"Lying Low" During Elections: Political Pressure and Monetary Accommodation

Allan Drazen
Tel Aviv University, University of Maryland, CEPR, and NBER

This Draft, October 2005

ABSTRACT: I present a model of political pressure on the Central Bank for higher monetary expansion. Since accommodating monetary policy is worth more to the politician in election years than non-election years, the amount of pressure differs over the electoral cycle. This induces an electoral cycle in monetary policy even though the Central Bank is independent and has no electoral motives *per se*. In equilibrium the monetary authority accommodates the politicians' desired policies in an election year, but is generally free from political influence in non-election years. An electoral cycle in fiscal policy may intensify the political monetary cycle, while an electoral structure that allows the government to call early elections may lessen it.

I wish to thank participants at the 2001 CEPR European Summer Symposium in Macroeconomics (ESSIM) and my discussant, John Driffill, as well as seminar participants at the Bank of Finland, Universidad Torcuato di Tella, and Tel-Aviv University for helpful comments on an earlier version of this paper. Financial support from the Yael Chair in Comparative Economics, Tel Aviv University and from the Israel Science Foundation is gratefully acknowledged.

"I wish we had the luxury to sit back and do nothing until after the election, as is the conventional procedure of the Federal Open Market Committee."

Federal Reserve chairman Alan Greenspan, (*FOMC Transcript*s, October 6, 1992).

1. Introduction

Conventional wisdom is that politicians often use the tools of economic policy to improve their re-election prospects. On a more formal level, this view has led to the study of political business cycles, that is, cycles in economic policy or activity that appear to be due to the electoral cycle. Fluctuations in economic policy or outcomes that are induced by pre-election economic manipulation are termed "opportunistic" political business cycles.

Early models of opportunistic pre-election manipulation of the economy, for example, Nordhaus (1975), assigned a central role to monetary policy, and, specifically, to monetary policy surprises. An incumbent seeking re-election engineered a surprise monetary expansion before an election, which led to a temporary increase in economic activity, followed with a lag by an increase in inflation.[1] After the election the incumbent reversed course, using a monetary contraction to "cool down" the economy and reduce inflationary expectations, and hence set the stage for "surprise" monetary expansion in the next election. Many subsequent models of political business cycles, though they differed in the motivation of policymakers, in the timing of the cycle, and in the modeling of formation of expectations, shared a reliance on monetary surprises as the driving force.

This type of political monetary cycle relies crucially on the incumbent politician more or less directly controlling monetary policy. If this is the case, it is plausible that a monetary expansion before an election may be part of an opportunistic incumbent's attempt to stimulate economic activity. Pre-electoral manipulation of economic policy may conceivably be punished rather than rewarded at the polls, but the institutional structure of policymaking itself would be consistent with elections inducing significant monetary expansions in the months before the election. However, when the monetary authority (hereafter, Central Bank) is independent, this

[1] Several studies document the relation between economic activity before an election and votes for the incumbent. Fair (1978, 1982) finds that a one percent increase in the growth rate of real economic activity in the year of the election increases the incumbent's vote total by about one percent. Lewis-Beck (1988) found similar effects of election year economic activity in Britain, France, West Germany, Italy and Spain; Madsen (1980) reported similar results for Denmark, Norway, and Sweden.

general argument is not very compelling. In this case, monetary policy cannot be simply chosen by the incumbent for political purposes, either before or after elections.[2]

Consistent with this argument, the predictions of the Nordhaus model are not borne out empirically in the data for the U.S. or in other countries with independent central banks. Most importantly, we see no significant increase in economic activity before an election, as the model predicts. (Drazen [2000a] presents a summary of the evidence.) Hence, on the basis of both the theoretical arguments and the empirical evidence, one may be tempted simply to dismiss the relevance of models of an opportunistic political monetary cycle in countries with relatively independent central banks.

There are, however, several reasons why a political monetary cycle merits further study. First, as discussed in the following section, there is significant anecdotal evidence of political pressure on monetary policy before elections. This suggests that there may be effects of the electoral cycle on monetary policy, but that they are more indirect than in the above models. Any attempt to model them must be consistent with the attempt to insulate monetary policymaking from political pressures. Second, a closer reading of the empirical findings also suggests a more complex picture. While monetary-based models are unconvincing explanations of the political business cycle in countries with independent central banks, we sometimes see pre-electoral monetary cycles in such countries over certain time periods, with money growth rates rising before elections and inflation rising after elections. (Some of the data are discussed in the next section.)

A third argument for studying pre-electoral political monetary cycles is that use of policy tools other than monetary policy to influence election outcomes may have significant effects on monetary policy, the nature of the effect depending precisely on the interaction between the Central Bank and politicians. Specifically, there is significant evidence of expansionary fiscal policy of one sort or another before elections in many countries. This has long been recognized in developing countries (see Drazen [2000b] for a discussion of the evidence for a range of countries), but was thought not to characterize developed countries, which generally have more independent central banks. Recent studies however (Persson and Tabellini [2002], Brender and

[2] It has also been argued that even if the incumbent could choose monetary policy as he wished, his ability to generate systematic monetary surprises before elections would be limited if voters are rational.

Drazen [in progress]) suggest that developed countries also display pre-electoral fiscal cycles, with taxes being reduced (or at least tax increases being postponed, as in Brender and Drazen) before elections. Hence, even if the Central Bank does nothing to influence election outcomes, a monetary response to an electoral fiscal cycle might yield a monetary cycle, as Willett (1983) or Beck (1987) suggest. We discuss the evidence at the end of section 5.

The purpose of this paper is to consider the effect of electorally induced political pressure on monetary policy when there is a clear separation of monetary authorities from politicians (and from fiscal authorities). We present a simple model of the interaction of the Central Bank with politicians over the electoral cycle. Even in the absence of a political fiscal cycle, there will be a political monetary cycle as long as voters vote on the basis of economic activity in election years and have preferences over outcomes that differ from those of the Central Bank. A political fiscal cycle to which the Central Bank reacts may further exacerbate the political monetary cycle.

The plan of the paper is as follows. In section 2, I present some evidence of electoral pressures on monetary policy, both anecdotal and more empirical. In section three I present a base model of monetary policy in the absence of political pressure, following the Clarida, Gali, and Gertler (1999, 2000) model of interest rate rules as a function of demand and supply shocks in a closed economy. In section 4, I then consider the same model when politicians and the Central Bank have different objectives and politicians can put pressure on the Central Bank to follow a policy closer to that desired by the former. In a framework of fixed election dates it is shown there is an equilibrium in which the Central Bank is free from political pressure in non-election years but is subject to pressure in election years. Whether pressure is fully or only partially accommodated depends, among other things, on the size of shocks. In section 5, the model is extended to include a political fiscal cycle, and with politicians putting pressure on the Central Bank to accommodate the fiscal cycle. In section 6, I consider the effect of uncertainty about election dates and show how the pattern of accommodation may be affected. Section 7 contains conclusions.

2. Political Pressures on Monetary Policy

There is significant anecdotal evidence for the U.S. that even though incumbent politicians do not control monetary policy, the Federal Reserve faces political pressures in

election years. Several studies suggest that decisions on monetary policy in the U.S. are influenced by the executive branch (see for example, the discussion in Woolley [1984], Havrilesky [1993], or Caporale and Grier [1998]). Though the President can use monetary policy as an electoral tool, a view that simply does *not* fit the institutional or observed behavioral facts, an independent central bank cannot totally ignore the political environment in which it finds itself. A central bank may find it prudent (or "political," if you wish) to be cognizant of political pressures, especially in election years in democracies. Hence, an independent central bank may be more willing to partially accommodate the executive branch's pressures for monetary policy during election years in order to avoid criticism.

The existence of pressure is recognized within the Fed. As Laurence H. Meyer wrote in 2001, when he was a member of the Board of Governors:

> The history of the Federal Reserve is replete with examples of attempts by presidents and senior administration officials to influence the conduct of monetary policy, especially in periods leading up to elections. Sometimes this takes the form of appointments—including specific instructions to appointees to vote in a particular way. Sometimes it takes the form of pressure on the chairman and occasionally on other members of the FOMC.

Woolley (1984) has studied the political relation between the U.S. President and the Federal Reserve in great detail. He argues that an independent central bank may be willing to accommodate executive branch pressure on monetary policy during election years in order to prevent sharp movements in interest rates, and more generally to avoid any appearance of interfering politically in the election process.[3] As a result it is widely argued that the FOMC is wary about raising (or lowering) interest rates in the months before an election. As Woolley writes:

> Sherman Maisel wrote that "Federal Reserve policy has always been to avoid, if possible, taking any major monetary actions as elections approach." This conclusion was echoed in several interviews with Federal Reserve officials. As Governor Partee put it, "if you were to ask a central banker about what he would

[3] Consider, for example, this excerpt from Martin Wolk of MSNBC on Aug. 13, 2002. "While the Fed can cut rates anytime, observers say Greenspan would be extremely reluctant to push through a surprise rate cut in October when it could influence the closest races."

