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Central bank strategies, credibility, and independence

A review essay

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1. Introduction

During the last thirty years, average inflation in most countries has been variable, highly persistent, and (perhaps more controversial) too high. In the U.S., for instance, inflation during the decades of the 1960s, 70s, and 80s averaged 2.5%, 7.4%, and 5.1%, while the first-order serial correlation coefficient for quarterly inflation in these periods was 0.7, 0.9, and 0.7. Evidence from other countries during the postwar era also suggests excessive average rates of inflation characterized by high degrees of persistence. Because sustained differences in inflation rates over time are only possible if there are similar differences in the rate of monetary expansion, an explanation of these stylized facts about inflation requires an explanation of central bank behavior.

Why do central banks systematically engage in policies that result in positive average rates of inflation? Why does inflation exhibit such high persistence? And

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how does the institutional structure of a country's central bank affect its inflation rate? These questions have been at the heart of a large body of work during the past decade, work that goes beyond the notion that inflation is a monetary phenomenon to try to explain why monetary policy is conducted in ways that lead to positive average inflation. This literature has focused almost exclusively on the role of time-inconsistent discretionary policies, arguing that a positive inflation bias is inherent in such policies, and it has now become common to view central banks as purposefully pursuing their objectives by attempting to equate inflation's marginal costs to its marginal benefits.[1] An understanding of average inflation experiences requires, therefore, an understanding of the costs and benefits of inflation as perceived by the central bank. And variations in inflation, either across countries or across time, must be explained by variation in central bank objectives, the public's perception of these objectives, or the constraints within which monetary policy operates.

Alex Cukierman, in *Central Bank Strategies, Credibility and Independence: Theory and Evidence* (The MIT Press, Cambridge, MA, 1992), 'attempts to uncover and analyze the reasons for positive inflation and positive rates of monetary expansion' (p. 1). 'The main focus of the book is positivistic. The central question posed is: How do central banks or, more generally, monetary policymakers behave?' (p. 2). To address this question, Cukierman employs a variety of models that differ mainly with respect to their informational assumptions. In all cases, the marginal benefits of surprise inflation exceed the marginal costs of inflation when both are evaluated at zero inflation. This generates an incentive for the central bank to engage in expansionary monetary policy. Since the public can also evaluate the costs and benefits of inflation (though possibly based on an information set that differs from that of the central bank), a zero inflation policy is not credible and the time-consistent equilibrium is characterized by an inflationary monetary expansion.

Cukierman's volume brings together in one place much of his extensive previous work on strategic monetary policy models, adding some excellent overview chapters and some simplified versions of his earlier work that will make it accessible to a wider audience. He provides a nice blend of theory and empirics, using cross-country data to test the implications of the models he develops. His discussion of the motives for inflationary policies and the role of learning in affecting the inflation process is excellent, and the data set on central banking institutions he uses to examine the role of central bank independence is likely to be an important resource for other researchers in this field. But the book is not a text on strategic monetary policy, nor is it a survey. Instead, it focuses predominately on Cukierman's own previous research; as a result, the volume strongly reflects his own personal interests and approach.

[1]For a recent survey of this literature, see Persson and Tabellini (1990).

The book is divided into four parts. In the first, Cukierman discusses various motives for monetary expansion under perfect information. The second and third parts are principally devoted to models of asymmetric information in which the central bank's objectives are changing over time. The fourth part deals with central bank independence.

2. Motives for inflation

Cukierman discusses four possible models of the benefits of inflation to a central bank, all of which lead in equilibrium to a positive rate of inflation. Chapter 3 deals with the employment motive for inflation; surprise inflation raises employment. Chapters 4, 5, and 7 cover the revenue motive for inflation, the balance-of-payments motive (the desire to devalue to improve a current account deficit), and the financial stability motive.[2] The focus in Part I is on models with perfect information.

Chapter 3 provides a useful analysis of the implicit microeconomic structure behind the common formulations of the contracting wage model of aggregate supply. If the nominal wage is unable to continuously clear the labor market, then some assumption must be made about the determination of employment out of equilibrium. The standard approach is to assume firms determine employment along their labor demand schedules. Thus, surprise inflation, by lowering the *ex post* real wage, induces firms to expand employment. Yet if the contract wage is set equal to the value expected to equate supply and demand, as is usually assumed, then the standard approach leaves unexplained why workers are willing to supply labor at a real wage below the marginal disutility of work. If quantities are determined by the minimum of supply and demand, Cukierman shows that the employment motive for surprise inflation vanishes. Expansionary policy that lowers the real wage does produce an excess demand in the labor market, but if employment is determined by the short side of the market (in this case, the supply side) employment actual declines.

