

# Political Cycles in OECD Economies

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This paper studies whether the dynamic behaviour of GNP growth, unemployment and inflation is systematically affected by the timing of elections and of changes of governments. The sample include the last three decades in 18 OECD economies. We explicitly test the implication of several models of political cycles, both of the “opportunistic” and of the “partisan” type. Also, we confront the implication of recent “rational” models with more traditional approaches. Our results can be summarized as follows: (a) The “political business cycle” hypothesis, as formulated in Nordhaus (1975) on output and unemployment is generally rejected by the data; (b) inflation tends to increase immediately after elections, perhaps as a result of pre-electoral expansionary monetary and fiscal policies; (c) we find evidence of temporary partisan differences in output and unemployment and of long-run partisan differences in the inflation rate as implied by the “rational partisan theory” by Alesina (1987); (d) we find virtually no evidence of permanent partisan differences in output growth and unemployment.

## 1. INTRODUCTION

Different models of political cycles emphasize either the “opportunistic” or the “partisan” incentives of policymakers. In “opportunistic” models, the policymakers maximize their popularity or their probability of re-election. In “partisan” models different political parties represent the interests of different constituencies and, when in office, follow policies which are favourable to their supporting groups; specifically, the left-wing parties are more concerned with the problem of unemployment, while the right-wing parties are relatively more willing to bear the costs of unemployment to reduce inflation.

This literature has developed in two clearly distinct phases. The first one, in the mid-seventies, is due to the influential work by Nordhaus (1975), and Lindbeck (1976) on “opportunistic” cycles and by Hibbs (1977) on “partisan” cycles. These papers share a “pre-rational expectations” model of the economy and are based upon an exploitable “Phillips curve”. The “political business cycle” model of Nordhaus predicts pre-electoral high growth and low unemployment, increasing inflation around the election time and a post-electoral recession, regardless of the political orientation of the incumbent government. Hibbs’ “partisan” model implies systematic and permanent differences in the inflation/unemployment combination chosen by different political parties.

Macroeconomists soon lost interest in this subject, because at that time the profession was developing (or fighting against), the “rational expectations revolution.”<sup>1</sup>

1. Furthermore, Nordhaus’ “political business cycle” model did not receive much empirical support. Soon after the publication of Nordhaus’ paper McCallum (1978) and Paldam (1979) presented negative empirical results for the U.S. and OECD economies respectively. More favourable results are shown by Tufte (1978), but only on a sample including a few American elections.

The second phase took off in the mid-eighties as a branch of the game-theoretic approach to the positive theory of policy. Cukierman and Meltzer (1986), Rogoff and Sibert (1988), Rogoff (1990), and Persson and Tabellini (1990) propose rational "opportunistic" models; Alesina (1987) develops a rational partisan approach. These models depart from their predecessors in two important dimensions. First, the assumption of economic agents' rationality makes real economic activity less directly and predictably influenced by monetary policy. Second, voters' rationality implies that they cannot be systematically "fooled" in equilibrium.

This second generation of models has empirical implications which are quite different from those of the earlier literature: the assumption of rationality reduces the extent and the likelihood of regular political cycles, although it does not eliminate them. For example, in models with rational economic agents and voters, Nordhaus' type cycles are mitigated. Rather than regular multi-year cycles on output and unemployment, one should observe, according for instance to Rogoff and Sibert (1988), short-lived electoral cycles on monetary and fiscal policy instruments, but not necessarily on the level of economic activity. Alesina (1987, 1988*b*) shows that in a partisan model with nominal wage contracts and rational voters, permanently different inflation rates across parties may result only in temporary, post-election differences in growth and unemployment.

This paper addresses two questions. First, whether or not the dynamic behaviour of GNP growth, unemployment and inflation is systematically affected by the timing of elections and of changes of governments. Second, whether or not the second generation of rational models has provided useful insights to interpret the evidence. The paper suggests an affirmative answer to both these questions by examining 18 OECD democracies, in the last three decades.

More specifically our results can be summarized as follows: (a) The "political business cycle" hypothesis, as formulated in Nordhaus on growth and unemployment is generally rejected by the data. (Some favourable evidence can be found in only two countries); (b) inflation tends to increase immediately after elections, perhaps as a result of pre-electoral expansionary monetary and fiscal policies; this result yields support to the Rogoff and Sibert (1988) and Rogoff (1990) model of "political budget cycles"; (c) we find evidence of temporary partisan differences in output and unemployment and of long-run partisan differences in the inflation rate as implied by the "rational partisan theory" of Alesina (1987). This pattern appears rather unambiguously in countries with a pure two-party system, or with clearly identifiable "right" and "left" coalitions; (d) we find virtually no evidence of permanent partisan differences in output and unemployment. Indirectly, results (c) and (d) yield support to the positive model of inflation developed by Kydland-Prescott (1977) and Barro and Gordon (1983*a, b*).