> want to see in a period prior to an election, he would say he wanted to have stability." Stability in interest rates and the money supply would presumably keep the central bank from being dragged into partisan politics. (1984, p.127)

Hence, the Fed is not so much interested in pushing the re-election of the incumbent as in simply "lying low" during the election so as not to be subsequently criticized.

Chappell and McGregor (2000) have looked at detailed records of FOMC deliberations for the years 1970 – 1978. For 1970 to March 1976, they used the FOMC's *Memorandum of Discussio*n, which summarizes the FOMC's deliberations on monetary policy for each meeting. After March 1976, the FOMC stopped producing the *Memorandum of Discussio*n. However, they report that after that date, meeting deliberations were tape-recorded, transcribed, and stored at the Fed, and some of these transcripts have been released in edited form. (Since 1981, transcripts of all FOMC meetings have been released with a five year lag, so we have transcripts from 1981 to 1996.) Though the FOMC records exhibit relatively little discussion of upcoming elections, Chappell and McGregor argue that the few references that do occur are consistent with the desire to appear apolitical, "perhaps consistent with a tendency to avoid overt actions in pre-election periods." One finds evidence in the transcripts they examined before the Congressional elections in 1970, and the Presidential elections in 1972 and 1976, the key theme being the difficulties of changing policy close to the election. To take but one quote, from then New York Fed President Volcker, "… it would be premature right now [to adjust downward the M1 range], given account not only of our economic conditions, but also of this time on the calendar, to give a really strong signal of easing" (*FOMC Transcript*s, October 19, 1976).

More recent transcripts give some evidence, though scattered, in the same direction, the quote from Alan Greenspan at the beginning of the paper being the most striking. (Greenspan goes on to say that he does not "think the markets have been viewing anything we have been doing as politically motivated." (*FOMC Transcript*s, October 6, 1992) In November 1988, the manager of the foreign exchange desk argued "that as we moved up toward the election there has been a feeling on the part of a lot of people in the market that the authorities would be particularly careful not to let exchange rates change very wildly. And, they succeeded in doing that." (*FOMC Transcript*s, November 1, 1988) In October 1992, regional Bank President McTeer comments, "Yet we're within a month of the election and I thought it was conventional

wisdom that we weren't expected to act so close to an election. But I never see any references to that anymore." (*FOMC Transcript*s, October 6, 1992).

Econometric evidence supports the "lying low" view. Wooley (1984), among others, has looked at the number of changes in the discount rate or reserve requirements over 1955-77 in even (*i.e.*, election years) versus odd (*i.e.*, non-election years). He finds that not only are visible policy changes are more likely in odd years (59 versus 31 in his sample), but also that easing is more likely in even years (61% of the changes) versus odd years (42% of the changes), with these differences being statistically significant. Beck (1987) finds a pre-electoral cycle for M1 growth rates in the U.S. over the period 1960-80, but finds no similar statistically significant evidence of a pre-electoral effect on nonborrowed reserves or the Fed Funds rate. He argues that the Federal Reserve accommodates fiscal policy in an election year, so that there is a passive political monetary cycle caused by a political cycle in fiscal instruments, but the Fed does not actively induce a political cycle.

As a preliminary test of the effect of elections on FOMC behavior, I considered whether FOMC behavior in setting the target Federal Funds rate was different in election and non-election periods. Specifically, one may ask if the Fed less likely to raise or lower the target at meeting dates in the 6 months before the election than at other times. Since the choices of lowering, leaving unchanged, or raising the target rate can be ordered, I ran an Ordered Probit Regression where using the inflation rate, the unemployment rate and an electoral dummy as explanatory variables. The regression was of the form:

$$\Pr(\text{change in FFTARGET at } t) = B_0 + B_1\pi_t + B_2\, UN_t + G_1\, EA6 + G_2 EA6 + \varepsilon_t$$

where

π = monthly inflation rate
UN = unemployment rate
G_1 – effect of electoral dummy on probability of no change in target versus decreasing target;
G_2 – effect of electoral dummy on probability of increasing target versus no change;
EA6 = 1 in 6 months before Presidential or Congressional Election; = 0 otherwise;
ε_t = error term

The observations were the decisions at meeting dates over the period 1982 – 2001. The regression results were as follows:

Parameter	Estimate	Standard Error	t-statistic	P-value
B_0	.866100	.489561	1.76914	[.077]
B_1	.061287	.034531	1.77481	[.076]
B_2	-.108219	.077919	-1.38888	[.165]
G_1	.448668	.237994	1.88521	[.059]
G_2	-.032552	.220444	-.147664	[.883]

From the parameter estimates, we can calculate the probability of a change in the target versus no change in the target

Probability of each choice when EA6 = 0

Pr(decrease)	Pr(No Change)	Pr(Increase)
0.33204	0.42451	0.24345

Probability of each choice when EA6 = 1

Pr(decrease)	Pr(No Change)	Pr(Increase)
0.18863	0.57800	0.23337

which shows that the Fed was approximately 15% less likely to change the Fed Funds target in the six months before the election than at other times.

To summarize the view for the U.S., as Woolley writes:

> In terms of elections, it is very clear that the Federal Reserve is not indifferent to what is going on. … It tries to lie low, to avoid being made the political issue, and this could lead it to pursue a policy course rather different from the one economists recommend. (1984, p.129)

It is often argued that other central banks are subject to similar pressure and analogously respond by "lying low" before elections, though there is little formal work that I have been able to find. Especially interesting is the case of Germany. On the one hand, the Bundesbank is argued to have one of the most independent central banks; recent work suggests a political cycle in German monetary aggregates.[4] Maier (2000, 2002) argues that there is a clear electoral cycle

[4] Berger and Woitek (2000) argue that the Bundesbank postponed interest rate increases until after elections, but suggest that the political cycle reflects shifts in money demand that occur because of uncertainty about electoral outcomes affects money demand before elections, which the Bundesbank accommodates.

when one looks at an index of monetary policy instruments, such as the discount rate and borrowing quota, with the policy stance becoming more expansive before elections. However, he finds no similar political cycle in short-term market interest rates. He argues that announced Bundesbank policy responds to political pressure before elections, but this does not translate into the *effective* Bundesbank policy. In his interpretation the Bundesbank "pretends relatively expansive monetary policy before elections to calm down politicians, but in the mean time shields the effective monetary policy from political pressure."

3. Monetary Policy Rules in the Absence of Political Pressure

I begin with a simple closed economy model subject to both supply and demand shocks, and I derive the monetary policy rule in the absence of political pressure. Since my goal is to consider the effect on monetary policy of political pressure on the monetary authority relative to the case of no pressure, I adopt as a baseline model a version of the monetary policy model of Clarida, Gali, and Gertler (1999, 2000) and the interest rate rules they derive. This approach, which derives the interest rate as a function of macroeconomic variables, is based the Central Bank minimizing a loss function defined over these same variables. I follow the loss-function approach (both here and for voter behavior below), rather than deriving the Central Bank's objective function from underlying optimization,[5] to make these results easily comparable to the existing literature on opportunistic political business cycles, which use such a set-up, and to recent work on monetary policy rules. Morover, it is the *difference* in the loss functions of the Central Bank and politicians that is crucial to the results; deriving this difference from the objectives of the underlying constituencies they represent would not change the key point.

I begin by specifying the stochastic economic environment and then, as a benchmark, what monetary policy the Central Bank would find optimal in this stochastic environment in the absence of political constraints. The economy is modeled by two equations -- an aggregate supply relation and an aggregate demand relation -- where both demand and supply are subject to stochastic shocks. The aggregate output gap x_t (the deviation of actual from potential output) is a function of unanticipated inflation:

[5] Rotemberg and Woodford (1999) suggest how loss functions of the general form of (4) may be derived from utility maximization as an approximation.

$$x_t = \pi_t - E_t \pi_{t+1} + s_t \quad \textbf{(1)}$$

where s_t is a supply shock which is mean zero and an i.i.d.[6] Note that it is expected future inflation, rather than current inflation, that enters into the supply relation. This implies that inflation depends entirely on current and expected future events and displays no inertia.[7]

Aggregate demand for output (relative to potential output) is a decreasing linear function of the ex-ante real interest rate with a stochastic term d_t:

$$x_t = -\varphi(i_t - E_t \pi_{t+1}) + d_t \quad \textbf{(2)}$$

where $\varphi > 0$ where d_t is an i.i.d. mean-zero random variable. (In section 5, I consider below the case in which d_t includes fiscal policy which varies over the electoral cycle in a known way.)

The Central Bank assigns a loss to both inflation and output fluctuations around a target, where its target for economic activity is potential output (the natural rate of economic activity), that is, $x = 0$, and the target for inflation is also zero. The Central Bank wants to minimize the expected present discounted value of losses, represented by Λ^{CB}, where the discount rate is β:

$$\Lambda_t^{CB} = L_t^{CB} + E_t(\beta L_{t+1}^{CB} + \beta^2 L_{t+2}^{CB} + \beta^3 L_{t+3}^{CB} + \dots) \quad \textbf{(3)}$$

where the Central Bank's single-period loss function is given by:

$$L_t^{CB} = \gamma \frac{x_t^2}{2} + \frac{\pi_t^2}{2} \quad \textbf{(4)}$$

where $\gamma > 0$.