This is not to argue that the short-end rule is the correct way to model out-of-equilibrium phenomena. After all, monetary expansions do seem to be associated with increases in employment [see, e.g., King (1991)], but Cukierman has performed a useful service in attempting to relate more carefully the standard objective function based on employment to an underlying model of the labor market. He goes on to propose an alternative labor market foundation for the employment motive for inflation. By postulating a two-sector labor market in which one sector, the unionized sector, is characterized by a predetermined

[2]Chapter 6, which seemed somewhat out of place in Part I, compares an adjustable peg system with a managed common currency, an issue of relevance for proposals for a common European monetary policy.

nominal wage set to establish an above market clearing real wage, Cukierman shows that a surprise inflation lowers real wages in both sectors and may lead to a rise in aggregate employment.

Chapters 4 and 5 on the seigniorage and balance of payments motives are, at least from the perspective of the U.S., less important as potential explanations of monetary policy than the employment motive or the financial stability motive of Chapter 7. However, Cukierman's discussion of the seigniorage or revenue motive for inflation nicely illustrates the use of theory and empirics that characterizes this book. The chapter begins with data on seigniorage and inflation from almost 80 countries over the 1971–82 period to illustrate the wide cross-sectional variation in these variables. Cukierman then develops a theory of seigniorage and draws out a number of hypotheses capable of explaining cross-country variations in inflation rates. For example, since the marginal benefit from seigniorage rises with the marginal distortionary cost of other revenue sources, inflation should be higher in countries with less efficient tax systems. Inflation should also be positively related to the initial level of government debt. Cukierman tests the first of these implications. His work with Edwards and Tabellini [Cukierman, Edwards, and Tabellini (1992)] relates the degree of political instability to the efficiency of the tax system: in countries with unstable governments, no government will wish to institute an efficient tax system if it is unlikely to accrue the benefits of doing so. Thus, countries characterized by a high degree of political instability should also be characterized by inefficient tax systems and a high reliance on seigniorage. The empirical results, reproduced from Cukierman, Edwards and Tabellini, generally support the basic hypothesis.

Chapter 7 presents an explanation for central banks' tendency to smooth interest rate fluctuations. Actually, two arguments are presented. One follows Mankiw (1987) and postulates that seigniorage is set on the basis of optimal public finance considerations, leading to random walk behavior for nominal interest rates. This is closely related to Cukierman's argument in Chapter 4 relating the efficiency of the tax system to inflation, but in Chapter 7 Cukierman rejects this hypothesis as unlikely to explain the behavior of central banks such as the Federal Reserve. Instead, he correctly argues that the Fed has tended to smooth interest rates in order to ensure financial market stability. This, and not optimal seigniorage collection, was certainly the paramount issue that motivated Federal Reserve behavior in its early years. Cukierman goes beyond just setting out these two alternative hypotheses by discussing the types of empirical tests that might be able to discriminate between them.

How successful are these various motives in explaining actual inflation? In the case of the U.S., it seems unlikely that the post-war history of inflation can be well explained by the type of models Cukierman develops in Part I. The price stability of the 1950s would require the assumption that the Fed gained an immediate reputation for low inflation once the 1951 Accord with the Treasury

was reached, even though the Fed had previously engaged in an interest rate pegging policy and commentators at the time were uncertain whether the Accord would actually mean the Fed would be allowed to conduct policy designed to control inflation.[3] The models are more relevant for the 1960s, except that the model of the economy on which the theory is based (a natural rate, rational expectations model) was not the model of the economy central banks (or most economists) believed in at the time. Policy makers saw themselves faced with the problem of reducing inflation at the cost of permanently higher unemployment. The 1970s were dominated by the oil price shocks, and the models developed in Part I, with the exception of Chapter 6, incorporate no role for exogenous shocks as the initiators of inflationary periods. Thus, while these static models do contain important insights, they are incomplete as explanations of the historical experience. Cukierman addresses some of these deficiencies in Parts II and III.

