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## *Macroeconomics and Politics*

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### *Introduction*

“Social planners” and “representative consumers” do not exist. The recent game-theoretic literature on macroeconomic policy has set the stage for going beyond this stylized description of policymaking and building more realistic positive models of economic policy. In this literature, the policymaker strategically interacts with other current and/or future policymakers and with the public; his behavior is derived endogenously from his preferences, incentives and constraints. Since the policymakers’ incentives and constraints represent real world political institutions, this approach provides a useful tool for analyzing the relationship between politics and macroeconomic policy. This paper shows that this recent line of research has provided several novel, testable results; the paper both reviews previous successful tests of the theory and presents some new successful tests.

Even though some pathbreaking contributions were published in the mid-1970s, (for instance, Hamada (1976), Kydland-Prescott (1977), Calvo (1978)) the game-theoretic literature on macroeconomic policy has only in the last five years begun to pick up momentum after a shift attributed to the influential work done by Barro and Gordon (1983a,b) on monetary policy. A useful way to classify game-theoretic models of monetary policy is by the number and type of players involved in the game:

a) games in which a single policymaker plays “against” the private sector of the economy. In these models the policymaker attempts to surprise the public with an unexpected monetary shock to reduce unemployment;<sup>1</sup>

1. The private sector is modeled as populated either by atomistic wage setters or by unions. In addition to Barro-Gordon (1983a,b) this model has been studied under different assumptions about agents’ information by Canzoneri (1985), Backus-Driffill (1985a), Barro

b) games in which different policymakers are in office at different points in time; they are elected politicians who can be voted out of office in favor of their opponents;<sup>2</sup>

c) games in which two policymakers controlling different policy instruments are in office at the same time in the same economy. Several authors, in particular, study the consequences of different degrees of independence of the Central Bank from the executive;<sup>3</sup>

d) games with multiple policymakers in office in different economies at the same time; this is the literature on international policy coordination;<sup>4</sup>

This paper, which is not a survey of the game-theoretic literature on macroeconomic policy<sup>5</sup>, focuses on empirical implementations of politico-economic models, and thus on the groups b) and c).

The positive and normative implications of these models depend crucially on the objectives the policymakers pursue. In general, politicians have two motivations. On one hand, they wish to remain in office as long as possible. In this case, the politicians of any party have the same objective function, since they all seek to maximize popularity. On the other hand, they may have references defined on policy issues and/or they may pursue the economic interests of different constituencies. Thus, different policymakers maximize different objective functions defined in terms of economic variables.

If politicians are exclusively motivated by the desire to hold office (i.e. they are only "office motivated"), they view winning an election as their only goal; if they have "ideological views" and/or care differently about the welfare of different constituencies, they view winning an election as a means of implementing the desired policy. In general, the two motivations may coexist; in addition, even ideological politicians are better off if their chances of appointment increase, since they can implement their desired

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(1986a), Cukierman-Meltzer (1986a) and Hoshi (1987) in the case of atomistic agents; by Driffill (1985), Backus-Driffill (1985b), and Tabellini (1988a) for the case of monopolistic labor unions.

2. This literature, which owes much to Nordhaus (1975), includes recent work by Cukierman-Meltzer (1986b,c), Alesina (1987), Rogoff-Sibert (1988), Rogoff (1987a), Alesina-Sachs (1988), Alesina-Tabellini (1987a,b), Persson-Svensson (1987), and Tabellini-Alesina (1987).
3. An early contribution in this area is Kydland (1976). More recently, see Sargent-Wallace (1981), Blinder (1982), Sargent (1986), Tabellini (1986), (1987a), Loewy (1986), and Alesina-Tabellini (1987c).
4. Since Hamada (1976) this literature has developed rapidly. For recent surveys see Fischer (1987), and Canzoneri-Henderson (1988).
5. A broad survey of this literature includes work by Barro (1986b), Fischer (1986), Cukierman (1986), Rogoff (1987b), and Persson (1988). A more specific survey of politico-economic models can be found in Alesina-Tabellini (1988).

policy only if in office. The difference between the two cases rests, however, in the nature of the objective function maximized by politicians. Purely "office motivated" politicians have indistinguishable objective functions; "Partisan politicians" have distinct objectives.

The first assumption, based upon the contribution of Downs (1957) is, although fairly extreme, the most widely accepted. It generates the well-known conclusion that in a two-party system, one should observe complete policy convergence, i.e. both parties follow the same policy when in office. This is the basic message of the "median voter theorem."<sup>6</sup>

The most influential application of these ideas to macroeconomic policy is the "political business cycle" theory of Nordhaus (1975), which is based upon three assumptions: 1) The policymakers are only "office motivated"; 2) they can manipulate an exploitable Phillips curve; 3) voters are not rational since they do not understand that they are systematically fooled by the politicians. Thus, the policymakers overstimulate the economy before elections and then reduce inflation with a recession at the beginning of the new term of office. Voters reward the incumbent for the pre-electoral expansion without learning from the past that a recession has to follow the expansion.

The theoretical literature on political business cycles made essentially no progress after Nordhaus (1975) and McRae (1977) for several years, because of the (presumed) devastating effect of the rational expectation critique. However, three important recent papers by Cukierman-Meltzer (1986b), Rogoff-Sibert (1988) and Rogoff (1987a) address these issues in models in which the policymakers, the voters and the economic agents behave rationally in an optimizing, general equilibrium framework. These models substitute the notion of asymmetric information between voters and policymakers to the assumption of voters' irrationality. This generates departures from optimality in policymaking which resemble (but are not identical to) those predicted by Nordhaus.

The second approach views different parties as "ideologically" motivated in the sense that they have partisan goals. Wittman (1977, 1983), Calvert (1985) and myself (1988a) show that, under this assumption, the "median voter theorem" does not hold and different parties follow different policies when in office. Hibbs (1977, 1987a,b) applies this view to macroeconomic policy and argues (on empirical grounds) that Socialist Parties in Europe and the Democratic Party in the United States have been systematically more expansionary and less averse to inflation than Conservative Parties in

6. For the original proof of this theorem see Black (1958). For a more recent treatment see Ordeshook (1986) and the references quoted therein. The result of policy convergence in a two-party system is more general than the "median voter theorem."

Table 1 POLITICO ECONOMIC MODELS OF BUSINESS-CYCLES

	<i>Non-Rational Behavior and Non-Rational Expectations</i>	<i>Rational Behavior and Rational Expectations</i>
<i>"Office Motivated" Politicians</i>	Nordhaus (1975)	Cukierman-Meltzer (1986b) Rogoff-Sibert (1988) Rogoff (1987a)
<i>"Partisan" Politicians</i>	Hibbs (1977, 1987a)	Alesina (1987) Alesina-Sachs (1988)

Europe and the Republican Party in the United States. This author claims that expansionary and inflationary demand policies redistribute income to the lower middle class, which supports in general, left wing parties.<sup>7</sup> Hibbs (1987a) tests this hypothesis on the United States with a model based upon an exploitable Phillips curve with no consideration of the rational expectation critique.

In a recent paper (Alesina (1987)) I proposed a game-theoretic model in which two parties with different objective functions strategically interact with each other and with a rational public. This model has different empirical implications from both Nordhaus' "political business cycle" and Hibbs' "partisan cycle"; Alesina-Sachs (1988) presents empirical tests on post Second World War United States data which do not reject that model.

Table 1 summarizes this discussion by classifying these politico-economic models of the business cycle along the two most important dimensions: the assumption about policymakers' motivations and the assumption about the rationality of voters and of economic agents. This paper suggests that the empirical evidence for the United States in the post war period discriminates in favor of the models in the upper and lower right corners of Table 1, namely the more recent rational models of politico-economic cycles. This argument is supported by a review of available empirical evidence and by several original tests.

The second part of this paper examines how the degree of the Central Banks' independence affects the magnitude of political influence on the economy, and monetary policy. An independent Central Bank could reduce the magnitude of politically induced fluctuations in monetary

7. Hibbs (1987a) presents empirical evidence on income distribution in the United States, which is consistent with this view. Minford-Peel (1982) and Minford (1985) argue along the same lines for the United Kingdom.

policy, and, as pointed out by Rogoff (1985), an inflation averse Central Banker could reduce the inflationary bias in policymaking. Based upon the available empirical evidence, this paper argues tentatively that independent Central Banks have been associated with a lower average inflation rate and may have been responsible for reducing politically induced volatility of monetary policy and inflation.

This paper also briefly examines the empirical implications for the policy-mix of the literature on monetary and fiscal policy coordination, in which the two policy instruments are controlled by two independent and (possibly) non-cooperative policymakers.

Finally, one should be explicit in emphasizing the difficulties that arise in this line of empirical research, in which institutions and policymakers' behavior are modelled endogenously. The first one is a lack of degrees of freedom. Institutional changes or even changes of governments are relatively infrequent events. Thus, the researcher has few useful observations, even if research is conducted over a relatively long period of time. The second one is of specification uncertainty. Virtually all these tests imply some assumptions about the objective functions of the policymakers. Since there is no clear guideline on how to choose these functions (particularly if long time series are used) there is a degree of arbitrariness in these tests. The third one is due to the difficulty of quantifying crucial variables, such as the degree of political polarization of different governments, or the degree of Central Banks' independence.

This paper attempts to convince the readers that, despite these difficulties, empirical research on politico-economic and institutional issues can provide important insights on the behavior of the economy.

Section 2 briefly reviews the Barro-Gordon (1983a,b) model of inflation bias. Section 3 presents a two party version of this model, which is tested in Section 4. Section 5 discusses recent models of "rational political business cycles." Sections 6 and 7 consider the issues of Central Bank independence. The last section addresses several directions of future research.