Since current policy puts no constraints on future policy, minimizing (3) over x_t and π_t. subject to (1) is equivalent to minimizing (4). This minimization yields the optimal relation between x_t and π_t of the form $\pi_t = -\gamma x_t$. Combining this condition with the aggregate supply relation (1), and imposing rational expectations about future shocks and the use of the *same* rule at all future dates, yields x_t and π_t as functions of the supply shock s_t, namely:

---

[6] Clarida, Gali and Gertler consider first-order serially correlated supply shoks. So far, I have not been able to solve the political model in such a case, for reasons that will become clear below.

[7] Following Calvo (1983), Clarida, Gali, and Gertler (1999) show that it can be derived from optimizing behavior of monopolistically competitive firms maximizing profits subject to costs on the frequency of future price adjustments, where (1) reflects staggered price adjustment by such firms.

$$\pi_t^B = -\frac{\gamma}{1+\gamma} s_t$$
$$x_t^B = \frac{1}{1+\gamma} s_t \quad . \qquad \textbf{(5)}$$

The superscript "*B*" indicates the Central Bank's first best policy. The associated interest rate rule is:

$$i_t^B = -\frac{1}{\varphi(1+\gamma)} s_t + \frac{1}{\varphi} d_t \qquad \textbf{(6)}$$

This rule gives the Central Bank's preferred interest rate response to supply shocks s_t and demand shocks d_t consistent with the desired output and inflation rates. This is the policy rule for interest rates derived by Clarida, Gali, and Gertler (1999).[8] Note that demand shocks are fully offset by interest rate changes, with there being no effect on x_t and on π_t.

4. Political Pressure and Monetary Accommodation with Fixed Election Dates

I now consider desired monetary policy of both the incumbent politician and the Central Bank when their objective functions over inflation and economic activity differ, where the politician's desired policy reflects that of the voters. I begin by making a number of simplifying assumptions that will later be relaxed. First, it is assumed that elections are held at known dates, specifically, every other period. I consider below the effects of uncertain dates of elections. Second, in order to concentrate on differential desired response to supply shocks, I assume that the representative voter and the Central Bank have the same targets for economic activity *x* and inflation π, differing only in the relative weight they put on these output and inflation fluctuations. Finally, I also assume for now that there is no political fiscal cycle, an assumption that will be relaxed below.

4.1 *Electoral Structure*

There is an election held at the end of every other period, with an electoral period denoted by *E* and a non-election period denoted by *O*. The nature of the election cycle itself

[8] Clarida, Gali, and Gertler (2000) point out that this rule is consistent with the Taylor rule when lagged inflation or a linear combination of lagged inflation and the output gap is sufficient to forecast future inflation.

affects monetary policy in two ways. First, the setting of monetary policy will depend on whether the economy is in an election or non-election period. Moreover, the willingness of the Central Bank to accommodate election (*E*) period pressures and the willingness of the executive not to interfere with monetary policy in non-election (*O*) periods will depend on the expectation that *E* periods are followed by *O* periods and *vice-versa*. Hence, the specification of the electoral cycle. The absence of deviations from the cooperative equilibrium that we derive reflects an infinite horizon for the usual reasons to prevent "unravelling".

The second way in which the nature of the election cycle itself affects monetary policy is due to the forward-looking nature of the supply and demand functions, which imply that policy in any period is forward-looking. Current optimal policy depends on next period's expected inflation, which depends on next period's monetary policy-setting regime. Inflation policy next period depends on the following period's regime, and so on. This makes solving a forward-looking problem in which there are expected to be elections every other period is quite complicated when the nature of election-year interaction depends on the realization of both supply and demand shocks and when shocks display persistence over time.[9] Specifically, whether the executive's desired monetary policy is fully or partially accommodated depends on the realization of these shocks, as it should in a realistic model. This means that the Central Bank in an *O* period must base its choices on the probability that it will partially or fully accommodate period in the subsequent *E* period, which in turn depends on expectations of accommodation in the next election cycle, and so on.

If there was serial dependence to shocks, this problem is intractable when there are two shocks with general distributions. To illustrate the nature of the interaction between the Central Bank and the incumbent politician in *E* and *O* periods with closed form solutions, I will therefore use the case of no serial correlation of supply shocks. This allows calculation of the solution for an infinitely repeated game where behavior depends on the realization of both demand and supply shocks (as well as expected future realizations).

4.2 *Political Pressure*

I assume that the politician can apply pressure on the Central Bank to follow certain

[9] Using standard, backward-looking Phillips Curve doesn't solve this technical problem.

policies. What is most important for our purposes is that politicians care more about monetary policy in election periods (as it affects their re-election chances) than in non-election periods and can exert some pressure on the monetary authorities in that direction, rather than the specific amount of pressure that can be applied.

Consider the following specification of threats by politicians and possible responses by the Central Bank. To model the pressure an incumbent can impose on the Central Bank, I assume that the incumbent can threaten to impose a private cost C on the Central Bank if desired policy is not followed. That is, I assume that the politician can push the Central Bank to its indifference point between following its own most desired policy and following the politician's most desired policy. Under certain conditions, the Central Bank's loss would be $L^{CB} + C$. This may represent the ability of the incumbent to criticize Central Bank actions and hence induce the Central Bank to follow a policy closer to the incumbent's desires in order to avoid criticism. For ease of exposition, I use an index variable I_t^P to indicate the politician's choice in period t, where $I_t^P = C$ represents pressure in t, and $I_t^P = 0$ a policy of no pressure.

I assume that the direct cost to the politician of imposing such pressure is zero, but that the pressure the politician can apply is finite. As the next paragraph makes clear, there are other costs to imposing pressure on the Central Bank, and this will limit the use of pressure. Making such pressure directly costly to the politician would not change the result that pressure is more likely to be used in an electoral than a non-electoral period, but could significantly change how it is used. Specifically, in the equilibrium derived below with fixed election dates, the politician always applies pressure in an election period, small shocks are fully accommodated by the Central Bank, while large shocks are only partially accommodated. If there was a fixed cost to the politician of applying pressure, pressure would only be applied shocks above a certain threshold. Hence, small enough shocks would result in no change in the Central Bank's actual policy, rather than full accommodation of the politician's preferences.[10] The model with uncertain election dates in section 6 has this characteristic that no pressure is applied for small enough shocks for a large enough probability of early elections.

Political pressure is effective only if it is not applied too often. Why? One may argue

[10] Lohmann (1992) presents such a model. Large shocks lead to partial accommodation in her model, as in the model presented here.

that if politicians try to pressure the Central Bank continually, some sort of a backlash or resistance will be generated. One way to model this simply is as follows. In any period in which the politician applies pressure, the Central Bank can respond with a "complaint", which is assumed to have non-zero, but small cost to the bank, "small" to be made more explicit below. (See (A3) in the Appendix.) Using an analogous representation to politician's choice of whether to impose pressure, I let I_t^{CB} indicate the Central Bank's choice of response in period *t*, where $I_t^{CB} = K$ represents a complaint in response to pressure in *t*, and $I_t^{CB} = 0$ represents no complaint. Such a "complaint" has no effect on policy outcomes in the current period, but neutralizes political pressure in the following period, if it is applied. That is, the threat of political pressure *C* is effective in period *t* only if $I_{t-1}^{CB} = 0$. Hence, the cost to the politician of applying political pressure on the Central Bank to follow a given policy is that the bank will respond, rendering pressure ineffective if applied in the following period. Therefore, the politician must choose when to apply pressure and not overuse it. I further assume that a Central Bank complaint about pressure *cannot* be made if no political pressure was applied in that period. That is, $I_t^P = 0$ implies that $I_t^{CB} = 0$ necessarily, meaning that the Central Bank cannot complain "pre-emptively." (One could also say that complaining about pressure that has not been applied does not effectively stop the use of future pressure.)

To summarize, when the Central Bank is criticized or threatened with criticism, it can complain, at some cost to itself, to deflect future criticism. This formulation of criticism and response is meant to capture in a stylized way a realistic component of the interaction of politicians and the Central Bank in the latter's choice of monetary policy. It will also be sufficient to deliver the result that politician's influence monetary policy in election years when it is most important to them not simply by threats of criticism, but also by constraining themselves not to interfere on a regular basis.

4.3 *The Incumbent's Objectives*

The politician's preferences are derived from those of the voters, so we begin with those. Voters are forward looking and care about the present discounted value of the loss function (with the same discount factor as the Central Bank), namely:

$$\Lambda_t^V = L_t^V + \mathrm{E}_t(\beta L_{t+1}^V + \beta^2 L_{t+2}^V + \beta^3 L_{t+3}^V + \dots), \qquad \textbf{(7)}$$

which we call the social loss function. The single-period loss function of average voter from macroeconomic fluctuations is:

$$L_t^V = \alpha \frac{x_t^2}{2} + \frac{\pi_t^2}{2} \qquad \textbf{(8)}$$

where $\alpha \geq \gamma$. That is, voters are assumed to have the same targets for economic activity and inflation but to assign a greater weight than the Central Bank to output fluctuations relative to inflation fluctuations. Among other things, strict inequality will mean that the incumbent wants smaller interest rate fluctuations in response to supply shocks, consistent with the discussion of pressures on monetary policy at the end of section 2. The difference in objectives between the Central Bank and voters (and hence politicians running for office who want to attract their votes) could stem from underlying heterogeneity of interests in the economy. Different individuals could have different preferences over inflation and unemployment because of differences, for example, in relative capital and labor endowments. The differences in objectives between politicians and the Central Bank thus flows from the fact that they view themselves as representing different constituencies.