3. Why does inflation vary and why is it persistent?

While the focus on static models with perfect information is useful for Cukierman's discussion of alternative motives for inflation, the models of Part I are not designed to account for the time variation or the persistence of inflationary periods. To explain these aspects of inflation, Cukierman incorporates asymmetric information in Parts II and III. The analysis builds on, and extends, the work in Cukierman and Meltzer (1986), with its emphasis on situations in which the central bank has private information about its own evolving preferences concerning inflation.[4] Chapter 8 provides an excellent overview of models of private information, focusing on factors that might constrain the central bank from choosing the one-shot time-consistent discretionary inflation policy. One approach in the literature has focused on reputational effects [see Rogoff (1989) for a survey]; the central bank refrains from the discretionary inflation rate because doing so will cause it to lose its reputation and the public will 'punish' the central bank by expecting high inflation for some period into the future. Such trigger strategy mechanisms, borrowed from the industrial organization literature, have been criticized since typically there are multiple equilibria depending on the punishment strategy,

[3]The alternative explanation is that the Fed's target output rate was equal to the economy's equilibrium rate so that there was no inflationary bias to policy. This, like an explanation based on reputation, relies on the behavior of unobservables to account for the observed movements of inflation. Such theories are difficult to dismiss entirely since the observations are also almost always consistent with the theory under some assumption about how the unverifiable, unobserved variables moved.

[4]Chapter 9 provides a simplified version of the Cukierman–Meltzer model (complete certainty after two periods); the original model of Cukierman and Meltzer is developed in Chapter 10.

and there is no explanation for how the public coordinates on a punishment strategy. Cukierman argues quite persuasively that the application of this approach is inappropriate in the monetary policy context.

A much more plausible starting point relies on learning as a discipline device for the central bank. Cukierman argues that the central bank has private information (usually taken to be its own preferences), and the central bank's actions (partially) reveal this information to the public. In this way, today's policy choice affects the public's future expectations as the public updates its beliefs about the central bank's private information. This learning process acts to constrain the behavior of the central bank; inflating today, for example, might lead the public to revise its beliefs about the preferences of the central bank (towards believing the central bank is a weak inflation type), thereby raising the future costs to the central bank of inflating.

The range of issues Cukierman is able to address within the context of this framework is impressive, and this argues for the usefulness of the approach, at least as a starting point for the analysis of central bank behavior. However, economists are generally skeptical of theories in which shifts in preferences play an important role. Tastes are typically treated as given, and for good reason; it is simply too easy to explain observations if tastes are allowed to change arbitrarily. To be useful, a model that explains variation in inflation as resulting from variation in the central bank's taste for inflation needs to impose testable restrictions on the data. This is often done in Cukierman's models by assuming a specific time series process to characterize the evolution of the central bank's preferences. Since these processes are arbitrary, not motivated or restricted by any underlying theory of central bank behavior, the preference shifts are ad hoc, designed to allow the theory to account for the observed pattern of inflation.

By attributing inflation variation to changes in central bank preferences for inflation, therefore, Cukierman's theory has a problem. Certainly a complete understanding of the output costs of the Volcker deflation will need to examine the role played by the speed with which the public learned that there had been a fundamental shift in the preferences of the Federal Reserve. However, evolving central bank preferences must reflect deeper level shifts in political power.[5] Ultimately, any theory of inflation based on the preferences of the central bank will need to model these shifts in testable ways. One interesting contribution along these lines is Waller (1992), who develops a model of the appointment process to the central bank governing board and shows that the ideological composition of the board will vary over an electoral cycle when administrative appointees must be confirmed by the legislative body. Another example is that of Fratianni, von Hagen, and Waller (1993); they show how a desire to be

[5]Woolley (1985) emphasizes the political dimension of central bank decision making. See also the discussion by Blackburn and Christensen (1989).

reappointed causes the preferences of the central banker to reflect the government's wishes for pre-election economic stimulation.

An alternative to the preference-based approach would be to examine directly the incentives and constraints central bankers face, how these might have changed over time, and how these changes affect the equilibrium rate of inflation. This is exactly the approach Cukierman adopts in Part IV, when he studies the relationship between inflation and cross-country variations in central banking institutional characteristics. A focus on incentives leads naturally to an examination of the manner in which the government might affect the conduct of monetary policy by affecting the institutional structure of the central bank. For example, Rogoff (1985), Canzoneri (1985), Lohmann (1992a), and Garfinkel and Oh (1993) analyze the effects of various legislated targeting rules on the conduct of policy, while Walsh (1993b) shows how policy is influenced by the government's decision on reappointing the central banker. An emphasis on incentives also allows insights from the literature on principal–agent relationships to be brought to bear on central banking issues [see Walsh (1992, 1993a) and Persson and Tabellini (1992)]. Aspects of monetary policy such as reporting requirements or legislated targeting procedures are part of the 'contract' between the government (the principal) and the central bank (the agent). The contract can be analyzed for its impact on the incentives for the central bank to make truthful announcements, engage in attempts to stabilize output, and pursue inflationary policies.