## 2. *The Basic Model*

Consider a simple version of a wage setting model á la Fischer (1977), or Taylor (1980). Wage setters wish to maintain the real wage at the level compatible with the natural rate of unemployment as generated by the market. Labor contracts last one period and are signed at the end of, say, period  $(t - 1)$  for period  $t$ . These contracts are uncontingent; full index-

ation, in particular, is excluded.<sup>8</sup> Thus, wage setters set the growth of nominal wages equal to expected inflation:

$$w_t = \pi_t^e = E(\pi_t/I_{t-1}) \quad (1)$$

where  $w_t$  = rate of growth of nominal wages;  $\pi_t$  = rate of inflation;  $E(\cdot)$  = mathematical expectation operator;  $I_{t-1}$  = information set available at time  $(t-1)$ . The superscript "e" indicates rationally expected variables. Given (1), the supply function for this economy with no capital can be written as follows:

$$y_t = \gamma(\pi_t - \pi_t^e) + \bar{y}; \quad \gamma > 0, \bar{y} \geq 0. \quad (2)$$

where  $y_t$  is real output growth and  $\bar{y}$  is the "natural" rate of growth compatible with the natural rate of unemployment.

The policymaker has the following cost function, defined on inflation and output, where  $\bar{b} > 0$ ,  $\bar{k} > 0$ ,  $\bar{\pi} \geq 0$ , and  $0 < \beta < 1$ :

$$Z = \sum_{t=0}^{\infty} \beta^t \left[ \frac{1}{2} (\pi_t - \bar{\pi})^2 + \frac{\bar{b}}{2} (y_t - \bar{k})^2 \right] \quad (3)$$

Assuming for simplicity that the rate of inflation is identical to the rate of money growth ( $m_t$ )<sup>9</sup> and substituting (2) in (3) one obtains:

$$Z = \sum_{t=0}^{\infty} \beta^t \left[ \frac{1}{2} (m_t - \bar{m})^2 + \frac{b}{2} (m_t - m_t^e - k)^2 \right] \quad (4)$$

where  $b = \bar{b}\gamma^2$ ;  $k = \frac{1}{\gamma} [\bar{k} - \bar{y}]$ ;  $\bar{m} = \bar{\pi} \geq 0$ .

By Okun's Law the model could also be presented using unemployment. The crucial point is that there is an optimal level of money growth, regardless of whether it is expected or not, which is  $\bar{m}$ , and a positive optimal level of unexpected money growth, if  $\bar{k} > \bar{y}$ . The first part of the objective function can be justified by a standard argument of "optimal seignorage." The second term, which plays an interesting role only if  $k > 0$ , can be justified by either of three non-mutually exclusive arguments. The

8. Partial indexation, or even the "optimal degree of indexation" in a more general model with demand and supply shocks could be considered without changing the basic message of this model. (Rogoff (1985), Devereux (1987)).

9. Alternatively, the model could be completed with a quantity equation, such as  $m_t = \pi_t + y_t$ . The simplification adopted in the text simplifies the algebra and the notation without affecting in any way the qualitative features of the results.

first one is that various distortions in the labor market, such as taxation, minimum wage laws etc., generate an output growth without policy intervention ( $\bar{y}$ ) which is too low. Thus, the policymaker may want to increase growth, with a monetary shock. The second argument is that labor unions which maximize the welfare of employed union members (as opposed to social welfare) keep the real wage too high, so that the labor market clears with too much unemployment. The third argument is that the policymaker weighs heavily the welfare of the unemployed and has preferences "inconsistent" with the market. In addition, the policymaker may desire to reduce the real value of non-indexed government debt by means of unexpected inflation, particularly if it disregards the welfare of bond holders.<sup>10</sup>

If the policymaker cannot make binding commitments to any policy rule, the model should be solved by minimizing (4) taking expectations as given. This corresponds to the one-shot Nash solution of the game, or to the case of "discretionary policy." By differentiating (4) with respect to  $m_t$  and then imposing  $m_t = m_t^e$ , one obtains:

$$m_t = \bar{m} + bk ; \quad (5)$$

$$y_t = \bar{y} . \quad (6)$$

If  $k > 0$ , the rate of money growth is higher than its optimal level ( $\bar{m}$ ), but output is unaffected. This is the well-known inflationary bias of discretionary monetary policy; it can be eliminated by a binding commitment to the optimal monetary rule:  $m_t = \bar{m}$ . However, it is well known that this rule is time inconsistent: if the public expects it, the policymaker has an incentive to abandon it and follow the discretionary policy given in (5), creating a beneficial inflation surprise. This bias can be eliminated or reduced by virtue of reputational mechanisms.

From a positive point of view (5) and (6) have three empirical implications: 1) If binding policy rules are not followed and if reputational forces are not strong enough, the average inflation rate will be higher than optimal. However, it is quite difficult to directly test this implication because one needs to pinpoint the unobservable "optimal inflation rate" and compare it with the actual one.<sup>11</sup> 2) For given preferences of the policymaker, i.e. for given  $b$  and  $k$ , an increase in the natural rate of

10. See Calvo (1978), Barro (1983), Grossman-Van Huyck (1986) and Poterba-Rotemberg (1988) for this interpretation of related models.

11. Richards (1986) measures the inflation rate desired by voters by means of a revealed preference argument and compares it with the actual inflation rate in the United States. His results are, however, inconclusive.

unemployment increases inflation and money growth. Barro-Gordon (1983b) argue that this model explains the positive correlation between the natural rate of unemployment and the inflation rate from the mid-sixties to the late-seventies in the United States. An interesting question is whether or not this model explains the experience of other countries. 3) If left wing governments are relatively more concerned with unemployment than conservative governments, cross-country differences of inflation rates should be correlated with the political type of government, even if there are no cross-country differences in level of unemployment (see Section 6 of this paper). The same is true "a fortiori" if left wing governments care less about the welfare of the owners of non-indexed government debt, than, say, income tax payers.<sup>12</sup> In addition, left wing governments may desire a higher level of government spending, and thus have a higher level of optimal seignorage (i.e. a higher  $\bar{m}$ ).

### 3. Political Cycles and Economic Cycles

This section generalizes the model to a two-party system. First of all, we allow for a more realistic dynamic structure in the output equation by assuming some "persistence" in it. With no loss of generality, we simplify notation by assuming  $\bar{y} = 0$ . Thus, the dynamic equation for output is:

$$y_t = \hat{\alpha}y_{t-1} + \gamma(m_t - m_t^e); \quad 0 < \hat{\alpha} < 1. \quad (7)$$

Alternatively,  $y_t$  in (7) can be interpreted as the deviation of output growth from its natural level, where the latter may not be constant over time.

In this economy two different policymakers ("parties") can hold office. These parties, labelled "D" and "R", have different preferences defined on inflation and output. The costs functions of the two parties are as follows:

$$Z^D = \sum_{t=0}^{\infty} \beta^t \left[ \frac{1}{2} (m_t - \bar{m}^D)^2 + \frac{\bar{b}^D}{2} (y_t - \bar{k}^D)^2 \right] \quad (8)$$

$$Z^R = \sum_{t=0}^{\infty} \beta^t \left[ \frac{1}{2} (m_t - \bar{m}^R)^2 + \frac{\bar{b}^R}{2} (y_t - \bar{k}^R)^2 \right]. \quad (9)$$

12. Minford (1985) and Alesina (1988b) emphasize this point, with references to several historical and recent episodes.



The difference in the objective functions of the two parties is given by:

$$\bar{m}^D \geq \bar{m}^R; \bar{k}^D \geq \bar{k}^R; \bar{b}^D \geq \bar{b}^R. \quad (10)$$

The two parties are not identical if at least one of the three inequalities in (10) hold strictly. The first one shows a difference between the optimal rates of inflation, which might reflect different needs for the inflation tax if the two parties' desired level of government spending is different. The second and third inequalities indicate a difference in the relative evaluations of the costs of inflation and unemployment.<sup>13</sup>

Elections take place every two periods. Party *D* is elected with probability *P* and party *R* with probability  $1-P$ . For the moment, *P* is treated as exogenous (later it is shown how to derive it from the underlying preferences of the voters.) Elections are held at the beginning of the period (say period *t*) and  $m_t$  is chosen immediately after the election by the elected party. The parties have full control over monetary policy: the issue of Central Bank independence is addressed in Sections 6 and 7.

The game described by equations (7), (8) and (9) implies that the policies of, say, periods (*t*-2) and (*t*-1) by the party in office affect the state of the world inherited by the party elected in period *t*, namely  $y_{t-1}$ . This strategic interaction over a state variable between each government and its successors is very difficult to treat analytically. Alesina-Tabellini (1987a), with certain simplifying assumptions, solve a similar game in which the state variable is the public debt. McKibbin-Roubini-Sachs (1987) propose a general method of solving linear quadratic two-party games with state variables, but they can only obtain the solution by numerical simulation.

In this paper, the game is greatly simplified by assuming that the policymakers' horizon coincides with their term of office; thus the infinite horizon game is divided into a series of two period games. Therefore, if, say, party *i*,  $i = D, R$ , is elected in period *t*, it minimizes:

$$Z^i = \sum_{j=0}^1 \beta^j \left[ \frac{1}{2} (m_{t+j} - \bar{m}^i)^2 + \frac{\bar{b}^i}{2} (y_{t+j} - \bar{k}^i)^2 \right] \quad i: D, R. \quad (11)$$

By substituting (7) into (11) one obtains:

13. The two parties have an identical discount factor. A difference in the  $\beta$ 's makes the algebra more cumbersome without adding any insight.

$$Z^i = \sum_{j=0}^1 \beta^j \left[ \frac{1}{2} (m_{t+j} - \bar{m}^i)^2 + \frac{b^i}{2} (\alpha y_{t+j-1} + m_{t+j} - m_{t+j}^e - k^i)^2 \right] \quad (12)$$

where  $b^i = \bar{b}^i \gamma^2$ ;  $\alpha = \frac{\hat{\alpha}}{\gamma}$ ;  $k^i = \frac{\bar{k}^i}{\gamma}$   $i: D, R$ . (13)

In period  $(t + 2)$  a new election takes place and the same game is repeated and so on. The model can then be solved by using (7), (12) and the following expectation formation mechanism, where  $m_t^D$  and  $m_t^R$  indicate the policies chosen by party  $D$  and  $R$  in period  $t$ .

$$m_t^e = P m_{t+\ell}^D + (1 - P) m_{t+\ell}^R \quad \text{if } t \text{ is an election period,} \\ \ell: 0, 2, 4 \dots \quad (14a)$$

$$m_{t+1+\ell}^e = m_{t+1+\ell}^D \quad \text{if } D \text{ elected in period } t + \ell \quad (14b)$$

$$m_{t+1+\ell}^e = m_{t+1+\ell}^R \quad \text{if } R \text{ elected in period } t + \ell \quad (14c)$$

Equations (14) show that in the first period of a new administration there is expectation uncertainty because wage contracts are signed before the election. In the second period, expectations are fully adjusted to the new policy regime, and, since there is no uncertainty or asymmetric information, we have perfect foresights. Thus, a period has to be interpreted as the length of a labor contract.