An incumbent cares both about the social welfare of voters directly and about getting re-elected, where voters are assumed to vote on the basis of the state of the economy (see footnote 1), as summarized by (7). We represent this by assuming the probability *q* of being re-elected in (the end of) an election period *t* depends negatively on the loss Λ_t^V that the average voter associates with economic conditions in *t*, that is, $q_t = q(\Lambda_t^V)$, where the derivative $q_\Lambda < 0$.

Denoting by θ the value of holding office in a period, the incumbent's loss function may be written:

$$\Lambda_t^P = \Lambda_t^V - (\theta + \beta q(\Lambda_t^V)\theta + \ldots), \qquad \textbf{(9)}$$

at the beginning of an election period *E* and

$$\Lambda_t^P = \Lambda_t^V - (\theta + \beta\theta + \ldots), \qquad \textbf{(10)}$$

in a non-election period, where the first term represents direct concern for social welfare, while the second set of terms in parentheses is the incumbents expected value of being in office.[11]

[11] A non-opportunistic policymaker, for whom θ = 0 would minimize social loss maximize social welfare, with the *same* objective in both election and non-election years.

4.4 *Incumbent's Desired Policy and Central Bank Accommodation*

We now derive the desired monetary policy of an incumbent politician. Given the forward-looking nature of the model and assumptions about independence of inflation choices across periods (other than the politician's inability to pressure the Central Bank in two consecutive periods if a complaint was generated), the only choice variable is current-period inflation. Desired monetary policy is found by differentiating (9) and (10) with respect to π_t, with the associated desired value of x_t following from (1). This may be written:

$$\frac{\partial \Lambda_t^P}{\partial \pi_t} = (1 - \theta q_\Lambda) \frac{\partial \Lambda_t^V}{\partial \pi_t} \quad = \quad 0 \qquad \textbf{(11)}$$

in an election period and:

$$\frac{\partial \Lambda_t^P}{\partial \pi_t} = \frac{\partial \Lambda_t^V}{\partial \pi_t} \quad = \quad 0 \qquad \textbf{(12)}$$

in a non-election period, where $1 - \theta q_\Lambda > 1$. Hence, maximizing the politician's objective with respect to monetary policy is the same as minimizing the voter's loss function Λ_t^V both in election and non-election periods, but with a smaller weight in the latter, implying a lesser payoff to his desired monetary policy, as it has no re-election implications. This intuitive observation is crucial to the nature of the cooperative equilibrium across periods derived below. Note further that given the forward-looking nature of aggregate supply and demand functions and of inflation expectations, minimizing Λ^V is minimizing L^V.

Since both demand and supply shocks are serially uncorrelated and are mean zero, the expected rate of inflation in *t*+1 as of *t* is zero, that is, $\mathrm{E}_t(\pi_{t+1}) = 0$, in both election and non-election periods. (This will *not* be the case if fiscal stimulus is expected in election periods.) One may then use the same methodology as in section 3 to derive the incumbent politician's desired monetary policy as a function of the demand and supply shocks, namely:

$$\pi_t^P = -\frac{\alpha}{1+\alpha} s_t$$
$$x_t^P = \frac{1}{1+\alpha} s_t \qquad \textbf{(13)}$$

where the *P* superscript represents the politician's most preferred policy. The politician's desired monetary policy has a greater response of inflation to supply shocks and a lesser response of output to supply shocks than the Central Bank's desired policy, as well as a greater output response to demand shocks. The associated interest rate is:

$$i_t^P = -\frac{1}{\varphi}\frac{1}{1+\alpha}s_t + \frac{1}{\varphi}\,d_t \qquad \textbf{(14)}$$

Note that the politician prefers a lower interest rate response to supply shocks than the Central Bank, but an identical response to demand shocks.

Consistent with the discussion in section 4.2, the incumbent politician can try to induce the Central Bank to follow this policy by threatening to impose a cost *C* on it if it fails to do so. Suppose that no pressure was applied on the Central Bank in the previous period, so that the current threat is effective. Call the policy chosen by the politician x^*, π^*. If the Central Bank follows the policy x^*, π^*, its current-period loss is $L^{CB}(x^*, \pi^*)$. If it deviates, it will follow its first best policy, namely (x^B, π^B), implying a current period loss of $L^{CB}(x^B, \pi^B) + C$. The policy x^*, π^* must therefore satisfy:

$$L_t^{CB}(x^*, \pi^*) \le L_t^{CB}(x^B, \pi^B) + C \qquad \textbf{(15)}$$

If $(x^*, \pi^*) = (x^P, \pi^P)$ satisfies this constraint, then it will be the policy and the Central Bank is said to fully accommodate political pressure on monetary policy. Substituting the definitions of (x^P, π^P) and (x^B, π^B) into (15), some algebra reveals that this will be the case when:

$$-\sqrt{\frac{2C}{1+\gamma}} \le -\left(\frac{\alpha-\gamma}{(1+\alpha)(1+\gamma)}\right) s_t \le \sqrt{\frac{2C}{1+\gamma}} \quad . \qquad \textbf{(16)}$$

In words, when supply and demand shocks are small enough so that the politicians desired policy is close enough to the Central Bank's desired policy, the threat of pressure will induce the Central Bank to follow (x^P, π^P).

When (15) is violated at (x^P, π^P), the equilibrium "compromise" policy (x^{CO}, π^{CO}) is the policy that just satisfies (15) with equality, that is:

$$L_t^{CB}(x^{CO}, \pi^{CO}) = L_t^{CB}(x^B, \pi^B) + C \,. \qquad \textbf{(17)}$$

Using the definition of (x^B, π^B) and the supply function (1), this condition yields simple expressions for π^{CO} and x^{CO}, namely:

$$\begin{aligned} \pi^{CO} &= -\frac{\gamma}{1+\gamma} s_t - \sqrt{\frac{2C}{1+\gamma}}, \; x^{CO} = \frac{1}{1+\gamma} s_t - \sqrt{\frac{2C}{1+\gamma}} \quad \text{for} \quad s_t > s^{CO} \\ \pi^{CO} &= -\frac{\gamma}{1+\gamma} s_t + \sqrt{\frac{2C}{1+\gamma}}, \; x^{CO} = \frac{1}{1+\gamma} s_t + \sqrt{\frac{2C}{1+\gamma}} \quad \text{for} \quad s_t < -\, s^{CO} \end{aligned} \,. \qquad \textbf{(18)}$$

where the critical value of the supply shock s^{CO} is:

$$s^{CO} = \frac{(1+\alpha)(1+\gamma)}{\alpha - \gamma} \sqrt{\frac{2C}{1+\gamma}} \,. \qquad \textbf{(19)}$$

These correspond to the two branches of (16) and are found by solving (17) and taking the relevant root. In this case we say that the Central Bank partially accommodates political pressure.[12] Call the two inflation values in (18) π^{CO-} and π^{CO+} respectively. The choice of inflation in an election period in (13) and (18) as a function of the realizations of s_t and d_t is illustrated in Figure 1, showing the relation between π_t and s_t, where d_t is set at 0.

The probability that monetary policy is (x^P, π^P) is simply the probability that (16) is satisfied, which depends on the joint distribution of s_t and d_t. Let's assume these distributions are independent. With i.i.d. shocks, this probability as seen from the previous period is a constant. Let us denote this probability of full accommodation by p. If the distributions of s_t and d_t are symmetric around their means, then the probability that the solution is one of the branches of (18) is equal and equal to $\frac{1-p}{2}$.

4.5 *Equilibrium Interaction of Incumbent Politicians and the Central Bank*

[12] In equilibrium the cost C is not imposed on the central bank, but the threat of pressure induces accommodation of the incumbent in choice of monetary policy.

We now demonstrate that there is an equilibrium over the electoral cycle with the following properties, as long as the politician cares enough about re-election (θ high enough) and re-election prospects are sufficiently sensitive to macroeconomic outcomes (and q_Λ sufficiently negative). In an electoral (*E*) period the Central Bank accommodates the desires of the incumbent politician, choosing either π^P or π^{CO} (depending on the realization of the shocks), with this outcome enforced by a threat of *C* by the politician (which is not carried out) and no complaint *K* from the Central Bank. In a non-electoral (*O*) period, the Central Bank chooses its preferred policy π^B, as derived above, since expected inflation in the next (election) period is zero, the politician putting no pressure *C* on the Central Bank and the Central Bank choosing not to complain. That is, in this equilibrium, the Central Bank accommodates the desires of an incumbent running for re-election by smoothing interest rates in an election period, but chooses its optimal policy in a non-election period ("constrained" only by expectations of expected future inflation policy) with no pressure from politicians.