To provide a successful positive theory of inflation, a preference-based approach or an incentive-based approach must be capable of explaining inflation's temporal persistence. Cukierman accounts for this persistence by linking the central bank's current actions to the public's expectations about the future. Current inflation provides information to the public, either about the central banker's type (Chapters 9–14 and 16) or about the central bank's private information about serially correlated aggregate supply shocks (Chapter 15). Therefore, high inflation today raises expected inflation next period as the public infers that the central bank is soft on inflation in the first case or because the public infers that a persistent aggregate supply shock has raised the marginal benefit of inflation in the second case. The rise in expected inflation in the following period also raises the actual rate of inflation for that period. Thus, persistence arises because of learning considerations, not because of wage and price rigidities (although Section 15.6 presents a model of overlapping contracts that is similar to the persistent shock model). Cukierman's models imply that inflation's persistence is due fundamentally to the persistence properties of the shock, not the policy response. If all shocks are transitory, so is inflation; or if the public shares the same information as the central bank, inflation's persistence is exactly that of the shock.

Cukierman's models have fairly precise empirical implications, and it would be interesting to see some direct tests of these. It is unlikely, however, that

models with shifting central bank preferences but no exogenous shocks could successfully explain recent periods of inflation. The rise in inflation in the 1970s was not caused simply by a reduction in central bankers' distaste for inflation – oil shocks did play a role. It is in explaining the persistence of inflation and the timing of the subsequent disinflations that the shifts in central bank policy priorities emphasized by Cukierman assume a more important role.[6]

4. Central bank independence

One of the most interesting developments in the area of political economy is the empirical work linking institutional structure to policy outcomes. Bade and Parkin (1982), Banaian, Laney, and Willett (1983), Grilli, Masciandaro, and Tabellini (1991), Alesina and Summers (1993), and Fratianni and Huang (1992), among others, have investigated the empirical relationship between central bank independence and average rates of inflation in cross-sections of countries.[7] Cukierman summarizes this work and then extends it in Part IV. In contrast to earlier parts of the book, Part IV, with its focus on institutional structures, moves away from preference-based theories of inflation variation and towards one based on incentives. This is a promising area of research, and Cukierman's discussion helps to highlight some of the directions future researchers should pursue.

Testing hypotheses about the role of central bank independence requires a measure of independence, and several cross-country measures have been constructed. The literature has made clear, however, that the concept of central bank independence is far from unambiguous. A basic distinction has been drawn between 'political' and 'economic' independence [Grilli, Masciandaro, and Tabellini (1991)]. Political independence involves the ability of the central bank to define its policy objectives free from government influence, while economic independence refers to the ability of the central bank to freely determine the manner in which it implements policy to achieve its (possibly politically determined) objectives. Hetzel (1990) has further argued the need to distinguish situations in which central bank decision making is separated from the political process while being committed to a rule such as adhering to the Gold Standard versus separation from the political system with policy determined under discretion.

Measures of central bank independence generally are designed to reflect the institutional framework within which central banks operate and depend on

[6]This view is argued (and modeled) by Ball (1990).

[7]The only study that focuses on fluctuations in central bank independence over time in a single country (Germany) is Lohmann (1992b).

various legal aspects of the central banking structure in each country. In Chapter 19, which represents a slightly rewritten version of Cukierman, Webb, and Neyapti (1992), Cukierman discusses an extensive database on legal characteristics of central banks for a large sample of developed and developing countries. The data categories range from information on who appoints the central bank's CEO and the provisions for the CEO's dismissal to information on the terms of government borrowing from the central bank. Cukierman, Webb, and Neyapti (CWN) use these data to construct a measure of legal independence. But they also construct an index based on the turnover rate of central bank governors and one based on the results of a survey of a 'non-random sample of specialists on monetary policy in various central banks' (CWN, p. 367).

If the measures of legal independence, turnover, and actual independence (as assessed by the questionnaire respondents) constructed by CWN are viewed as possibly noisy measures of the underlying extent of central bank independence, the degree to which the separate measures are correlated should provide some guidance to the relative importance of the measurement error in each. Unfortunately, in the sample of 26 countries for which both legal independence and questionnaire-based indices are available, the rank correlation between the two is only 0.04.[8] Only for the industrialized countries is the correlation marginally significant at 0.33. In regressions of the turnover rate on the legal independence index, no significant relationship is found.