In the second period, labeled  $(t+1)$ , assuming that elections take place in period  $t$ , the first order conditions and (14) imply:

$$m_{t+1}^i = \bar{m}^i + k^i b^i - b^i \alpha y_t; \quad i = D, R. \quad (15)$$

In period  $t$ , the election year, the first order conditions are given by:<sup>14</sup>

$$m_t^i = A^i - B^i y_{t-1} + C^i m_t^e; \quad i = D, R. \quad (16)$$

where:  $A^i = \frac{\bar{m}^i + b^i k^i [1 + \alpha \beta \gamma (1 + b^i)]}{1 + b^i [1 + \beta \alpha^2 \gamma^2 (1 + b^i)]};$

$$B^i = \frac{\alpha b^i [1 + \beta \alpha^2 \gamma^2 (1 + b^i)]}{1 + b^i [1 + \beta \alpha^2 \gamma^2 (1 + b^i)]}; \quad C^i = \frac{1}{\alpha} B^i. \quad (17)$$

14. These first order conditions can be obtained by substituting (15) into (12) and differentiating with respect to  $m_t^D$  (and  $m_t^R$ ).

Using (14), finally one obtains:

$$m_t^D = \eta^D - \theta^D y_{t-1}; \quad \eta^D > 0; \quad \theta^D > 0; \quad (18a)$$

$$m_t^R = \eta^R - \theta^R y_{t-1}; \quad \eta^R > 0; \quad \theta^R > 0. \quad (18b)$$

$$\text{where: } \eta^D = \frac{A^D - (1 - P)A^D C^R + (1 - P)A^R C^D}{1 - PC^D - (1 - P)C^R};$$

$$\theta^D = \frac{B^D - (1 - P)B^D C^R + (1 - P)C^D B^R}{1 - PC^D - (1 - P)C^R}. \quad (19)$$

$$\eta^R = \frac{A^R - PA^R C^D + PC^R A^D}{1 - PC^D - (1 - P)C^R}; \quad \theta^R = \frac{B^R - PB^R C^D + PC^R B^D}{1 - PC^D - (1 - P)C^R}. \quad (20)$$

Equations (15) and (18) fully describe the dynamic behavior of the money supply. Simple manipulations establish that:

$$\eta^D > \eta^R; \quad \bar{m}^D + k^D b^D > \bar{m}^R + k^R b^R. \quad (21)$$

Thus, the constant term for the reaction function of party *D* is higher than that of party *R* in both periods. Note that this holds if any of the three inequalities in (10) is satisfied.

If and only if  $b^D > b^R$  then the coefficients on lagged output are also different; in particular we have:

$$\theta^D > \theta^R; \quad b^D \alpha > b^R \alpha. \quad (22)$$

If  $b^D = b^R$ , inequalities in (22) hold as equalities and the difference in the two parties' reaction functions is restricted to the constant.

In general, there is also an intertemporal difference between the first and second period of an administration. Even if  $b^D = b^R$ , the first and second period constants and the coefficients on lagged output are, in general, different. However, these intertemporal comparisons are much less clear cut and robust than the inequalities across parties given in (21) and (22). In fact, the former (unlike the latter) are affected by the "last period problem" and by the shape of the objective functions.

Let us now turn to the output equation. Given (14), there is no difference in the behavior of output in the second half of the two administrations:

$$y_{t+1} = \hat{\alpha} y_t. \quad (23)$$

This result relies only upon the fact that in the second period there are no informational asymmetries between the policymaker in office and the public. In period  $t$  instead, output behaves differently depending upon which administration is in office. Using (7) and (14) one obtains:

$$y_t^D = \hat{\alpha}y_{t-1} + \gamma(1 - P)(m_t^D - m_t^R); \quad (24)$$

$$y_t^R = \hat{\alpha}y_{t-1} - \gamma P(m_t^D - m_t^R). \quad (25)$$

The solution can be obtained by substituting (18) into (24) and (25). If  $b^D = b^R$  the result is the following:

$$y_t^D = \hat{\alpha}y_{t-1} + \gamma(1 - P)(\eta^D - \eta^R); \quad (26)$$

$$y_t^R = \hat{\alpha}y_{t-1} - \gamma P(\eta^D - \eta^R). \quad (27)$$

Equations (23), (26) and (27) fully describe the dynamic behavior of output. They predict a recession in the first half of a Republican administration and an expansion in the first half of a Democratic administration. In addition: 1) The more different the two objective functions, i.e. the higher  $\bar{m}^D$  is relative to  $\bar{m}^R$ , and  $k^D$  relative to  $k^R$ , the larger (in absolute value) the shift will be in the constant of the output equation in the first halves of the two administrations; 2) The higher (lower)  $P$  is the bigger (smaller) the recession in the first half of an  $R$  administration and the smaller (bigger) the expansion generated by party  $D$ . Since the only "surprise" is the electoral result, the less expected this result is, the bigger is the real effect of the new policy.

It is worth emphasizing that the Republican administrations do not cause recessions because they "like" them, but because expected inflation is kept high by the existence of the more expansionary policymaker, i.e. party  $D$ . Conversely the Democratic administrations can achieve an expansion because inflationary expectations are lowered by party  $R$ .

If  $b^D > b^R$ , then the autoregressive coefficient in period  $t$  is also different; it is greater than  $\hat{\alpha}$  for party  $R$  and smaller than  $\hat{\alpha}$  for party  $D$ . The implications for the constant are unchanged.

We can now briefly consider voting behavior and show that this model is consistent with the assumption that voters are rational and fully understand the differences in the two parties' preferences. Consider a distribution of voters with different preferences over inflation and output (or unemployment) and assume that they are fully informed about the preferences of the two parties and about the economy. Let us assume that there is uncertainty about the distribution of voters' preferences, and, in

particular, about the policy most preferred by the median voter. One can then derive a function relating the policies expected by voters to the probability distribution of the electoral result. Thus, if one indicates with  $m_t^{De}$  and  $m_t^{Re}$  the policies expected by the voters from the two parties in period  $t$ , one can derive a function such as

$$P = P(m_t^{De}, m_{t+1}^{De}, m_t^{Re}, m_{t+1}^{Re}) \quad (28)$$

which maps the expected policies into the probability of electing party  $D$ .<sup>15</sup>

Since voters have rational expectations, the probability of electing party  $D$  is given by the value of the function (28) computed at the point where  $m_t^{De} = m_t^D$ ,  $m_t^{Re} = m_t^R$  etc. The result of policy convergence does not apply here. In fact, under the assumptions of this model, the two parties cannot commit to policies different than the time consistent ones computed above.<sup>16</sup> For example, party  $D$  would like to commit to a lower money growth policy, to reduce the inflationary bias and the output fluctuations, and to increase its chances of reelection. However, since voters are fully informed and rational, they cannot be fooled into believing anything other than the time consistent policies.<sup>17</sup>

This description of the political process is, obviously, very stylized. For instance, since the voters in this model are fully informed about politicians' preferences, they have nothing to learn; observing today's policy does not provide any new information about the reaction function of future policy-makers. Thus, since voters are forward looking, the probability of reelecting the incumbent party is not a function of its current and past policies. If, instead, voters have to learn something about the policymakers in office, the probability distribution of the electoral outcome would be a function of current and past policies, because the latter convey some information about the policymakers' preferences and/or "competence." Some progress in this direction is made by Alesina-Cukierman (1987), Rogoff-Sibert (1988) and Rogoff (1987a) in different contexts. These papers show that rational models with asymmetric information generate implications consistent with retrospective voting behavior.<sup>18</sup>

15. An explicit derivation of such a function in a related context is presented in Alesina-Cukierman (1987).

16. This result holds, even if the two parties assign some utility to being elected per se. See Alesina (1988a) for more discussion of this point.

17. Reputational mechanism in the repeated game may sustain other equilibrium, with less policy volatility as shown by Alesina (1987) (1988a).

18. For an extension of this model that incorporates congressional and mid-term elections, see Alesina-Rosenthal (1988).

#### 4. *Partisan Cycles in the United States*

The model in this section is tested against three possibilities: a) elections might have no effects on monetary policy or on the dynamics of output and unemployment; b) the model of "partisan cycles" of Hibbs (1987a), based upon an exploitable Phillips curve, which implies that differences in output and unemployment should persist for the entire term of office of each administration: c) the "political business cycle" theory of Nordhaus (1975), which predicts recessions at the beginning of each administration and an expansion at the end, with no systematic differences between parties.

Let us consider first the money supply equation for the case in which  $b^D = b^R$ , so that the difference between the two objective functions is restricted to the constant term. Given the discussion in Section 3, the difference between periods of the same administration is disregarded. Under these restrictions Table 2 presents a test of the model. The annual rate of growth of M1 is considered for the period 1949–1985.<sup>19</sup> Given the autoregressive properties of M1 two lagged values of the dependent variable are included as regressor as, for instance, in Barro (1978). The other regressors in Table 2 are derived directly from the theory. The partisan dummy  $R$  assumes the value of 1 in the years of Republican administrations and zero otherwise. Different specifications with (1) the rate of unemployment ( $u$ ), (2) the difference between the actual rate of unemployment and the natural rate of unemployment, as computed by Gordon (1987) ( $u^*$ ), (3) real output growth ( $\hat{y}$ ); and (4) the deviation of the output from potential output, as computed by Gordon (1987) ( $y^*$ ) are used.