One can demonstrate that this is an equilibrium by considering deviations in any period and show they are not profitable for either side. This is shown formally in the Appendix. In the text, I present the argument more intuitively. Consider first an *E* period, which is followed by an *O* period. The politician clearly prefers his best attainable monetary policy outcome to any other policy outcome and perceives no cost to a threat of *C* in the current period. Since the Central Bank is indifferent when (15) holds with equality, it will carry out this policy. Moreover, anticipating being able to carry out its preferred policy in the subsequent period with no threat *C* from the politician, it will not respond to the threat of *C* today with a complaint *K*.

Consider then an *O* period, which is followed by an *E* period. The Central Bank carries out its preferred policy. The politician prefers this policy and no threat *C* to a deviation to a policy of π^P or π^{CO} enforced by a threat of *C*. To see this, note that a threat of *C* will be countered by a complaint *K* by the Central Bank, since this allows it to achieve a far better outcome in the following period *E* when the politician will pressure the Central Bank in equilibrium. That is, by responding to pressure in *O*, the bank would achieve π^O in *E*, rather than π^P or π^{CO}. In essence, this deviation implies that the politician achieves his desired monetary policy in the current (*O*) period at the expense of not achieving his desired monetary policy in the following (*E*) period, just the opposite of what he desires if he cares about re-election and

chances of re-election are sensitive to macroeconomic outcomes. Hence, the politician puts no pressure on the Central Bank in *O*. Intuitively, the politician forgoes the use of pressure in a non-election period in order to use it in an election period, when it is more valuable. In the absence of pressure from the politician, the Central Bank does not complain.

4.6 *Monetary Aggregates*

We have now characterized the implications of the interaction of politicians and the Central Bank over the electoral cycle for the tools of policy, namely the interest rate, with political pressure implying smaller interest rate fluctuations in election than non-election years. What about the implications for monetary aggregates? The money supply growth rate consistent with the equilibrium interest rate would be given a money market equilibrium condition relating aggregate money supply and demand. Political pressure in an election year implies pressure for interest rates to be lower than in the absences of pressure and for output to be higher. Both of these would raise money demand, so that political pressure would raise the aggregate money supply. Hence, looking at monetary aggregates would see a political cycle with money growth rates being on average higher in election years, consistent with the cycle observed in many cases. However, as should certainly be clear by now, the political monetary cycle, though qualitatively similar to what is implied by an opportunistic model in which politican's directly control monetary policy arises for more subtle reasons. Here, the monetary aggregate cycle arises from the pressure to dampen a political interest rate cycle.

5. The Interaction of Monetary and Fiscal Cycles

We now consider a political fiscal cycle and ask how it affects monetary cycle in a model of an independent Central Bank facing electoral pressure. The main result is that the fiscal cycle will give an additional impetus to a political monetary cycle. Not only will the Central Bank be pressured to accommodate supply and demand shocks in an election year, but the fiscal cycle with be a source of those shocks, leading to a possibly even greater monetary cycle.

As discussed in the introduction, there is growing evidence, even in developed countries of pre-electoral fiscal expansion. Moreover, there is empirical evidence of the connection between a fiscal and a monetary cycle. Several researchers found a political cycle in fiscal policy from 1960 to 1980 in the U.S. (See especially Keech and Pak [1989], who both document

the cycle and explain its disappearance.) Following these results, Beck (1987) tested for the connection between a monetary aggregate cycle observed over the same period and a fiscal cycle. He regressed M1 on its on lags and on fiscal indicators and found the political cycle in the latter helped explain the cycle in the former, empirical results I have found robust to alternative specifications. Allen (1986) estimates a reaction function for the growth of the monetary base and M1 and argues that an increase in the federal debt induced higher money growth rates two to four quarters before an election, that is, that the Federal Reserve was more accommodative of fiscal shocks before elections.

Consider the following simple model. To focus ideas, suppose that there are no demand shocks other than fiscal expenditures g_t, which follow a fully predictable pattern of $g_t = 0$ in an *O* period and $g_t = g^P > 0$ in an *E* period. I assume a fiscal cycle, rather than derive it from an underlying political model for a number of reasons. The first is simplicity of exposition, since our interest is not in explaining a fiscal cycle *per se*, but in considering the interaction of monetary and fiscal policy. Second, though the literature gives arguments why rational voters may be more likely to vote for a candidate who increases spending or cuts taxes before an election, there is no generally accepted model of such an effect. [13] Nor is there agreement that a pre-electoral fiscal expansion is rewarded at the polls,[14] nor even that it is electorally motivated. Third, given the apparent empirical support for such a cycle, it seems reasonable to take it as given in a model where one is most interested in its effects on monetary policy.

With no change in the voters' objective function (8), the effect of fiscal shocks would simply be to drive up interest rates, as shown in (14). That is, if the voters (and hence politicians) have the same target for economic activity as the Central Bank, they will find it optimal to have the Central Bank fully offset any effect of demand shocks via higher interest rates. This seems inconsistent with the arguments presented in section 2 on "lying low" in an election year. That is, it would appear that voters want interest rates to rise less in an election year in response to *both* demand and supply shocks than the Central Bank finds optimal, so that

[13] The argument that higher fiscal spending may signal higher ability when there is asymmetric information about candidate characteristics (for example, Rogoff [1990]) is a leading argument, though not universally accepted. Targeted fiscal transfers to more politically "impressionable" voters, as in Dixit and Londregan (1996), is another possible basis.

[14] See, for example, Peltzman (1990) or Brender (forthcoming).

politicians would pressure the Central Bank to accommodate both supply and demand shocks. One way to model the desire for partial accommodation of demand shocks is to replace the voter's objective function (8) by:

$$L_t^V = \alpha\frac{(x - ad_t)^2}{2} + \frac{\pi_t^2}{2} \qquad \textbf{(20)}$$

where $0 \le a \le 1$.

Fiscal shocks will then have two effects on the interaction between politicians and the Central Bank, one perhaps obvious, the other probably less so. The obvious effect is that the politician's desired monetary policy in an election period will differ from the Central Bank's desired monetary policy in the inflation response to both demand and supply shocks. The less obvious effect is that the expectation of a fiscal impulse in an election period, by raising the expected rate of inflation when there is political pressure, will also have an effect in the preceding *O* period. We now show this more formally.

Consider an *E* period. Since the following period is an *O* period, in which the Central Bank can choose monetary policy to minimize (4), there would be no direct effect of a demand shock d_{t+1}. However, since policy in t+1 depends on expectations of policy in t+2 (another *E* period), $E_t(d_{t+2}) = g^P$ will enter in, so that monetary policy in t+1 will depend on g^P. We therefore conjecture a policy rule for t+1 of the form:

$$\pi_{t+1}^O = -\frac{\gamma}{1+\gamma}s_{t+1} + \kappa^o a g^P \qquad \textbf{(21)}$$

where κ^o is a coefficient to be determined. As indicated, g^P enters in because of expectations of policy at t+2.

Using the same methodology as in section 4.3 above, and using (21) to form $E_t(\pi_{t+1}) = \kappa^o a g^P$, one may then derive the incumbent politician's desired monetary policy as a function of the demand and supply shocks, namely:

$$\begin{aligned} \pi_t^P &= -\frac{\alpha}{1+\alpha}(s_t - \kappa^o a g^P) + \frac{\alpha}{1+\alpha}a g^P \\ x_t^P &= \frac{1}{1+\alpha}(s_t - \kappa^o a g^P) + \frac{\alpha}{1+\alpha}a g^P \end{aligned} \qquad \textbf{(22)}$$

where the *P* superscript represents the politician's most preferred policy, and the last term in each expression follows from $d_t = g^P$. Note that the politician's desired monetary policy has a greater response of inflation to supply shocks and a lesser response of output to supply shocks than the Central Bank's desired policy, as well as a greater output response to demand shocks. The associated interest rate is:

$$i_t^P = -\frac{1}{\varphi}\frac{1}{1+\alpha}s_t + \frac{1}{\varphi}\frac{1+\alpha(1-a)}{1+\alpha}g^P + (1+\frac{1}{\varphi}\frac{1}{1+\alpha})\kappa^o a g^P \qquad \textbf{(23)}$$

Note that the coefficients on the first two terms are lower than the analogous terms for the Central Bank's interest rate rule. That is, an incumbent whose behavior represents the preferences of the average voter will desire lower interest rate fluctuations in response to supply and demand shocks than would the Central Bank. The last term represents the interest rate response to expected future inflation.