There are two possible interpretations for this lack of correlation. One is that the measures are dominated by measurement error. The other is that these indices measure basically orthogonal aspects of central bank independence and that all are needed to capture the different dimensions of central bank independence. Not surprisingly, this later interpretation is the one adopted by Cukierman. He proceeds then, in Chapters 20–22, to examine the relationship between the various measures of central bank independence and inflation. Unfortunately, most of the variables measuring the detailed aspects of legal independence are statistically insignificant. This might be due to multicollinearity; banks independent along one dimension might generally be independent with respect to the other aspects CWN measure.[9] This seems to be the case for the developed countries, as Cukierman finds a significant negative effect of central bank independence on inflation when he replaces the individual legal measures with an aggregate index of independence. For the developing countries, however, the index is not significant, but inflation is significantly related to a measure of the turnover rate of central bank governors.

[8]See CWN's Table 6, p. 369, or Cukierman's Table 19.9, p. 392. Cukierman presents both weighted and unweighted measures of the two indices.

[9]For example, central banks free to determine monetary policy might also tend to have control over the terms of central bank lending to the government.

A difficulty with much of this analysis, however, is that it is not really designed to test whether inflation is negatively related to central bank independence. The empirical work instead becomes a test of the measures of central bank independence. That is, at times Cukierman seems to take the hypothesis that independence is associated with low inflation as given, and then judges various measures of independence on how well they explain inflation. But if measures of independence are chosen on the basis of their negative correlation with inflation, those same measures cannot be used to test the hypothesis that independence leads to low inflation. For example, Cukierman finds that the rate of turnover of central bank governors has an insignificant coefficient in an inflation regression for developed countries and a positive and statistically significant coefficient in an inflation regression for developing countries. He concludes that 'this suggests that turnover is a better measure of actual independence in developing than in developed countries' (p. 419). But this conclusion only follows if the hypothesis that independence lowers inflation is taken as given; yet it is in order to test this hypothesis that one wants to develop measures of independence.

An even more direct example of this type of analysis is provided by the 'inflation-based' index of central bank independence given in Table 21.1. This index is the predicted inflation rate obtained from a regression of inflation on the legal and turnover rate variables; consequently, this index by construction maximizes the correlation between central bank independence and inflation. Cukierman uses the resulting ranking of central banks to discuss outliers – countries associated with large residuals in the inflation regression. A significant omission from this discussion (and from Table 21.1) is Japan which has had low inflation since the mid-1970s, yet also ranks low in terms of central bank independence.[10]

Another problem that Cukierman is able to address only partially is the issue of the direction of causation between inflation and a variable such as central bank turnover. High inflation, if viewed as an indication of failed central bank policy, might lead to the replacement of the central banker.[11] In this case, high turnover is not a reflection of low central bank independence causing inflation. Cukierman uses instrumental variables to estimate the effect of turnover on inflation, using inflation, the index of legal independence, and turnover from the previous subperiod (essentially the previous decade) as instrumental variables. He reports that the basic conclusions are unaffected. However, he also shows that there is two-way Granger causality between inflation and turnover, which he interprets to mean that sustained inflation lowers central bank independence,

[10]For a discussion of the relationship between the Bank of Japan and the Ministry of Finance, see Cargill and Hutchison (1990).

[11]Walsh (1993b) shows that the optimal commitment policy can be sustained if the central banker cares about holding office and the government fires the central banker whenever inflation exceeds a preannounced value.

which in turn results in higher inflation. But the serial correlation in inflation and turnover revealed by the tests for Granger causality raise questions about the use of lagged inflation and turnover as instrumental variables. It will be interesting to see if future work using the CWN data set can help to clarify the causal relationships between inflation and the institutional characteristics of central banks.

If, in fact, central bank independence is causally related to average inflation rates, with greater independence associated with lower inflation, it is important to ask why this should be the case. Given the view of central banks as purposeful agents, any answer must be framed in terms of the effect of independence on central bank objectives, incentives, or on the central bank's ability to commit. Cukierman offers two explanations. The first is that granting independence to the central bank is a partial substitute for a commitment technology: 'The conveyance of authority to the central bank by political authorities can be viewed as an act of partial commitment. By delegating some of their authority to a relatively apolitical institution, politicians accept certain restrictions on their future freedom of action' (p. 351).

The second explanation simply *assumes* the result by postulating that independent central banks have a greater preference for low inflation. This is consistent with the earlier emphasis in Parts II and III on the role of central bank preferences. Chapter 8, for instance, examines a modification of the book's basic model to allow for two policy makers (the Treasury and the Central Bank) with differing preferences over inflation. Actual outcomes are taken to be a weighted average of the policies desired by these two authorities. The greater the weight on the central bank's preferences, the lower will be inflation since the central bank is assumed to prefer less inflation. This weighting parameter is then interpreted as reflecting the degree of central bank independence.