In all these specifications the partisan dummy has a negative coefficient, as predicted by the theory, which is significant at least at the ten percent level, and in one case at the five percent level. The coefficients on the different measures of economic activity also have the sign predicted by the theory and are significant at the five per cent level.<sup>20</sup> Analogous results are

19. 1959–1985 M1 data are called from Citibase. Preceding 1959 the "old" definition of M1 has been used. This can be justified if one assumes that before 1959 policymakers had one "eye" on the old M1. The same regressions have been performed using the series M1 reconstructed by Litterman and Weiss at the Minneapolis Fed; there are no significant changes in the results. Finally, note that by identifying a "period" identified as occurring with one year, each administration lasts four, rather than two, periods. Extension of the model accommodating this point are straightforward.

20. The coefficients on lagged economic activity and the partisan dummy remain virtually identical, if correction for autocorrelation is obtained by using generalized least squares. (These results are available upon request.) Barro (1978) presents a regression similar to equation (1) of Table 2. He does not consider partisan effects, and, in addition to the regressors considered in this paper he adds a measure of the deviation of government spending from a normal value. Note that a partisan difference in the money growth may, in fact, be due to a partisan difference in the level of government spending. An additional

Table 2 DEPENDENT VARIABLE: ANNUAL RATE OF GROWTH OF M1  
SAMPLE 1949–1985 (*t*-STATISTICS IN PARENTHESES)

	C	M1(-1)	M1(-2)	<i>u</i> (-1)	<i>u</i> *(-1)	$\hat{y}$ (-1)	<i>Y</i> *(-1)	R
Equation 1	-0.985	0.539	0.204	0.507				-0.895
$R^2=0.72$	(-1.13)	(3.72)	(1.43)	(3.26)				(-1.74)
D.W. = 2.05								
Equation 2	1.524	0.578	0.235		0.512			-0.929
$R^2=0.71$	(2.82)	(3.99)	(1.60)		(3.01)			(-1.77)
D.W. = 2.07								
Equation 3	2.478	0.841	0.065			-0.307		-1.527
$R^2=0.69$	(3.58)	(5.42)	(0.41)			(-2.76)		(-2.59)
D.W. = 2.15								
Equation 4	1.56	0.630	0.167				-0.007	-1.044
$R^2=0.69$	(2.77)	(4.28)	(1.11)				(-2.52)	(-1.91)
D.W. = 2.16								

*Definition of variables:* M1 = rate of growth of M1; *u* = rate of unemployment (per cent); *u*\* = difference between actual and "natural" rate of unemployment;  $\hat{y}$  = rate of growth of output (per cent); *y*\* = difference between actual real output and "potential" output; *R* = dummy assuming the value of 1 when a Republican President is in office and zero otherwise.

*Sources:* unemployment, output, and M1 (from 1959) from Citibase; M1 (1947–1959), natural unemployment and potential output from Gordon (1987).

obtained with quarterly data. Table 3 displays the regression of the quarterly rate of growth of M1 (1949.1 – 1985.4) on several autoregressive terms, the difference between actual and natural unemployment (*u*\*) and the partisan dummy *R*, defined as above. The coefficient on *R* is negative and significant at the five percent level and this result is quite insensitive to the lag structure used for money growth. Similar results are obtained by testing the other specifications of Table 2 with quarterly data.<sup>21</sup>

Several researchers have found similar results on partisan effects over monetary policy using many different specifications. For instance Hibbs (1987a), Tabellini-LaVia (1987), Havrilesky (1987), Chapell-Keech (1987), Alesina-Sachs (1988), Beck (1982), (1984), present results consistent with the view that Republican administrations have been associated with tighter monetary policy. These studies differ in the sample period, the definition of "money" (M1, M2, "monetary base"), the choice of variables included in

reason why Barro uses this variable is that the World War II period is included in his sample.

21. The autoregressive specifications in the regressions of Tables 2 and 3 have been chosen as the best, using standard criteria. Specifications with less autoregressive terms leave autocorrelated residuals. Lagrange multipliers tests on the specifications presented show no autocorrelation of the residuals, while longer lag structures do not improve the regression.

Table 3 DEPENDENT VARIABLE: QUARTERLY RATE OF GROWTH OF M1  
SAMPLE 1949.1–1985.4

<i>Independent variable</i>	<i>Coefficient</i>	<i>t-statistics</i>
C	0.431	3.67
M1(−1)	0.399	5.06
M1(−2)	−0.014	−0.17
M1(−3)	0.189	2.28
M1(−4)	−0.139	−1.64
M1(−5)	0.328	4.17
$u^*(-1)$	0.138	3.78
R	−0.238	−2.16

$R^2 = 0.49$   
 $D.W. = 2.01$

Sources: see Table 2.

the objective functions of the policymakers, the specification of the partisan dummies, and the frequency of data, but they have qualitatively similar implications regarding partisan effects.<sup>22</sup>

We now turn to the output and unemployment equations. Tables 4 and 5, borrowed from Alesina-Sachs (1988), show that the qualitative implications of the model are not inconsistent with the evidence on real output growth. Table 4 shows that in the nine completed administrations of the post-war period the rate of GNP growth in the first half of Democratic administrations has been higher than in the second half, while the rate of growth in the first half of Republican administrations has been much lower than in the second half. The difference in the rate of growth in the first halves of the two administrations, and, in particular in the second year, is striking. On the contrary, as predicted by the theory, the rate of growth in the second half of the two administrations has been very similar.

Table 5 reports the timing of all the recessions in the post World War II period in relation to the preceding presidential elections. A few months after the election of every Republican administration, a recession has started. Leaving aside the post war recession, which started in November 1948, five of the seven recessions fit this theory. The two recessions which do not fit occurred in the last year of the second Eisenhower administration and in the last year of the Carter administration (affected by the second oil

22. Hibbs (1987a) and Tabellini-LaVia (1987) also show a partisan behavior of the cyclically adjusted federal budget deficit. However, neither of these studies' sample includes the entire administrations of President Reagan.



shock.) Note that these two recessions are also inconsistent with the "political business cycle" theory of Nordhaus, since they have occurred at the end of the term of office.

Needless to say, many other factors which are unrelated to the political process have contributed to the cyclical fluctuations shown in Table 4. For example, various supply shocks (such as oils shocks), have certainly played

Table 4 RATE OF GROWTH OF GNP (CONSTANT PRICES)

DEMOCRATIC ADMINISTRATIONS

	Year			
	First	Second	Third	Fourth
<i>Truman</i>	0.0	8.5	10.3	3.9
<i>Kennedy/Johnson</i>	2.6	5.3	4.1	5.3
<i>Johnson</i>	5.8	5.8	2.9	4.1
<i>Carter</i>	4.7	5.3	2.5	-0.2*
<i>Average</i>	3.3	6.2	5.0	3.3
<i>Average</i>				
<i>First/Second Halves</i>		4.8		4.1

REPUBLICAN ADMINISTRATIONS

	Year			
	First	Second	Third	Fourth
<i>Eisenhower I</i>	4.0	-1.3	5.6	2.1
<i>Eisenhower II</i>	1.7	-0.8	5.8	2.2
<i>Nixon</i>	2.4	-0.3	2.8	5.0
<i>Nixon/Ford</i>	5.2	-0.5	-1.3*	4.9
<i>Reagan I</i>	1.9	-2.5	3.6	6.4
<i>Average</i>	3.0	-1.1	3.3	4.1
<i>Average</i>				
<i>First/Second Halves</i>		1.0		3.7

Source: Economic Report of the President, 1987.

\*Oil Shocks

Note: This table is not identical to Table 2 of Alesina-Sachs (1988), due to the recent revisions in the GNP statistics.

Table 5 POST-WORLD WAR II RECESSIONS

<i>Through</i>	<i>Beginning of Contraction</i>	<i>Previous Election (Party Elected)</i>
October, 1949	November, 1948	November, 1948 (D)
May, 1954	June, 1953	November, 1952 (R)
April, 1958	July, 1957	November, 1956 (R)
February, 1961	April, 1960	November, 1956 (R)
November, 1970	October, 1969	November, 1968 (R)
March, 1975	December, 1973*	November, 1972 (R)
July, 1980	January, 1980*	November, 1976 (D)
November, 1982	May, 1981	November, 1980 (R)

Source: National Bureau of Economic Research.

\*Oil Shocks.

an important role. In addition, military expenditures for the Korean and Vietnam wars may help explain the rapid growth in 1952–53 and in the late-1960s. Nevertheless, the simple empirical regularity suggested by these Tables is rather striking. It should also be noted that both Tables 4 and 5 suggest, not surprisingly, that there is a lag between the change in administration and the effect of policy changes on the economy.

The implications of the model can be tested more precisely by analyzing the dynamic behavior of quarterly series of output and unemployment. A test of the model for the case of  $b^D = b^R$  is that in an autoregressive specification of output or unemployment the constant should shift up (down) in the first half of Democratic (Republican) administrations.