The Central Bank's optimal policy is to choose a policy that minimizes (4), subject to $\mathrm{E}_t(\pi_{t+1}) = \kappa^o a g^P$. One may derive:

$$\begin{aligned}\pi_t^D &= -\frac{\gamma}{1+\gamma}(s_t - \kappa^o a g^P)\\ x_t^D &= \frac{1}{1+\gamma}(s_t - \kappa^o a g^P)\end{aligned} \qquad \textbf{(24)}$$

The policy x^*, π^* must therefore satisfy:

$$L_t^{CB}(x^*,\pi^*) \le L_t^{CB}(x^D,\pi^D) + C \qquad \textbf{(25)}$$

Substituting (x^P, π^P) and (x^D, π^D) into (25), one derives similar bounds to (@@):

$$-\sqrt{\frac{2C}{1+\gamma}} \le (\frac{\alpha}{1+\alpha})\, Z_t \le \sqrt{\frac{2C}{1+\gamma}} \qquad \textbf{(26)}$$

where $Z_t = a g^P - \frac{\alpha-\gamma}{\alpha(1+\gamma)}(s_t - \kappa^o a g^P)$ and 6^o is be determined. The "compromise" policy (x^{CO}, π^{CO}) satisfies:

$$\pi^{CO} = -\frac{\gamma}{1+\gamma}\left(s_t - \kappa^o a g^P\right) - \sqrt{\frac{2C}{1+\gamma}} \quad \text{for} \quad \left(\frac{\alpha}{1+\alpha}\right) Z_t > \sqrt{\frac{2C}{1+\gamma}}$$
$$\pi^{CO} = -\frac{\gamma}{1+\gamma}\left(s_t - \kappa^o a g^P\right) + \sqrt{\frac{2C}{1+\gamma}} \quad \text{for} \quad \left(\frac{\alpha}{1+\alpha}\right) Z_t < -\sqrt{\frac{2C}{1+\gamma}} \qquad \textbf{(27)}$$

(with the analogous expressions for x^{CO} in the two cases). This yields a similar diagram to Figure 1 (for $d_t = 0$), but with $s_t - \kappa^o a g^P$ replacing s_t.

In a non-election period there will be no political pressure on monetary policy in equilibrium, so that the Central Bank chooses policy to minimize (3) subject to its expectations of monetary policy in the following (that is, *E*) period. The Central Bank's desired policy in an *O* period, denoted (x^O, π^O), is simply:

$$\pi_t^O = -\frac{\gamma}{1+\gamma} s_{t+1} + \frac{\gamma}{1+\gamma} \mathrm{E}_t \pi_{t+1}^E$$
$$x_t^O = \frac{1}{1+\gamma} s_{t+1} - \frac{1}{1+\gamma} \mathrm{E}_t \pi_{t+1}^E \qquad \textbf{(28)}$$

Given the probabilities of full and partial accommodation as derived in the previous subsection, this expectation may be written

$$\begin{aligned} \mathrm{E}_t \pi_{t+1}^E &= p\,\mathrm{E}_t(\pi_{t+1}^P \Big| -\sqrt{\frac{2C}{1+\gamma}} \le \left(\frac{\alpha}{1+\alpha}\right) Z_t \le \sqrt{\frac{2C}{1+\gamma}}\,) + \frac{(1-p)}{2}\mathrm{E}_t(\pi_{t+1}^{CO+} \big| Z_t) + \frac{(1-p)}{2}\mathrm{E}_t(\pi_{t+1}^{CO-} \big| Z_t) \\ &= \left(p\frac{\alpha}{1+\alpha} + (1-p)\frac{\gamma}{1+\gamma}\right)\kappa^o a g^P + \frac{\alpha a p}{1+\alpha} g^P \end{aligned} \qquad \textbf{(29)}$$

where each of the three expectations in the first line is taken conditional on the shocks lying in a certain region (as made explicit in the first term). Here, we see the importance of the simplification of i.i.d. supply shocks. With serial correlation, not only would π_{t+1}^P depend on policy in *t*+2 (which would depend on policy in *t*+3, and so on), but the probabilities of the regimes would also depend on the current shocks in a complicated way.

Substituting this into (29) and equating the resulting coefficients with the expression for π^O in (14), one obtains:

$$\kappa^o = \frac{\alpha}{1 + (1-p)\dfrac{\alpha - \gamma}{1+\gamma}} \qquad \textbf{(30)}$$

We rewrite (28) as:

$$\pi_t^O = -\frac{\gamma}{1+\gamma} s_t + \kappa^o a g^P$$
$$x_t^O = \frac{1}{1+\gamma} s_t - \frac{1}{\gamma} \kappa^o a g^P \quad . \qquad \textbf{(31)}$$

This completes the formal derivation of the interaction of a fiscal and a monetary political cycle. The main result was that the political fiscal cycle gives an additional impetus to the monetary cycle. As in the previous, the Central Bank is pressured to accommodate shocks in an election year. However, the monetary cycle will be even stronger due to the existence of the fiscal cycle. Moreover, there will be an effect on monetary policy in a non-election period, since inflation policy must look forward to an election period in which it is known that there is an expansionary shock. The implications for monetary aggregates are as discussed in section 4.6.

6. Uncertain Election Dates

I now return to the basic monetary model of section 4 and consider the effects of changing the electoral structure from one of fixed election dates, known in advance, to one where there may be "early elections". Specifically, instead of elections being held every other period, suppose that elections must be held at least once every two periods, but that an election period may be followed by an election in the following period with some probability. This is meant to represent the electoral structure in many countries other than the U.S., where there is a possibility of elections occurring at other than fixed intervals.

This change in the electoral structure may have a significant effect on the nature of the interaction between politicians and the monetary authority. The equilibrium derived in section 4, in which no complaint is made about pressure in election (*E*) periods and no pressure is put on the monetary authority in non-election (*O*) periods depended on the known sequence of *E* and *O* periods. The central bank doesn't complain about pressure in an *E* period because it knows for certain that the following period is an electoral period in which it will be free of pressure. The politician does not put pressure on the monetary authority in an *O* period in order to "hold his fire" for a known *E* period in which use of pressure is more valuable. Uncertainty about whether

an *E* period will be followed by an *O* period or by another *E* period may thus significantly change behavior and thus the nature of the equilibrium.

To model the effect of early elections, suppose that an *E* period is followed by another *E* period with probability δ, where $1 \geq \delta \geq 0$, which might depend on factors such as whether there was an election in the previous period.[15] In what follows I assume for simplicity that δ is constant. Suppose for a moment that politicians always put pressure on the central bank in an election period, as in the model with fixed election dates. The monetary authority thus expects that political pressure in the current *E* period will be followed by political pressure in the following period with probability δ. If δ is high enough then the Central Bank may then find it optimal to complain about pressure, so that it would not be optimal for the politician to apply pressure for sufficiently small supply shocks. (In the model of section 4 where politicians and the monetary authority agree about the output target, the desired response to demand shocks is identical.). We therefore begin by finding the critical value $s^B \geq 0$ of the supply shock such that if the politician only applies pressure in an *E* period when the supply shock falls outside the range $[-s^B, +s^B]$, the Central Bank does not complain.[16] (It is assumed, as above, that the distribution of supply shocks is symmetric around zero.) This value will depend on *K*, the cost to the bank of complaining and on δ, as well as on other parameter values.

If the politician is expected to follow a rule of applying pressure only when supply shock falls outside the range $[-s^B, +s^B]$, the Central Bank must decide whether to complain about pressure in an *E* period looking forward to the next period. The central bank may either complain about pressure in the current *E* period (in which case pressure is ineffective in the following period) or may choose not to complain, in which case pressure will be effectively applied in the following period with some probability. If the central bank complains, its expected discounted loss over this period and next is:

---

[15] If the maximum amount of time before elections were more than two periods, we would also want to consider the possibility that an *O* period would be followed by another *O* period rather than an *E* period, where this would affect the politician's decision of whether to apply pressure in a non-election year. The same general sort of analysis to that presented below would apply.

[16] There will be no pressure in an *O* period, since *O* periods are followed for sure by *E* periods, implying that it will not be optimal for the politician to apply pressure in an *O* period.

$$K + \beta \int_{s=-\infty}^{+\infty} L^{CB}(x^B(s), \pi^B(s))\, \mathrm{dF}(s) \qquad \textbf{(32)}$$

where $\mathrm{F}(s)$ is the CDF of next period's supply shock. If the central bank does not complain about pressure in the current period, its expected discounted loss in the next period is:

$$\begin{aligned} &\beta(1-\delta) \int_{s=-\infty}^{+\infty} L^{CB}(x^B(s), \pi^B(s))\, \mathrm{dF}(s) \quad + \quad \beta\delta \int_{s=-s^B}^{s=+s^B} L^{CB}(x^B(s), \pi^B(s))\, \mathrm{dF}(s) \\ &+ \quad \beta\delta \left[\int_{s=-\infty}^{s=-s^B} L^{CB}(x^*(s), \pi^*(s))\, \mathrm{dF}(s) + \int_{s=+s^B}^{s=+\infty^C} L^{CB}(x^*(s), \pi^*(s))\, \mathrm{dF}(s) \right] \end{aligned} \qquad \textbf{(33)}$$

where (x^*, π^*) is the policy favored by the politician, which may be either (x^P, π^P) or (x^{CO}, π^{CO}), depending on the realization of the supply shock. (Note that in this structure in which a complaint makes pressure ineffective for one period in the future, the expected loss from the two options is the same after the next period.) The Central Bank will find it optimal not to complain bout pressure in an *E* period as long as (32) (weakly) exceeds (33), that is, as long as:

$$K \geq \beta\delta \left[\begin{aligned} &\int_{s=-\infty}^{s=-s^B} [L^{CB}(x^*(s), \pi^*(s)) - L^{CB}(x^B(s), \pi^B(s))]\, \mathrm{dF}(s) \\ &+ \int_{s=+s^B}^{s=+\infty} [L^{CB}(x^*(s), \pi^*(s)) - L^{CB}(x^B(s), \pi^B(s))]\, \mathrm{dF}(s) \end{aligned} \right]. \qquad \textbf{(34)}$$