This approach is inadequate to explain why independent central banks deliver lower inflation – it simply assumes the result. Why should central banks place more weight on inflation? Rogoff's (1985) conservative central banker story is one option; appointing central bankers who are tough on inflation serves as a partial substitute for a commitment technology.[12] Central bankers may represent banking interests who prefer low inflation, although the model of Chapter 7 argued that the desire for financial stability that arises when the central bank cares about the banking sector's profits actually provides a motive for inflation. While such preference-based arguments do suggest greater central bank independence will be associated with lower inflation, they also tend to imply that the cost of low inflation will be greater output volatility. By placing greater weight on inflation control, an independent central bank is less concerned with engaging in stabilization policies. Alesina and Summers (1993)

[12]Fratianni and Huang (1992) argue that independent central banks are better able to commit; this leads to lower inflation even if the central bank and the government have identical preferences.

show, however, that there is no relationship between the variance of GDP and central bank independence among the industrialized nations.

Another alternative is that independent central banks face different incentives than do their governments – they are often subject to monetary targeting and reporting requirements that may constrain their behavior, for example. These institutional features, designed in part to limit the central bank's independence, can serve to lower the discretionary rate of inflation. The specialized knowledge required to manage the day-to-day conduct of monetary policy argues for delegating responsibility to a separate agency, a central bank, equipped with the ability to respond flexibly to new information. The inflationary bias inherent in discretionary monetary policy argues for some limitations on the ability of the central bank to pursue employment stabilization policies at the expense of price stability. As a result of these conflicting tensions, delegating authority for monetary policy to a central bank gives rise to a principal–agent problem [Walsh (1992), O'Flaherty (1990)]. The institutional structure within which the central bank operates can affect policy outcomes, and aspects of central bank design can be evaluated from a principal–agent perspective in terms of their effect on the trade off between flexibility and price stability. If governments are purposeful, they should be expected to influence the incentives the central bank faces. From this perspective, the extent to which the central bank is independent becomes endogenous.

The final chapter of the book, Chapter 23, attempts to address the determinants of central bank independence. Cukierman gives primary focus to political instability and past inflation as explanations of central bank independence. His basic hypothesis linking political instability and central bank independence is as follows: 'In countries with a sufficient degree of internal cohesion, more political instability should be associated with a higher degree of central bank independence, whereas the reverse should be true in countries with relatively low levels of national consensus' (p. 446). Some simple empirical evidence is presented to support this hypothesis.[13]

While the results are suggestive (and that is all Cukierman claims for them), the basic hypothesis is itself open to question. Milesi-Ferretti (1993), for example, develops a model in which an increased probability of a change in political party (greater political instability) may increase the likelihood that the government will 'tie its hands' (i.e., give the central bank greater independence, or, in Milesi-Ferretti's model, choose a fixed exchange rate system) if the conservative party is in power, but lower the likelihood of such behavior if the

[13]The central bank independence index for 14 middle-income countries is regressed on index of changes in political parties within a given regime and an index of the number of regime changes. The first has the expected positive sign, the second the expected negative sign, and both are statistically significant. The regression accounts for 15% of the variation in the index of central bank independence.

left is in power. In other words, the implication that political instability, within a stable regime, will lead to greater central bank independence does not appear to be robust.[14]

While many of my comments on Cukierman's analysis of the relationship between central bank independence and inflation are skeptical in nature, this is not the impression I would wish to leave the reader. Cukierman has made an important contribution to the empirical analysis of central bank institutions and policy outcomes. The data set he, Webb, and Neyapti have collected should see wide use in empirical studies of the role of institutional features on policy outcomes.

5. What's missing: Stabilization policy and normative analysis

Given that Cukierman's stated goal is to explain central bank behavior, his general neglect of stabilization policy is surprising. Certainly in recent years, major central banks have neither focused solely on inflation control nor have they believed that monetary policy can or should attempt to systematically affect the average level of unemployment. Instead, most central banks seem concerned with balancing short-run stabilization policies with longer-run control over the average rate of inflation. Only in Chapter 7, when discussing interest rate smoothing behavior in response to financial shocks, and in Chapters 6 and 15, when aggregate supply shocks are introduced, does the central bank's response to exogenous shocks play any role in the book. Instead, the bulk of Cukierman's analysis focuses on situations in which the only shocks are those arising from shifts in the central bank's preference for inflation.