Table 6 defines three political dummies for Democratic administrations; analogous notation applies to Republican administrations. A proxy for the effects of imported oil price on the economy (OIL) is also used as a regressor to account for the most evident exogenous supply shock.<sup>23</sup> Let us

23. The variable OIL is constructed, following Hibbs (1987a) as:

$$\text{OIL} = [(lg\text{POIL}_t - lg\text{POIL}_{t-4}) - (lg\text{PGNP}_t - lg\text{PGNP}_{t-4})] \times R_t \times 100$$

Where POIL = price index of imported crude petroleum (Saudi Arabian crude); PGNP = GNP deflator;  $R_t$  = ratio of net import (import-export) of crude petroleum over GNP

Table 6 PARTISAN DUMMIES FOR DEMOCRATIC ADMINISTRATIONS

Quarters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DD1	1	2	3	4	4	3	2	1	0	0	0	0	0	0	0	0
D1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
D2	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

define  $Y_t$  as the level of real GNP, and let  $\hat{y}_t = (\lg Y_t - \lg Y_{t-4}) \times 100$ ,  $\hat{y}_t = (\lg Y_t - \lg Y_{t-1}) \times 100$  and  $y_t^* = Y_t - Y_t^*$  where  $Y_t^*$  is potential GNP as measured by Gordon (1987). The following three regressions for the sample 1949.1, 1985.4 do not reject the model ( $t$ -statistics in parenthesis):

$$\begin{aligned} \hat{y}_t = & 1.299 + 0.996 \hat{y}_{t-1} - 0.144 \hat{y}_{t-2} - 0.232 \hat{y}_{t-3} - 0.682 \text{OIL}_{t-1} \\ & (5.70) \quad (12.18) \quad (-1.24) \quad (-3.01) \quad (-2.38) \\ & + 0.237 \text{DD1}_{t-1} - 0.324 \text{RR1}_{t-1} + 0.328 \text{D2}_{t-1} \quad (29) \\ & (2.30) \quad (-3.09) \quad (1.07) \end{aligned}$$

$$R^2 = 0.83 \quad D.W. = 2.02$$

$$\begin{aligned} \hat{y}_t = & 0.848 + 0.176 \hat{y}_{t-1} + 0.082 \hat{y}_{t-2} - 0.196 \hat{y}_{t-3} - 0.616 \text{OIL}_{t-1} \\ & (4.96) \quad (2.12) \quad (1.01) \quad (-2.56) \quad (-2.85) \\ & + 0.163 \text{DD1}_{t-1} - 0.246 \text{RR1}_{t-1} + 0.156 \text{D2}_{t-1} \quad (30) \\ & (2.12) \quad (-3.11) \quad (0.71) \end{aligned}$$

$$R^2 = 0.32 \quad D.W. = 2.01$$

$$\begin{aligned} y_t^* = & 1.880 + 1.026 y_{t-1}^* - 0.075 y_{t-2}^* - 17.892 \text{OIL}_{t-1} + 2.804 \text{DD1}_{t-1} \\ & (0.58) \quad (12.61) \quad (-0.91) \quad (-3.70) \quad (1.60) \\ & - 6.587 \text{RR1}_{t-1} + 3.403 \text{D2}_{t-1} \quad (31) \\ & (-3.73) \quad (0.64) \end{aligned}$$

$$R^2 = 0.95 \quad D.W. = 1.97$$

(annual average). Sources: for POIL International Monetary Fund (IFS); for import and export of petroleum Statistical Abstract of the United States; for all the other variables Citibase. Due to missing data for POIL, the variable OIL assumes the value of zero from 1948.3 to 1950.1.

The autoregressive specifications of (29), (30) and (31) have been chosen as the "best," using standard criteria (see footnote 21); in any case, the significance and the value of the coefficients on the political dummies are robust to different autoregressive specifications of the dependent variable. The dummies *DD1* and *RR1* capture the idea that it takes about two to three quarters for a change of policy to achieve its full effect on output, and that the effects of the new policy gradually disappear after seven or eight quarters, since the economy adjusts, as predicted by the theory. The two dummies *RR1* and *DD1* in (29) and (30) have the expected sign and are both significant at the five percent level. In (31) *RR1* is strongly significant, while *DD1* is borderline significant at the ten percent level. The theory also predicts that there should be no difference in the constant term in the second half of the two administrations: the dummy *D2* has, in fact, an insignificant coefficient in all the equations. The variable *OIL* is significant in all the equations and has the expected sign.

A similar picture emerges for unemployment, as shown by the following two regressions on unemployment (*u*), and on the difference between actual and natural unemployment, as measured by Gordon (1987) (*u\**). The only difference between the regressions on output and those on unemployment is that we allowed for an additional quarter lag between changes of policies (and oil shocks) and their visible effect on unemployment. This specification is consistent with the assumption that production reacts sooner than employment to policy shocks.

$$\begin{aligned}
 u_t = & 0.292 + 1.602 u_{t-1} - 0.898 u_{t-2} + 0.241 u_{t-3} + 0.213 OIL_{t-2} \\
 & (2.49) \quad (19.29) \quad (-6.48) \quad (3.04) \quad (2.92) \\
 & -0.041 DD1_{t-2} + 0.060 RR1_{t-2} - 0.039 D2_{t-2} \quad (32) \\
 & (-1.57) \quad (2.19) \quad (-0.50)
 \end{aligned}$$

$$R^2 = 0.97 \quad D.W. = 2.00$$

$$\begin{aligned}
 u_t^* = & -0.006 + 1.598 u_{t-1}^* - 0.887 u_{t-2}^* + 0.223 u_{t-3}^* + 0.192 OIL_{t-2} \\
 & (-0.13) \quad (19.16) \quad (-6.37) \quad (2.77) \quad (2.65) \\
 & -0.040 DD1_{t-2} + 0.056 RR1_{t-2} - 0.053 D2_{t-2} \quad (33) \\
 & (-1.55) \quad (2.04) \quad (-0.68)
 \end{aligned}$$

$$R^2 = 0.97 \quad D.W. = 1.99$$

Using the same criteria of footnote 21, the specification with three autoregressors has been chosen as the "best". The dummy *RR1* is significant at

the five percent level, while the dummy *DD1* is borderline significant at the 10 percent level. The dummy *D2* is insignificant, as predicted by the theory.

Analogous results are obtained by using different specifications of the political dummies, for instance by using *D1* and *R1* rather than *DD1* and *RR1* (see Table 6). Here is the regression of  $\hat{y}$  using *D1* and *R1*, lagged two quarters:

$$\begin{aligned}\hat{y}_t = & 1.26 + 1.047 \hat{y}_{t-1} - 0.184 \hat{y}_{t-2} - 0.251 \hat{y}_{t-3} \\ & (4.75) \quad (12.89) \quad (-1.54) \quad (3.19) \\ & - 0.693 \text{OIL}_{t-1} + 0.665 \text{D1}_{t-2} - 0.656 \text{R1}_{t-2} + 0.342 \text{D2}_{t-2} \quad (34) \\ & (-2.35) \quad (2.10) \quad (-2.08) \quad (1.07)\end{aligned}$$

$$R^2 = .83 \quad D.W. = 2.09.$$

As before, the dummies *D1* and *R1* are significant at the five percent level with the correct sign and the dummy *D2* is insignificant.<sup>24</sup>

The general picture emerging from these results (and from many other regressions available upon request), is that if one allows for one or two quarters between the change of the administration and the observation of the effect of the “new policies” on output and unemployment, the model presented in Section 2 is not rejected by the data.<sup>25</sup>

These results discriminate in favor of this model against the two other politico-economic models of output and unemployment—Nordhaus’ “political business cycle” and Hibbs’ “partisan cycle.”

Nordhaus’ “political business cycle” implies that the coefficients on the

24. It should also be emphasized that the significance of the partisan dummies is not due to the particular variable used to correct for oil shocks. For instance, if the variable *OIL* is excluded by regression (29) one obtains:

$$\begin{aligned}\hat{y}_t = & 1.234 + 1.025 \hat{y}_{t-1} - 0.157 \hat{y}_{t-2} - 0.228 \hat{y}_{t-3} + 0.227 \text{DD1}_{t-1} \\ & (5.36) \quad (12.47) \quad (-1.33) \quad (-2.91) \quad (2.17) \\ & - 0.353 \text{RR1}_{t-1} + 0.176 \text{D2}_{t-1} \\ & (-3.33) \quad (0.57)\end{aligned}$$

$$R^2 = .80; \quad D.W. = 1.98$$

Similar results are obtained for the other regressions (30)/(34).

25. Chapell-Keech (1987) present results which are consistent with the model of this paper. They assume that the public forms expectations on money growth (as in Barro (1978)) by looking at lagged values of money growth and other lagged variables. Since monetary policy is systematically different under the two administrations, expectations do not adjust immediately to a change of party in office, causing a cycle on unemployment similar to that of the model of the present paper. Alesina-Sachs (1988) also note that the “unexpected money variable” of Barro (1978) show a “partisan behavior,” although with some relevant exceptions.

dummies *DD1* and *RR1* (or *D1* and *R1*) should be identical and both negative. This theory, in fact, predicts a recession at the beginning of any administration. The tests presented in this section can be appropriately compared to those performed by McCallum (1978) for the Nordhaus' cycle. McCallum includes a dummy that captures the Nordhaus' cycle in an autoregression of unemployment. For instance, in one of McCallum's specifications this dummy (*EV*) assumes the values of 1 in the second half of each administration and zero otherwise; no evidence of "political business cycles" was found in the sample used (1949, 1974). By repeating the same regression on the longer sample now available (1949.1–1985.4), controlling for the oil shocks, and using the same dummy *EV*, one obtains:

$$u_t = 0.307 + 1.673u_{t-1} - 0.935u_{t-2} + 0.214u_{t-3} \\ (3.12) \quad (20.52) \quad (-6.62) \quad (2.68) \\ + 0.222OIL_{t-2} - 0.085EV \quad (35) \\ (3.05) \quad (-1.53)$$

$$R^2 = 0.97 \quad D.W. = 2.02$$

In equation (35) the dummy *EV* has the correct sign and it is borderline significant at the 10 percent level. However, note that the model of this paper and that of Nordhaus have similar qualitative implications for Republican administrations. Thus, equation (35) cannot be taken as supportive of Nordhaus' cycle because it does not control for partisan differences. This regression also suggests why some researchers, such as, for instance, Tufte (1978) and Haynes-Stone (1987a,b), find support for Nordhaus' cycle, particularly if partisan differences are ignored.