The qualitative features of these results are consistent with the finding on the United States by Alesina and Sachs (1988), Alesina (1988*a*) and Chapell and Keech (1988). The advantage of a multi-country study is that, of course, one has many more degrees of freedom. Elections and changes of governments are relatively infrequent events. Thus, the researcher is left with very few observations and only one country is considered. This is why systematic multi-country studies are particularly useful in this area.

The paper is organized as follows. In the next section we highlight the empirical implications of several models of political cycles. Since several comprehensive reviews of the literature have recently appeared (Alesina (1988*a*), Nordhaus (1989), Persson and Tabellini (1990)) we sketch the various models very succinctly. In Section 3 we present regressions on a panel data set of all the countries in the sample. Section 4 briefly discusses the results of country by country regressions. Section 5 employs Hamilton's (1989) method of timing recessions and expansions. The last section concludes.

## 2. MODELS OF POLITICO-ECONOMIC CYCLES

## 2.1. The “political business cycle” (Nordhaus (1975))

The assumptions underlying Nordhaus’ “political business cycle” (henceforth PBC) can be characterized as follows:

A.1. The economy is described by a Phillips curve:

$$u_t = \bar{u} + \alpha u_{t-1} + \gamma(\pi_t - \pi_t^e) + \varepsilon_t; \quad 0 < \alpha < 1; \gamma < 0. \quad (1)$$

where  $u$  is unemployment;  $\bar{u}/(1 - \alpha)$  is the steady state “natural” level of unemployment;  $\pi$  is inflation;  $\pi^e$  is expected inflation;  $\varepsilon$  is a random shock with zero mean;  $\alpha$ ,  $\gamma$  are parameters. The autoregressive term in (1) captures various sources of persistence. The “natural” level of unemployment is normalized at zero, with no loss of generality. By Okun’s law, the same model can be written in terms of output growth,  $y_t$ , instead of unemployment. In the empirical work which follows, we will consider both GNP growth and unemployment.

A.2. Inflation expectations are adaptive:

$$\pi_t^e = \pi_{t-1} + \lambda(\pi_{t-1}^e - \pi_{t-1}); \quad 0 < \lambda < 1. \quad (2)$$

A.3. Inflation is directly controlled by the policymakers.<sup>2</sup>

A.4. Politicians are “opportunistic”: they only care about holding office, and they do not have “partisan” objectives.

A.5. Voters are “retrospective”. They judge the incumbent’s performance based upon the state of the economy during the incumbent’s term of office, and heavily discount past observations.

A.6. The timing of elections is exogenously fixed.

Under these assumptions, Nordhaus derives the following testable implications: (i) every government follows the same policy; (ii) towards the end of his term of office, the incumbent stimulates the economy to take advantage of the “short run” more favourable Phillips curve; (iii) the rate of inflation increases around the election time as a result of the pre-electoral economic expansion; after the election, inflation is reduced with contractionary policies.<sup>3</sup>

This basic model has recently been developed by investigating the role of rationality.

## 2.2. Rational political business cycle models

Persson and Tabellini (1990) propose a simple model which summarizes the basic insights of this approach, due to Rogoff and Sibert (1988). Assumptions A.1, A.3, A.4, and A.6 as in Nordhaus’ model are retained. Assumption A.2 is replaced by:

A.2'.  $\pi_t^e = E(\pi_t / I_{t-1})$ : rational expectations.

A.2".  $I_{t-1}$  includes all the relevant information except the level of “competence” of different policymakers.

Assumption A.5 is substituted by:

A.5'. Voters choose the candidate which is rationally expected to deliver the highest utility, if elected.

A.5". There are no differences in voters’ utility functions.

2. To be precise, Nordhaus (1975) assumes that policymakers control aggregate demand and, indirectly, inflation. This difference is inessential.

3. Nordhaus’ (1975) model predicts that inflation should increase *before* the election. However, given time lags between the effects of aggregate demand policies on output and inflation, one can build a model in which inflation increases after, rather than before the election. (See Lindbeck (1976)).