Also neglected in the book are the normative implications of the analysis. This omission is intentional; Cukierman is explicit in stating that his objectives are positive. That is why he concludes Chapter 3 by arguing that the central bank's objective function should be interpreted as representing the 'distributional motivated political compromise reached through the central bank between the advocates of employment stimulation and the advocates of price stability' (p. 43) and not as a social welfare function. Still, it would have been nice if one chapter had pulled together some of the normative policy recommendations that flow from the work. For example, should countries reform their central banking institutions to grant them greater independence and insulate them from political

[14]Japan provides an interesting case study. There, low inflation has been achieved even though the central bank has little independence. Most explanations attribute Japan's low inflation to its high degree of political stability [Cargill and Hutchison (1990)]. Political stability has made central bank independence unnecessary. It will be interesting to see how the recent political developments in Japan, with a coalition government ending almost 40 years of LDP control, will affect the Bank of Japan's institutional independence and Japan's rate of inflation.

influence, as the Maastricht Treaty requires EC countries to do? This is the normative conclusion many have drawn from the empirical relationship between independence and inflation. However, Cukierman's findings suggest independence is neither necessary nor sufficient for maintaining low average inflation. Japan provides an example of a country that has experienced low inflation during the past 15 years even though its central bank has little legal independence. Several other countries have achieved low inflation, even though their central banks have little independence, by the adoption of a rule-based policy (usually fixing their exchange rate relative to a low-inflation country). Other countries have central banks with a great deal of legal independence, yet have experienced high inflation.[15] Woolley (1985) concludes a discussion of central bank independence by stating that 'insulating a central bank politically does not mean undertaking organizational reforms so much as modifying dominant political coalitions' (p. 348).

The natural way to conduct normative policy analysis within a framework that emphasizes purposeful behavior on the part of the central bank is to ask what incentives a central bank should face. Persson and Tabellini (1992) and Walsh (1992, 1993a) adopt this perspective to derive an 'optimal contract' for the central banker and show that linear reward systems based on either observed inflation or money growth may serve to solve the inflationary bias of discretionary policy. One insight from this approach is that the optimal commitment policy in the type of model employed by Rogoff (1985) and others can be implemented even if the central bank has private information as in Canzoneri (1985); because the inflation bias is constant across states of nature, the government does not need to verify the central bank's private information. The optimal contract is able to eliminate the inflationary bias of discretionary policy while still achieving the optimal policy response to shocks. This contracting approach suggests that central banking structures should be designed to allow the central bank a great deal of independence to respond to economic disturbances while, at the same time, creating incentives (via reporting requirements and targeting strategies) that serve to limit average inflation. Further work on the optimal institutional design of central banks will need to employ Cukierman's findings on the relationship between actual institutional characteristics of central banks and their behavior. This information, and the data collected by CWN, will undoubtedly play an important role in increasing our understanding of how central bank incentives are affected by the bank's institutional structure.

[15]Recall that, except for the industrialized countries, there was no correlation with the questionnaire measures of actual independence and the measure based on legal characteristics of the central bank.

6. Conclusions

One comes away from this volume impressed with the range and depth of Cukierman's work on inflation. The book provides convincing examples of the issues that can be addressed within the model of shifting central bank preferences. However, other important aspects of policy analysis are neglected, perhaps not surprisingly since this is not intended to be a survey volume on strategic monetary policy analysis. Except in Chapter 15, one gets little sense from the book that issues associated with stabilization policy issues play a very large role in monetary policy discussions.

This volume can serve as a useful reference work for researchers interested in aspects of central bank design and policy outcomes. The database on central banks should find wide usage. Graduate students will also find it a very good introduction to the literature on strategic monetary policy models. The overview chapters are clearly written and are excellent at emphasizing the economic issues involved, while the more advanced chapters take the reader to the current state of the literature. One of the nice things about this book is that Cukierman uses the same model over and over, showing how it can be slightly modified or reinterpreted to handle different situations and address different issues. In fact, this review has touched on only a small number of the topics covered in the book; Cukierman offers insights on the role of announcements, the precision of monetary control, and the measurement of credibility, to name just a few of the additional topics he covers. The clarity of Cukierman's discussion and the range of issues he addresses make this a worthwhile addition to any monetary economist's library.

References

Alesina, Alberto and Lawrence H. Summers, 1993, Central bank independence and macroeconomic performance, Journal of Money, Credit and Banking 25, 151–162.

Bade, Robert and Michael Parkin, 1982, Central bank laws and monetary policy, Unpublished paper.

Ball, Laurence, 1990, Time-consistent policy and persistent changes in inflation, NBER working paper no. 3529, Dec.