The results presented above also discriminate against Hibbs' (1987a) formulation of "partisan cycles." In contrast with the predictions of Hibbs' model, the difference between output and unemployment in the two administrations appears exclusively in the first halves.

The model of Section 3 assumes that the public knows with absolute precision the objective function of each new government; the knowledge is tempered only by the uncertainty factor of stochastic electoral results. Several authors, including Backus-Driffill (1985a,b), Barro (1986a), Tabellini (1988a), Cukierman-Meltzer (1986a), and Hoshi (1987), study the situation wherein the public is uninformed and has to learn the preferences of new policymakers. This learning process makes the dynamic pattern of inflation, unexpected inflation, output, and unemployment richer than in the model of this paper. The empirical implications of these learning models depend upon specific assumptions, but one result is particularly appealing.

Consider the case in which a very conservative administration is elected, say a Republican administration with a very low  $b^R$ ,  $\bar{m}^R$  and  $k^R$ . In this situation, the public may take time to learn the true preferences of the "conservative" policymaker and expected inflation may remain higher than actual inflation for several periods, causing a prolonged recession. This additional element of asymmetric information (in addition to electoral uncertainty) can explain why sharp disinflations can be associated with sharp and relatively long lasting recessions.

Future research could examine the empirical evidence of other industrial democracies from the same point of view as the model of Section 3. This task is difficult for a least four reasons: first, one has to focus upon countries that have clearly identifiable "left" and "right" parties (or coalitions) and in which there have been several changes of governments from left to right and vice versa. Second, in most countries (excluding the United States) the timing of elections is endogenous, a feature which requires some important adjustment in the theoretical structure of the model and in the nature of the empirical tests. Some progress in this direction is made by Terrones (1987). Third, the monetary policies of most industrial countries have been more constrained than the United States' policy by the exchange rate regimes. The effects of the transition from the Bretton Woods system to floating rates to (for some countries) the European Monetary System cannot be ignored. For instance the EMS can be viewed as a "commitment technology" to restrain inflationary governments. Fourth, the conditions of the world economy, and, in particular, of world demand, strongly influence the performance of small open economies; thus, different governments may face very different constraints when in office. Alt (1985) provides an insightful attempt to deal with some of these issues in the context of several countries.

### 5. New "Political Business Cycles" Theories

Three recent papers by Cukierman-Meltzer (1986b), Rogoff-Sibert (1988) and Rogoff (1987a) have reconsidered "political business cycles" of the Nordhaus' type in rational game-theoretic models. In these models, politicians do not have partisan views. A well-defined social welfare function exists, but it is partially or completely disregarded by office-motivated politicians, who are willing to depart from optimality if, by doing so, they increase their chances of reappointment. Voters and economic agents are rational, but are imperfectly informed about some aspects of either the economic environment and/or the characteristics of the policymakers. This asymmetry of information generates an incentive for the policymakers to engage in sub-optimal signaling behavior before elections.

In Cukierman-Meltzer (1986b) there is an asymmetry of information between voters and policymakers about the realization of shocks in the economy. In Rogoff-Sibert (1988) and Rogoff (1987a) voters do not have full information about the "competence" of the policymakers; they can only observe it with a lag. "Competence" is defined as the ability to provide public goods or transfers efficiently, i.e. minimizing waste. Since voters prefer competent policymakers, the latter would like to appear as competent as possible. Thus, before elections, politicians engage in highly visible budget activities, such as increases of personal transfers, provision of new public services or goods, reduction of taxes or of prices of public services; these policies may also be accompanied by monetary financing, and may generate a monetary cycle. Note that since this tactic is effective, if and only if the voters do not acquire enough information to compute the budgetary or inflationary consequences of it, these budget cycles would have to take place immediately before elections, otherwise they would be counterproductive to the goals of politicians. These budget and, possibly, monetary cycles described above may imply very little or nothing at all for a four-year cycle on employment; thus they are consistent with the lack of empirical evidence for the Nordhaus' "political business cycle."

Personal transfers are one of the most visible means of increasing voters' disposable income before elections. Thus, in Rogoff's (1987a) terminology, transfers provide a signal of competence which is very easy for politicians to make use of. By carefully looking at the elections from 1960 to 1976, Tufte (1978) concludes that personal transfers were usually increased in the

Table 7 TRANSFERS AND ELECTIONS

*Dependent variable:* TR = Ratio of net transfers over GNP; seasonably adjusted quarterly data

*Sample:* Equation 1: 1949.1–1985.4 (*t*-statistic in parenthesis)

Equation 2,3: 1961.1–1985.4 (*t*-statistic in parenthesis)

	C	TR(-1)	TR(-2)	TREND	U	EV1	EV2	FD
<i>Equation 1</i>	-0.183	0.757	0.010	0.008	0.135		0.056	0.037
$R^2 = 0.97$	(-1.37)	(8.77)	(0.12)	(3.97)	(4.08)		(1.10)	(1.18)
<i>D.W.</i> = 1.87								
<i>Equation 2</i>	0.070	1.093	-0.240	0.007	0.070	0.128		0.060
$R^2 = 0.98$	(0.54)	(10.49)	(-2.55)	(2.46)	(2.29)	(2.46)		(2.48)
<i>D.W.</i> = 1.93								
<i>Equation 3</i>	0.013	1.106	-0.255	0.006	0.070	—	0.117	0.073
$R^2 = 0.99$	(0.10)	(10.78)	(-2.66)	(2.36)	(2.32)		(3.00)	(2.95)
<i>D.W.</i> = 1.97								

*Source:* Citibase. All the variables are defined in the text.



Table 8 DUMMIES USED IN TABLE 7

	<i>Quarters of Each Administration</i>															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
EV1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
EV2	-1	-1	0	0	0	0	1	1	-1	-1	0	0	0	0	1	1

months immediately preceding the November elections. On the contrary, federal payments for social security and unemployment insurance "have increased more rapidly after the elections."

By focusing on personal transfers, Table 7 provides some statistical support for Tufte's claim and, indirectly, for the "political budget cycle" of Rogoff (1987a) and Rogoff and Sibert (1988). The ratio of net personal transfers (total personal transfers to U.S. citizens, less personal contributions to social insurance) over GNP is considered to be a measure of "net personal transfers." This ratio shows an increasing trend throughout the sample period, a trend possibly reversed only by the administrations of President Reagan. (For a politico-economic explanation of this trend see Anderson (1987)). In the regressions of Table 7 two autoregressive terms and a time trend are used as regressors.<sup>26</sup> Unemployment is also included, since some components of the transfers increase automatically with it. The two electoral dummies EV1 and EV2 are defined in Table 8. A positive coefficient on them signals the existence of a political budget cycle. The dummy EV1 refers only to Presidential elections, while EV2 includes both Presidential and mid-term elections. Note that the November elections occur in the middle of the fourth quarter of the year; thus it is unclear, in principle, whether this quarter should be considered pre- or post-electoral. Tufte (1978), however, shows that in several elections the increase in transfers payments occurred in the fourth quarter of the year in October or even in early November, but before the elections. In addition, transfers actually paid in, say, December may have been announced and approved before the elections. The dummy FD assumes the values of 1, 2, 3 and 4 in the first, second, third and fourth quarter of the fiscal year respectively, to control for possible fiscal cycles. For instance, government spending may be relatively higher at the end of the fiscal year.<sup>27</sup>

Table 7 shows that the electoral dummies are significant at the five

26. The same criteria of footnote 21 are used to choose the best autoregressive representation.

27. Until 1976 the fiscal year started on July 1; since 1976 it has started on September 1. FD assumes the value of 1 in the transitional quarter.

percent level for the sample period of 1961–1985.<sup>28</sup> They are not significant if one includes the earlier period; this result is consistent with Tufte's observation that the Eisenhower administrations did not follow this pattern.

In summary, the evidence discussed by Tufte and these regressions are, broadly speaking, consistent with a "political budget cycle" on personal transfers. Needless to say, "political budget cycles" could be observed on many other variables, such as other types of government expenditures or prices of public services. Also, as noted by Rogoff (1987), this theory could be tested on a much larger data set by considering state or even city elections.

The existence of a monetary cycle with increasing money growth before elections, and reductions after the elections is an open question. Tufte (1978) presents some qualitative evidence for such a cycle, but only for the period 1961–1976. Grier (1987) and Meiselman (1986) find statistical evidence for political monetary cycles, but, again, this excludes the 1950s. Meiselman cautiously concludes that some but not all administrations show some evidence of a political monetary cycle.

The election of 1972, when President Nixon ran as the incumbent, might serve as the "textbook example" of pre-electoral manipulation of economic policy. On October 1, 1972, social security payments were increased by 20 percent and indexed to inflation. At the same time, in the last two quarters of 1972, M1 was growing at an annual rate of almost 8 percent, compared with an average of about 4 percent in the following three years, and about 5 percent in the preceding three years.

Finally, it should be noted that political budget cycles based upon asymmetric information are not inconsistent with the partisan behavior of policymakers. For instance, Alesina-Cukierman (1987) moves a step towards integrating these two approaches by building a model with "partisan" parties and imperfectly informed voters.<sup>29</sup>

## *6. Inflation Bias, Political Cycles and Central Bank Independence*

In most industrial countries monetary policy is not directly controlled by the government, since a certain degree of independence is granted to the

28. The coefficients on EV1 and EV2 for the sample 1961–85 remain significant, at least at the 10% level if the dummy FD and/or unemployment are dropped as regressors. These additional regressions are available upon request.

29. Frey-Schneider (1978) test a model which attempts to capture both partisan and electoral incentives. However, their model is not based on an optimizing framework and it is impossible to interpret their results from the point of view of this paper. Haynes-Stone (1987a) emphasize the coexistence of these two incentives. See also Alt-Chrysal (1983).

Central Banks. The models of the preceding sections suggest that by reducing the influence of the executive on the Central Bank, the inflationary bias and the excessive volatility in policymaking, due to the political cycle, could be reduced.