Condition (34) with equality determines the critical value s^B such that the Central Bank does not complain in response to political pressure. Solving for $L^{CB}(x^*(s), \pi^*(s)) - L^{CB}(x^B(s), \pi^B(s))$, which equals *C* for $|s_t| \geq s^{CO}$, s^{CO} defined by (19), a symmetric definition for the supply shock around zero implies that (34) with equality may be written:

$$K = 2\beta\delta \left[\int_{s=s^B}^{s=s^{CO}} \frac{(\alpha-\gamma)^2}{(1+\gamma)(1+\alpha)^2} \frac{s^2}{2}\, \mathrm{dF}(s) \quad + \quad \int_{s=s^{CO}}^{s=\infty} C\, \mathrm{dF}(s) \right]. \qquad \textbf{(35)}$$

When $s^B \geq s^{CO}$, the first term on the right-hand side disappears and s^B has a simple form, namely, $s^B = \mathrm{F}^{(-1)}(1 - K / 2\beta\delta C)$ for $1 \geq K / 2\beta\delta C \geq 0$, and $s^B = 0$ otherwise.

To better understand the determination of s^B in general, note that as δ falls (actually as the product $\beta\delta$ falls) the critical value s^B such that (35) holds will fall as well. The same is true

as *K* rises. Intuitively, as the probability of an election next period falls, as the future is discounted more heavily, or as the direct cost to the Central Bank of complaining about pressure rises, the range of current supply shocks $|s_t| \geq s^B$ over which the politician can put pressure in an *E* period without generating a complaint rises as well. This should be intuitive. Note further that with $K > 0$, for δ sufficiently close to zero, (34) will hold as an inequality even for $s^B = 0$. That is, when there is a cost to the Central Bank of complaining, the politician can apply pressure at any level of the shock without generating a complaint if the probability of an election is sufficiently low. The case of fixed election dates in section 4, where δ = 0 in an *E* period is a limiting case of this.

Conversely, for δ high enough and *K* low enough, (35) is satisfied for $s^B > 0$, so that the possibility of early elections may limit the amount of pressure politicians can credibly apply to the Central Bank. As long as δ, the probability of an early election is nonzero, then as *K* approaches zero, the value of s^B satisfying (35) goes to infinity. That is, political pressure in an election year almost always generates a Central Bank complaint, since the cost of complaining is small enough and the value (induced by the possibility that there will be pressure again next period in the absence of a complaint) is positive.

To summarize, we have now defined a political equilibrium with uncertain election dates, namely where the politician applies pressure in an election period only for realizations of s_t outside the range $[-s^B, +s^B]$ (with s^B defined by (35) or by $s^B = 0$, if no positive value of s^B is consistent with (35), so that (34) holds as an inequality), and the Central Bank not complaining about pressure. For this to be the political equilibrium when there is a positive probability of an election period being followed by another election period, a further condition must hold. For $s^B > 0$, the politician must find it optimal not to apply pressure for $|s_t| < s^B$, consistent with no complaint rather than apply pressure for some values in this range, even though this generates a complaint and makes pressure ineffective in the following period. That is, it must be optimal for the politician not to deviate from this equilibrium for values of the supply shock $|s_t| < s^B$.

Let us derive the necessary condition on the politician's behavior more formally. Suppose in an *E* period there is a realization of a positive supply shock (for example) $s_t < s^B$. If

the politician deviates from the above equilibrium and applies pressure in the current period for the realization s_t he reduces the size of L^V by:

$$L^V(x^B(s_t),\pi^B(s_t)) - L^V(x^*(s_t),\pi^*(s_t)) \ . \qquad \textbf{(36)}$$

but he generates a complaint so that pressure is ineffective next period. If he does not deviate from the equilibrium derived above, that is, if he does not apply pressure in the current period, he may then effectively apply pressure in the following period, which is valuable if the there is an election next period and the shock is outside the range $[-s^B,+s^B]$. The discounted gain next period from not applying pressure in the current period is thus:

$$2\beta\delta\left[\int_{s=s^B}^{s=\infty}\left[L^V(x^B(s),\pi^B(s)) - L^V(x^*(s),\pi^*(s))\right]\mathrm{dF}(s)\right] . \qquad \textbf{(37)}$$

For the politician to find it optimal not to apply pressure, (37) must exceed (36) for all values of $s_t < s^B$. That is, defining $\Delta(s) \equiv L^V(x^B(s),\pi^B(s)) - L^V(x^*(s),\pi^*(s)$, a further condition for the "limited- pressure, no-complaint" equilibrium above is:

$$\Delta(s_t) \le 2\beta\delta\left[\int_{s=s^B}^{s=\infty}\Delta(s)\,\mathrm{dF}(s)\right] , \qquad \textbf{(38)}$$

for all values of $s_t < s^B$. One may calculate values such that this condition will *not* hold, so that the solution calculated above is not an equilibrium. For example, for very small, but positive *K*, the value of s^B satisfying (35) will approach infinity. With δ positive but small, it may then be optimal for the politician to apply pressure for a high enough realization of s_t even though it is known to make pressure ineffective next period. When (38) is violated for the value of s^B satisfying (35), we may then derive a critical value of the shock below which the politician will not apply pressure. This value, denoted s^P, is defined by:

$$\Delta(s^P) = 2\beta\delta\left[\int_{s=s^B}^{s=\infty}\Delta(s)\,\mathrm{dF}(s)\right] , \qquad \textbf{(39)}$$

where $s^P < s^B$.[17] In this case the political equilibrium is such that the politician applies pressure

[17] Since $\Delta(s)$ is decreasing in *s*, that is, since the loss to the politician from the banks policy relative to his desired

in an electoral period if the shock is in the range $[-s^P, +s^P]$ and there was no pressure applied in the previous period, and the Central Bank complains about pressure, making it ineffective if the following period is also an election period. Numerical calculation suggests that *K* must be quite small for where $s^P < s^B$, that is, for this to be the political equilibrium.[18]

7. Concluding Comments

Analyses that assume that monetary policy is controlled by incumbent politicians and that political monetary cycles reflect use of monetary policy to improve the politician's re-election prospects are neither theoretically plausible nor really consistent with the data. One way to state a main argument in the paper is that the monetary characteristics of an opportunistic political business cycle should reflect the *interaction* between politicians using economic policy to help their re-election prospects and a separate monetary authority whose objectives do not coincide with the politician's objectives. This paper was meant to be a step in exploring that interaction.

We began with the observation that an independent monetary authority is not indifferent to the implications of its decisions in election years and is therefore responsive to pressure. This certainly seems to be true for the Federal Reserve in the United States and may describe other "independent" central banks as well. In fact, it is probably in large part the desire to maintain independence that means a central bank is not indifferent to the political implications of its monetary policy decisions in an election year. A key result is that in this case, we may observe a political cycle monetary aggregates with more expansionary monetary policy in election years even though the monetary authority does not have the motive of helping the re-election of the incumbent. One may say, perhaps paradoxically, that it is the desire to appear apolitical as measured by changes in interest rates in election year that leads to the political cycle in policy, especially monetary aggregates.

The inability of politicians to use monetary policy to affect election outcomes successfully may lead them to use fiscal policy instead. Another main result is that such a fiscal cycle may strengthen the monetary cycle. In fact, there appears to be some evidence for the U.S. that one of the driving forces of a political monetary cycle is the political fiscal cycle. It is sometimes argued that though there may be a political fiscal cycle, it does not necessarily have

---

policy is decreasing in *s*, if (38) is violated for $|s_t| < s^B$ (and hence for s^B), (39) can only hold for a lower value of *s*.

[18] For example for $\alpha = 1$, $\gamma = 0.5$, $\beta = .95$, for $\delta = .2$, that is a twenty percent probability of an another election in the period following an election, $s^P < s^B$ requires $K < .00025C$.

macroeconomic consequences.[19] This would be consistent with the view that fiscal policy meant to affect election outcomes is more distributional than aggregate. In this model there is still a monetary cycle to the extent that there are aggregate demand and supply shocks that the Central Bank is pressured to accommodate.

More generally, the paper was meant, on a conceptual level, to induce us to rethink monetary phenomena in political business cycles. And, it should force us to focus on the interactions between politicians and central banks in understanding such cycles. The nature of the interaction and, as we saw, the electoral system itself would affect what sort of political monetary cycle emerges. This direction of research is in its infancy, but in my opinion, deserves much attention.

[19] Walsh (2000) argues strongly that for the U.S. (after 1980) and other developed countries, there is little evidence that fiscal manipulation, if it exists, has any aggregate effects.