Banaian, King, Leroy O. Laney, and Thomas D. Willett, 1983, Central bank independence: An international comparison, Federal Reserve Bank of Dallas Economic Review, 1–13.

Blackburn, Keith and Michael Christensen, 1989, Monetary policy and policy credibility, Journal of Economic Literature 27, 1–45.

Canzoneri, Matthew, 1985, Monetary policy games and the role of private information, American Economic Review 76, 1056–1070.

Cargill, Thomas F. and Michael M. Hutchison, 1990, Monetary policy and political economy: The Federal Reserve and the Bank of Japan, in: Thomas Mayer, ed., The political economy of monetary policy (Cambridge University Press, Cambridge).

Cukierman, Alex, 1992, Central bank strategy, credibility, and independence: Theory and evidence (MIT Press, Cambridge, MA).

Cukierman, Alex, Sebastian Edwards, and Guido Tabellini, 1993, Seigniorage and political instability, American Economic Review 82, 537–555.

Cukierman, Alex and Allan H. Meltzer, 1986, A theory of ambiguity, credibility, and inflation under discretion and asymmetric information, Econometrica 54, 1099–1128.
Cukierman, Alex, Steven Webb, and Bilin Neyapti, 1992, The measurement of central bank independence and its effect on policy outcomes, The World Bank Review 6, 353–398.
Fratianni, Michele and Haizhou Huang, 1992, Central bank independence and optimal conservativeness, Working papers in economics no. 92–030 (Indiana University, Bloomington, IN).
Fratianni, Michele, Jürgen von Hagen, and Christopher J. Waller, 1993, Central banking as a political principal–agent problem, April (Indiana University, Bloomington, IN).
Garfinkel, Michelle and Seonghwan Oh, 1993, Strategic discipline in monetary policy with private information: Optimal targeting horizons, American Economic Review 83, 99–117.
Grilli, Vittorio, Donato Masciandaro, and Guido Tabellini, 1991, Political and monetary institutions and public financial policies in the industrial countries, Economic Policy 13, 342–392.
Hetzel, Robert L., 1990, Central banks' independence in historical perspective, Journal of Monetary Economics 25, 165–176.
King, Robert G., 1991, Money and business cycles, Paper presented at the Fall Academic Conference (Federal Reserve Bank of San Francisco, San Francisco, CA).
Lohmann, Susanne, 1992a, Optimal commitment in monetary policy: Credibility versus flexibility, American Economic Review 82, 273–280.
Lohmann, Susanne, 1992b, Federalism and central bank autonomy, Mimeo., Dec. (Stanford University, Stanford, CA).
Mankiw, N. Gregory, 1987, The optimal collection of seigniorage: Theory and evidence, Journal of Monetary Economics 20, 327–341.
Milesi-Ferretti, G.M., 1993, The disadvantage of tying their hands: On the political economy of policy commitments, Centre for Economic Performance discussion paper no. 125, March.
Persson, Torsten and Guido Tabellini, 1990, Macroeconomic policy, credibility and politics (Harwood Publishers, London).
Persson, Torsten and Guido Tabellini, 1992, Designing institutions for monetary stability, Paper presented at the Carnegie–Rochester Conference, Nov.
Rogoff, Kenneth, 1985, The optimal degree of commitment to an intermediate monetary target, Quarterly Journal of Economics 100, 1169–1190.
Rogoff, Kenneth, 1989, Reputation, coordination and monetary policy, in: R. Barro, ed., Modern business cycle theory (Harvard University Press, Cambridge, MA).
Tabellini, Guido, 1986, Money, debt and deficits in a dynamic game, Journal of Economic Dynamics and Control 10, 427–442.
Trehan, Bharat and Carl E. Walsh, 1990, Seigniorage and tax smoothing in the U.S., 1914–1986, Journal of Monetary Economics 25, 97–112.
Waller, Christopher J., 1992, A bargaining model of partisan appointments to the central bank, Journal of Monetary Economics 29, 411–428.
Walsh, Carl E., 1992, Optimal contracts for central bankers, Working paper no. 92–07, Nov. (Federal Reserve Bank of San Francisco, San Francisco, CA).
Walsh, Carl E., 1993a, Optimal contracts for independent central bankers: Private information, performance measures and reappointment, Working paper no. 93–02, May (Federal Reserve Bank of San Francisco, San Francisco, CA).
Walsh, Carl E., 1993b, When should central bankers be fired?, July (University of California, Santa Cruz, CA).
Woolley, John T., 1985, Central banks and inflation, in: L.N. Lindberg and C.S. Maier, eds., The politics of inflation and economic stagnation (Brookings Institution, Washington, DC).