Consider again the model of Section 3. The discretionary equilibrium described there is suboptimal for two reasons: First, the average inflation is too high because politicians have an incentive to generate a monetary surprise; second, the partisan monetary policies generate suboptimal fluctuations in money supply and in output and unemployment. It can be easily shown that the optimal monetary rule for the two parties in every period is:

$$m_t^D = m_t^R = \lambda \bar{m}^D + (1 - \lambda) \bar{m}^R; \quad 0 < \lambda < 1. \quad (36)$$

Both parties are better off by committing to a “cooperative” monetary rule, which eliminates inflationary bias and excessive policy fluctuations.<sup>30</sup> In (36)  $\lambda$  represents the weight attributed to the objectives of party *D* in the agreement. Thus, the higher (lower) is  $\lambda$ , the closer the policy chosen is to the bliss point of party *D* (*R*) between the parties. Alesina (1987) (1988a) shows how  $\lambda$  can be chosen as a result of a bargaining game in which the party with a higher probability of election receives more weight.

The problem is that this rule is time-inconsistent. If there are no enforcement mechanisms, the party in office has an incentive to manipulate monetary policy for either partisan and/or electoral motives, and abandon the rule. Two types of enforcement help in sustaining cooperation: first, reputational considerations can raise the costs of a deviation from the optimal “cooperative” behavior; in fact, such a deviation may be “punished” by voters and by future governments, possibly of the opponent party. Alesina (1987) (1988a), Alesina-Spear (1987), Ferejohn (1986) and Rogoff-Sibert (1988) explore reputational games in two-party systems, and show how the pure discretionary outcome can be improved. However, reputation does not solve the problem completely, unless politicians are very far-sighted. In addition, these mechanisms require much sophistication and coordination of strategies, as emphasized by Rogoff (1987b).

Since concerns for reputation may not be a sufficiently strong incentive to ensure cooperation, certain institutions could be designed to help achieve the optimal outcome, such as a Central Bank, independent from each current government. If the politicians currently in office do not have direct control over monetary policy, they cannot engage in partisan or electoral

30. In this example, the optimal rule is of the *K*-percent type. More generally, it may be contingent on the realization of shocks.

policymaking. In addition, as suggested by Rogoff (1985), the appointment of a Central Bank particularly averse to inflation can reduce the inflationary bias. However, assuming that political parties have separate “ideological” goals, they would not be able to agree in general, on how “conservative” (i.e. anti-inflationary) the Central Banker should be. Thus, the choice of a Central Banker requires a compromise, as shown in (36); perhaps a bi-partisan committee, rather than the current administration alone should be in charge of supervising the Central Bank. This institutional arrangement isolates monetary policy from short-run partisan or electoral pressure. On the other hand, a bi-partisan control may still guarantee some “democratic” supervision of monetary policy and avoid the risk of a Central Bank developing into a bureaucratic body, unresponsive to social welfare. This criticism of independent Central Banks has been made by Friedman (1982) among others.

In summary, by isolating the Central Bank from direct political pressure from each current government, three goals can be achieved: 1) reduction of the inflation bias; 2) reduction of partisan variability in monetary policy; 3) reduction of pre-electoral manipulation of monetary policy.

These propositions can, in principle, be tested by analyzing countries whose Central Banks have different institutional arrangements. These tests require first a classification of the degree of “independence” of different Central Banks, which is not easy to compute. The degree of independence of Central Banks is affected by at least four factors: 1) the institutional and formal relationships between the Banks and the executive; for instance, who (and how often) appoints Central Bankers, the presence of government officials in the board of directors of the Banks, and the requirements of government’s approval of specific policies; 2) informal relationships and contacts between Central Bankers and members of the executive; 3) budgetary and financial relationships between the Central Bank and the executive; 4) macroeconomic relationships, such as the existence of rules forcing the Central Bank to accommodate fiscal policy.

Quantifying these elements is not easy; debates on how independent the Federal Reserve really is from the President and/or from the Congress in the United States illustrate this difficulty.<sup>31</sup> Nevertheless, Bade-Parkin (1985) and Masciandaro-Tabellini (1988) provide courageous attempts to classify the degree of independence of several Central Banks.

Bade-Parkin (1985) consider twelve countries for the floating rates period

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31. Woolley (1984) provides a detailed discussion of this issue. In agreement with Weintraub (1978) and Stein (1985) this author concludes that despite the formal independence of the Federal Reserve, the President had an important influence on monetary policy. The same conclusion is supported by the empirical results of Havrilesky (1988).

Table 9 INFLATION, CENTRAL BANK INDEPENDENCE AND GOVERNMENT SPENDING (1973–1985)

<i>Countries</i>	<i>Degree of Central Bank Independence (1)</i>	<i>Average Inflation Rate (GNP Deflator) (2)</i>	<i>Rate of Government Spending Over GNP (percent) (3)</i>
Italy	1/2	16.1	35.6
Spain	1	15.2	26.2
New Zealand	1	12.7	36.4
United Kingdom	2	12.3	37.3
Australia	1	10.5	28.4
France	2	10.2	39.1*
Sweden	2	9.8	38.3
Denmark	2	9.1	39.7
Norway	2	8.8	38.3
Canada	2	8.1	23.1
United States	3	7.2	21.7
Belgium	2	6.8	36.0
Netherlands	2	5.8	35.4
Japan	3	5.0	16.2
Germany	4	4.1	29.3
Switzerland	4	4.0	9.0

Sources: (1) Bade-Parkin (1985), Masciandaro-Tabellini (1988); Fair (1980).

(2) Hansson (1987). Original source: International Monetary Fund, IFS.

(3) International Monetary Fund, IFS.

\*ratio computed over GDP.

and classify their Central Banks in four groups, from the least independent (group 1) to the most independent (group 4). They consider two dimensions of independence—political and financial (i.e. criteria 1, 2 and 3 respectively). Political independence appears more relevant, and it is the criterion emphasized in this paper. In Table 9, Bade and Parkin's sample is extended to include New Zealand and Spain, by using the institutional information provided by Masciandaro-Tabellini (1988) and Fair (1980), respectively.<sup>32</sup> The first two columns of Table 9, which is an extended and updated version of a similar table in Bade-Parkin (1985), show that, broadly speaking, there is an inverse relationship between the degree of independence of Central Banks and the average inflation rate. The two countries

32. Masciandaro-Tabellini (1988) show that the Central Bank of New Zealand is by all criteria less independent than Australia's Central Bank, which is classified in group 1 by Bade and Parkin. Fair (1980) reports that, unlike in any other country in this sample, in Spain "all measures—taken by the Central Bank—are subject to approval of Ministry of the Economy."

with the most independent Central Banks had the lowest inflation. The most dependent Central Banks (group 1) had some of the highest inflation rates.<sup>33</sup>

This correlation, however, does not necessarily establish a causal link. For instance, this relationship may be due to the fact that countries with a preference for low inflation also prefer more independent Central Banks. Or, countries with the strongest anti-inflationary preferences believe that the most effective way to achieve their target is by delegating control of monetary policy to an independent agency.

In addition, Central Banks' independence is not the only institutional explanation for cross-sectional differences in average rates of inflation. Hansson (1987) provides an encouraging attempt to explain these differences in terms of several other sociological and institutional characteristics. By a cross-sectional and time series analysis, he shows that the position of the government in the left-right-wing spectrum, the various proxies of social consensus (such as strike activities and index of labor conflicts), and the effects of oil shocks, together with Central Bank independence explain the different inflation rates in different countries. However, even accounting for these socio-political differences, the degree of independence of the Central Bank remains a significant variable.

An additional factor not considered by Hansson (1987), but which may also be important and related to the political orientation of different governments is the size of the public sector, measured, for example, by government spending over GNP. A higher level of desired government spending may require a higher level of seignorage. Table 9 shows that there may be some correlation between the size of government and the inflation rate. This correlation is, however, far from perfect. For instance, Belgium, the Netherlands, and Germany appear as outliers. Further research may shed more light on this issue.<sup>34</sup>

The second question is whether or not independent Central Banks reduce politically induced variability in monetary policy. To answer such a question we would need a detailed study of political monetary cycles in several different countries, a task which goes beyond the scope of the present paper. However, consider three cases: the United Kingdom,

33. Bade and Parkin's classifications disregard institutional changes in the period considered. The Italian Central Bank obtained more economic independence in 1982 (Tabellini 1988b). Given this change we classified Italy as 1/2 rather than 2, as in Bade-Parkin.

34. Mankiw (1987) reports a positive correlation between level of inflation and tax burden in the United States. Poterba-Rotemberg (1988) do not find the same correlation in other countries. An insightful explanation suggested by these authors for their results, which is consistent with the present paper, is that the government's objective function, which leads to the choice between inflation and other taxes, may change over time as a function of changes of political parties in office.

Germany, and the United States. In the United Kingdom, with a relatively dependent Central Bank, the pattern of macroeconomic policy in general, and monetary policy in particular, has been quite "partisan", according to Hibbs (1977), Minford-Peel (1982), Minford (1985) and Alt (1985). On the contrary, partisan volatility in monetary policy has been less evident in Germany, which has a much more independent Central Bank. The United States may fall somewhere in between. These three countries allow a suggestive comparison, given in Table 10, because they experienced a change of government from "left" to "right" at roughly the same time in the early eighties. Both the average and the variance of inflation across regimes is highest in the United Kingdom, lowest in Germany, and intermediate in the United States.

### 7. Central Bank Independence and the Policy Mix

A second important effect of Central Bank independence is on the policy mix. Fiscal and monetary policy are controlled by two authorities which are, at least partially, independent, but they are linked by the intertemporal government budget constraint. This institutional arrangement generates interesting strategic interaction if the two authorities have different preferences over the policy mix.