APPENDIX: The Political Equilibrium

In this appendix I show formally the nature of the equilibrium described in section 4.8. The choice for the politician is whether to exert pressure *C* or not in a given period, where this choice will depend on the Central Bank's actions in the previous period, namely, whether there was a complaint *K*. In response to pressure *C*, the Central Bank will always choose an accommodating policy defined by either (13) or (18). Hence, the choice for the Central Bank in a period is whether to complain. Denoting the actions of agent *j*, where *j* = *P* for politician and *B* for Central Bank, in period *t* by the indicator I_t^j where *t* = *E*, *O*, the Central Bank thus has a choice of actions $I_t^B = \{K, 0\}$ depending on I_t^P, while the politician has a choice of actions $I_t^P = \{C, 0\}$ depending on I_{t-1}^B.

One may then represent the equilibrium strategies by:

$$I_E^B\{I_t^P = C, I_t^P = 0\} \rightarrow \{0, 0\} \qquad I_O^B\{I_t^P = C, I_t^P = 0\} \rightarrow \{K, 0\} \qquad \textbf{(A1)}$$

for the Central Bank if *t* is an election and non-election period respectively and by:

$$I_E^P\{I_{t-1}^B = K, I_{t-1}^B = 0\} \rightarrow \{0, C\} \qquad I_O^P\{I_{t-1}^B = K, I_{t-1}^B = K\} \rightarrow \{0, 0\} \qquad \textbf{(A2)}$$

for the politician if *t* is an election and non-election period respectively.

I first show that the Central Bank's strategy as summarized by (A1) is optimal given the politician's strategy (A2). First, by assumption, the Central Bank cannot complain if the politician applies no pressure, so that $I_E^B\{I_t^P = 0\} = I_O^B\{I_t^P = 0\} = 0$ necessarily. Second, since the politician applies no pressure in a non-election period according to (A2), there is no gain to the Central Bank from complaining about pressure in an election period, as it will be able to follow its preferred policy in a following non-election period whether or not they chose to complain in the previous period. Since *K* is costly, the Central Bank will choose not to complain, that is $I_E^B\{I_t^P = C) = 0$. Finally, consider the optimal response to political pressure *C* in a non-election period. If the Central Bank does not complain, in the following (election) period the politician will be able to successfully apply pressure, which he will do according to (A2), and the equilibrium monetary policy will be that favored by the politician. If the bank complains, the politician will apply no pressure in the following period, so that the equilibrium monetary policy

will be that favored by the Central Bank. That is, more preferred policy next period is obtainable at the cost of *K* today. Since policy is the same in the current period and in all periods after the next period, complaining will be optimal as long as:

$$K \leq \beta\left(\mathrm{E}_t(L_t^{CB}(x^*,\pi^*)) - \mathrm{E}_t(L_t^{CB}(x^B,\pi^B))\right) \qquad \textbf{(A3)}$$

(where the "*" superscript refers to the policy under political pressure, either (x^P,π^P) or (x^{CO},π^{CO}). I assume that (A3) holds, that is that *K* is not too large.

I now show that the politician's strategy as summarized by (A2) is optimal given the Central Bank's strategy (A1). When the Central Bank complains in the previous period, pressure is ineffective in *t*, so the politician will apply no pressure. Hence, we have $I_E^P\{I_{t-1}^B = K) = I_O^P\{I_{t-1}^B = K) = 0$. Now, suppose there was no pressure in the previous period. Given that there will be no complaint about political pressure in an election period, the politician can apply pressure costlessly, that is, $I_E^P\{I_{t-1}^B = 0) = C$. What about pressure in a non-election period if it would be effective? According to (A1), pressure in a non-election period will induce a complaint, so that pressure in the following period will be ineffective. Therefore, $I_O^P\{I_{t-1}^B = 0) = C$ implies that the politician will get his preferred policy in the current (*O*) period at the expense of the Central Bank getting its preferred policy in the following (*E*) period, while, $I_O^P\{I_{t-1}^B = 0) = 0$ implies the opposite, namely that the politician will get his preferred policy in the following (*E*) period at the expense of the Central Bank getting its preferred policy in the current (*O*) period. The value of these two strategies can be computed from evaluating (9) and (10) under the two cases, where the electoral value of the latter over the former depends on the excess of $q(\Lambda_E^V(\pi^*))$ over $q(\Lambda_E^V(\pi^B))$, that is, on its effects on election prospects. For any value of $\theta > 0$, there exists some value of this difference such that $I_O^P\{I_{t-1}^B = 0) = 0$ is preferred to $I_O^P\{I_{t-1}^B = 0) = C$.

REFERENCES

Allen, S. (1986), "The Federal Reserve and the Electoral Cycle," *Journal of Money, Credit and Banking* 18, 88-94.

Beck, N. (1987), "Elections and the Fed: Is There a Political Monetary Cycle?," *American Journal of Political Science* 31, 194-216.

Berger, H. and U. Woitek (2000), "The German political business cycle: Money Demand Rather than Monetary Policy," working paper.

Brender, A. (2002), "The Effect of Fiscal Performance on Local Government Election Results in Israel: 1989-1998," Bank of Israel Research Department Discussion Paper, forthcoming, *Journal of Public Economics*

Brender, A. and A. Drazen (in progress), "The Political Fiscal Cycle"

Calvo, G. (1983), "Staggered Prices in a Utility Maximizing Framework," *Journal of Monetary Economics* 12, 383-98.

Caporale, T. and K. Grier (1998), "A Political Model of Monetary Policy with Application to the Real Fed Funds Rate," *Journal of Law and Economics* 41, 409-28.

Chappell, H. W. and R.R. McGregor (2000), "Fed Chat: FOMC Transcripts and the Politics of Monetary Policymaking," working paper.

Clarida, R., J. Gali, and M. Gertler (1999), "The Science of Monetary Policy: A New Keynesian Perspective," *Journal of Economic Literature* 37, 1661-1707.

_____, _____ , and _____ (2000), "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory," *Quarterly Journal of Economics* 115, 147-80.

Dixit, A. and J. Londregan (1996), "The Determinants of Success of Special Interests in Redistributive Politics," *Journal of Politics* 58, 1132-55.

Drazen, A. (2000a), *Political Economy in Macroeconomics*, Princeton, NJ: Princeton University Press.

_____ (2000b), "The Political Business Cycle After 25 Years," *NBER Macroeconomics Annual 2000*, Cambridge MA: MIT Press

Fair, R. (1978), "The Effect of Economic Events on Votes for President," *Review of Economics and Statistics* 60, 159-72.

_____ (1988), "The Effects of Economic Events on Votes for President: 1984 Update," *Political Behavior* 10, 168-79.

Havrilesky, T. (1993), *The Pressures on American Monetary Policy*, Boston: Kluwer.

Keech, W. and K. Pak (1989), "Electoral Cycles and Budgetary Growth in Veterans' Benefit Programs," *American Journal of Political Science* 33, 901-11.

Lewis-Beck, M. (1988), *Economics and Elections*, Ann Arbor: University of Michigan Press.

Lohmann, S. (1992), "Optimal Commitment in Monetary Policy: Credibility versus Flexibility" *American Economic Review* 82, 273-86.

Madsen, H. (1980), "Electoral Outcomes and Macroeconomic Policies: The Scandinavian Cases," in P. Whitely, ed., *Models of Political Economy*, London: Sage, 15-46.

Maier, P. (2000), "Pressure on the Bundesbank?," *Kredit und Kapital*, 4, pp. 1-30.

_____ (2002), "Rhetoric and Action: What Are Central Banks Doing Before Elections?," forthcoming, *Public Choice*

Meyer, L. (2001), "Comparative Central Banking and the Politics of Monetary Policy," National Association for Business Economics' Seminar on Monetary Policy and the Markets, Washington, D.C., May 21, 2001

Nordhaus, W. (1975), "The Political Business Cycle," *Review of Economic Studies* 42, 169-90.

Peltzman, S. (1992), "Voters as Fiscal Conservatives," *Quarterly Journal of Economics* 107, 327-61.

Persson and Tabellini (2002), "Do Electoral Cycles Differ Across Political Systems?," working paper, July 2002.

Rogoff, K. (1990), "Equilibrium Political Budget Cycles," *American Economic Review* 80, 21-36.

Rotemberg, J. and M. Woodford, "Interest Rate Rules in an Estimated Sticky Price Model," in J. Taylor, ed., *Monetary Policy Rules*, Chicago: University of Chicago Press (for NBER), 57-119.

Walsh, C. (2000), Comment on "The Political Business Cycle After 25 Years," *NBER Macroeconomics Annual 2000*, Cambridge MA: MIT Press

Willett, T. (1983), “Presidential Politics, Budget Deficits, and Monetary Policy in the United States" *Public Choice*, 53-69.

Woolley, John T. (1984), *Monetary Politics: The Federal Reserve and the Politics of Monetary Policy*, Cambridge, UK: Cambridge University Press.

Figure 1: Monetary Policy with and without Political Pressure ($d_t = 0$)