. However, giving the central bank incentives to hit interest rate targets–-nominal or real—only exacerbates credibility problems and is counter-productive.

[11]Barro and Gordon (1983) were the first to present a formal model of reputation in the context of macroeconomic policy.

[12]A close parallel to the Kotlikoff, Persson and Svensson example is presented in Kreps (1984). There the reputation of firms can be sold, and a reputation has value if there is always a next generation of buyers.