Fiscal authorities may face electoral and partisan incentives that could

Table 10 AVERAGE INFLATION RATES IN SELECTED PERIODS:  
GERMANY, UNITED KINGDOM, UNITED STATES (GNP DEFLATOR,  
AVERAGE IN ANNUAL RATE OF GROWTH, PERCENT)

	(a)	(b)	Difference (a)–(b)	Bade-Parkin's Index of Independence
Germany	Social Democrats 1975–82	Christian Democrats 1983–85	1.8	4
	4.3	2.5		
U.K.	Labourists 1975–79	Conservatives 1980–85	7.3	2
	16.3	9.0		
U.S.	Carter 1977–80	Reagan 1981–85	2.6	3
	8.0	5.4		

Source: For Germany and United Kingdom: International Monetary Fund, IFS. For the United States: Economic Report of the President, 1987.

encourage them to generate "excessive" government spending and/or a deficit bias. Meltzer-Richard (1981) provide a politico-economic explanation of the (excessive) size of government. Cukierman-Meltzer (1986c), Alesina-Tabellini (1987a), Persson-Svensson (1987), and Tabellini-Alesina (1987) show in dynamic models of fiscal policy how the level and the variance of budget deficits can be influenced by political competition. This research shows that political competition may generate a deficit bias and accumulation of government debt above the "social planner" optimum.<sup>35</sup> In any case, if there is a conflict of objectives between the fiscal and the monetary authorities, the dynamic behavior of government debt is affected by this non-cooperative interaction.

The most useful way to address this point is by reviewing the argument of Sargent-Wallace (1981). They show that if budget deficits are an exogenous process independent of monetary policy (and the government cannot engage in Ponzi schemes), then restrictive monetary policies are unsustainable; sooner or later the deficit has to be monetized, because there is a limit to the amount of government debt that can be held by the public. Thus, a tighter monetary policy today implies a looser monetary policy in the future. This argument, however, holds only in the case of "fiscal dominance", namely if fiscal policy is given exogenously, and monetary policy is determined residually from the government budget constraint. Instead, an independent Central Bank may hold onto a tight monetary policy, even with rising deficits; with no monetary accommodation the Fiscal Authority may be forced to adjust its budget policy. In the extreme case of "monetary dominance", in which monetary policy is given as an exogenous process (contrary to Sargent-Wallace (1981)), budget deficits are determined by the Central Bank. Thus, independent and tough Central Bankers can enforce fiscal responsibility when it is lacking.

An empirical implication of this argument is that countries with more independent Central Banks should exhibit lower budget deficits. Recent work by Parkin (1987), Masciandaro-Tabellini (1988) and Tabellini (1988b) suggests, at least tentatively, that this implication is consistent with the empirical evidence of several countries in the last three decades. Parkin (1987) examines the same sample of twelve countries as Bade-Parkin (1985) and concludes that "there are surprisingly strong links between Central Bank laws and deficits." The countries with more independent central banks (particularly Switzerland, Germany, and the United States) have

35. In addition to these recent papers, there is a vast theoretical and empirical literature that addresses the political economy of fiscal policy. For a survey, see Mueller (1979), or Buchanan, et al. (1987). However, unlike the papers quoted in the text, this literature is based upon voters' and economic agents' "fiscal illusion."



lower long-run average deficits and lower variance. Countries with more dependent Central Banks (such as Italy) have higher long-run deficits. An exception is France, which shows a deficit close to that of Switzerland and of Germany, both in terms of average and variability. Masciandaro-Tabellini (1988) examine a smaller group of countries: Australia, Canada, Japan, New Zealand, and the United States, and find that New Zealand has the least independent Central Bank of the group and the highest average of deficits, while the opposite holds for the United States. Tabellini (1988b) examines the current Italian experience in this light.

Countries experiencing "changes of regimes" can also be used to test these theories. Some indirect evidence on this point is suggested by the literature on stabilization of hyperinflations, particularly in the interwar period. Several researchers, including Sargent (1982) and Dornbusch-Fischer (1986), have noted that inflations and budget deficits have been stopped when a consistent and credible change of regime occurred. The credibility of the policy change has been accomplished in several cases by means of institutional reforms which, in particular, granted more independence to the Central Banks, and limited the availability of automatic credit lines extended from the Central Banks to the Treasury. The most obvious examples of these institutional reforms took place in Germany in 1923–24 and France in 1926.

An important distinction should be made, however, between the steady state and the adjustment path. Consider the appointment of a new "tough" Central Banker, refusing to monetize the deficits. In the long-run, an equilibrium will be reached, but in the short-run the monetary and fiscal authorities might engage in "chicken games", as argued by Sargent (1986), Tabellini (1986), and Loewy (1986). Suppose, for instance, that the Fiscal Authority is unsure about how tough the new Central Banker is; then the former may pursue an overly expansionary fiscal policy in order to test how willing the latter is to resist. On the other hand, the Central Banker may respond with an overly restrictive monetary policy, to establish toughness and force the Fiscal Authority to change policy. This example has been used to describe the policy mix observed in the first two years of the first administration of President Reagan.

## *Conclusions*

Recent politico-economic models based upon the game-theoretic macroeconomic literature provide original and empirically testable results.

After the influential work of Nordhaus (1975), the literature on political business cycles made virtually no progress on theoretical grounds for more than ten years, while empirical results were overall inconclusive. Recent

optimizing and rational models have provided novel theoretical insights and suggested original empirical predictions. This paper argues that these recent rational models may out-perform empirically the traditional non-rational approaches and can shed some light on several empirical puzzles. With respect to the "partisan cycles" of Hibbs (1987a), this paper shows that they may survive even in rational expectation models, but with fairly different characteristics. Empirical evidence of the postwar United States indicates that a "rational partisan model" may even outperform Hibbs' "non-rational" model.

The game-theoretic literature on monetary and fiscal policy coordination provides important insights into cross-country differences in several macroeconomic variables, such as inflation, government deficits, and the monetary/fiscal policy mix.

This line of research also has important normative implications. Models which explicitly address the relationship between alternative institutional settings and the economy can determine the optimal institutional arrangements, given that "benevolent dictators" do not exist. For instance, this literature provides a conceptual framework to ask the question of who should control the Central Bank, and it sheds some new light on the old question of "rules versus discretion."

Only a few issues concerning the relationship between macroeconomics and politics have been addressed here. For instance, this paper considers the effects of elections on the economy, but ignores the reverse link of economic conditions to voting behavior and electoral results.<sup>36</sup> One interesting question raised in this paper is whether voters make naive or sophisticated and rational choices. The empirical literature on voting is inconclusive on this point. For instance, results by Kramer (1971) and Fair (1978) (1982) (1987) could be interpreted as showing that voters have very short memories and that their behavior can be easily predicted and influenced by skillfully-timed economic policies. However, similar empirical implications can be derived from a model with rational voters who have short-run information asymmetries as in Rogoff-Sibert (1988). In addition, Alesina-Rosenthal (1988) show that a voting equation derived under the assumption of voters' rationality, and compatible with the model of Section 3 of this paper, performs at least as well as the voting equations estimated by Kramer (1971) and Bloom and Price (1975).

A second important issue is the relationship between political competition and government debt. Several recent papers have introduced a political dimension to general equilibrium dynamic models of fiscal policy.

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36. Some of the most notable contributions in this area include Kramer (1971), Arcelus-Meltzer (1975), Fair (1978, 1982, 1987), Fischer-Huizinga (1982) and Bloome and Price (1975).

Cukierman-Meltzer (1987c) adopt the overlapping generation framework, and Alesina-Tabellini (1987a), Persson-Svensson (1987) and Tabellini-Alesina (1987) use the framework of Lucas-Stokey (1983). These papers show how political forces generate a dynamic pattern of government debt which may be quite different from the social planner's optimum, even if everybody behaves rationally.<sup>37</sup> An insight that emerges from these papers is that since government debt is a link between current and future governments, today's government, by strategically manipulating the debt, can influence the policies of its successors; this strategic behavior can generate a "deficit bias." More generally, these papers demonstrate that there are empirically testable relationships between political institutions and fiscal deficits. This testing might help explain the wide variety of budget policies observed across countries and time periods.

A third topic is the politico-economic dimension of international policy coordination. International agreements on policy coordination are set up by politicians facing domestic political incentives and constraints, rather than by social planners. Thus, domestic political games between political parties, and international policy games between countries, are closely connected. Tabellini (1987b) and Lohmann (1987) provide useful insights on this issue.

Fourth, the external debt problems of developing countries are another clear case in which politics and economics are deeply interconnected. Domestic political and distributional struggles affect the dimension of the debt the use of external debt, and the choice of how to deal with debt crises. Thus, choices regarding debt are a function of the relative political influence of different groups. Alesina-Tabellini (1987b) suggest a link between socio-political polarization, public external debt, and private capital flight in developing countries.

In summary, this paper suggests that positive models of economic policy cannot and should not ignore the political arena. Economists cannot ignore the political system and political scientists cannot ignore economic forces; a closer interaction between the two disciplines would be extremely fruitful.

I would like to thank Guido Tabellini for innumerable discussions. I have also benefited from conversations with Albert Marcet, Allan Meltzer, Thomas Romer, and Howard Rosenthal. I am very grateful to my discussants and to several participants at the Conference for many useful comments. Nouriel Roubini and Ardo Hansson kindly provided help in finding some data and Giovanna Prennushi was a valuable research assistant. I am responsible for any mistakes and for the opinions expressed in this paper.

37. These political distortions go beyond the well-known problems of dynamic inconsistency of the optimal fiscal policy, pointed out, for instance, by Fischer (1980) and Lucas-Stokey (1983).

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## Comment

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### 1. Introduction

After lying buried for more than a decade under the ashes of the rational expectations revolution, the theory of political business cycles (PBC) has enjoyed a resurgence in recent years. Alesina's excellent paper surveys some of the theoretical and empirical developments which have breathed new life into this area. The scope of the paper actually extends beyond PBC's to other areas of "strategic macroeconomics," but Alesina's work on PBC's is so striking that I am going to focus my remarks on that topic.

Even though one can point to some shortcomings in the underly-