$E(\cdot)$  is the expectation operator and  $I_{t-1}$  is the information set of the voters at time  $(t-1)$  when expectations are formed. A.2") implies an asymmetry of information between the policymakers and the voters: the former know their own competence, but the latter do not.<sup>4</sup> Policymakers' "competence" is defined as their ability of keeping unemployment low (and GNP growth high) with a relatively low level of inflation.<sup>5</sup>

By taking advantage of this informational asymmetry, and by trying to appear as competent as possible before elections, the politicians behave in a way leading to a Nordhaus' type PBC. However, given voters' rationality and awareness of the politicians' incentives, the latter are limited in their "opportunistic" behaviour. Thus, the resulting cycles are more short-lived and less regular than in Nordhaus' model.

The original proponents of the "competence" model, i.e. Rogoff and Sibert (1988) and Rogoff (1990), consider a budget problem, rather than an inflation/unemployment trade-off, but with identical assumptions about the distribution of information. These papers have empirical implications on opportunistic cycles on monetary and fiscal variables, rather than on unemployment and output. In fact, the model by Rogoff and Sibert (1988) makes predictions on the inflation rate similar to those of the Nordhaus model, but does not imply any correlation between elections and GNP growth or unemployment.

### 2.3. *The "partisan theory" (Hibbs (1977, 1987))*

A strong version of the "partisan theory" (henceforth PT) based upon a non-rational expectation mechanism, adopts assumptions A.1, A.2, A.3 and A.6. Assumptions A.4 and A.5 are substituted by:

A.4'. Politicians are "partisan," in the sense that different parties maximize different objective functions. Left-wing parties attribute a higher cost to unemployment relative to inflation than right-wing parties.

A.5". Each voter is aware of the partisan difference and votes for the party which offers the policy closer to his most preferred outcome.

The assumption of partisanship is justified by the distributional consequences of unemployment. In periods of high unemployment, low growth and low inflation the relative share of income of the upper middle class, increases and the other way around, as shown by Hibbs (1987).

Thus, this model implies that different parties choose different points on the Phillips curve: output growth and inflation should be permanently higher and unemployment permanently lower when the left is in office than with right wing governments.<sup>6</sup>

### 2.4. *"Rational partisan theory" (Alesina (1987))*

Alesina (1987) and (1988b) suggests a "rational partisan theory" (henceforth RPT). This model adopts Assumption A.1, A.2', A.3, A.4', A.5" and A.6. The objective functions of the two parties can be written as:

$$W^i = \sum_{t=0}^T \delta^t [ -(\pi_t - c^i)^2 - b^i (u_t - K^i)^2 ], \quad 0 < \delta < 1; \quad (3)$$

4. In Cukierman and Meltzer (1986) the asymmetry of information is related to the knowledge of the realization of a random shock to the economy.

5. Formally, the degree of competence is modelled by adding a term in equation (1) which changes over time and is known by the policymaker but becomes known to the voters with a lag. For an explicit test of this model on U.S. data see Alesina, Londregan and Rosenthal (1990).

6. Nordhaus' PBC and Hibbs' PT can coexist. If one assumes that politicians are both opportunistic and partisan and voters are retrospective as implied by A.5, one obtains a "weaker" form of PT which incorporates elements of pre-electoral opportunistic behaviour. See Frey and Schneider (1978) and Nordhaus (1989).

where  $i = L, R$  identifies the “left” and the “right” parties. The difference between the two parties can be summarized by at least one of these three sets of inequalities:

$$c^L > c^R \geq 0; \quad b^L > b^R \geq 0; \quad K^L < K^R \leq \frac{\bar{u}}{1-\alpha}. \quad (4)$$

The last double inequality implies the time-inconsistency problem in monetary policy pointed out by Kydland-Prescott (1977) and Barro and Gordon (1983*a, b*). Since at least one of the two parties targets a level of output growth which is above the natural rate (normalized at zero), it introduces an “inflation bias” because of the lack of pre-commitments in monetary policy. Thus, a test of the RPT is indirectly a test for this specification of policymakers’ objective functions.

This model generates a political cycle if we assume that uncontingent labour contracts are signed at discrete intervals (which do not coincide with the political terms of office) and that electoral outcomes are uncertain because of shocks to voters’ preferences or to voters’ participation rates in elections. The basic idea of the model is that, given the sluggishness in wage adjustments, changes in the inflation rate associated with changes in government create temporary deviations of real economic activity from its natural level.

More specifically, the following testable implications can be derived from the model: (i) at the beginning of a right-wing (left-wing) government output growth is below (above) its natural level and unemployment is above (below); (ii) after expectations, prices and wages adjust, output and unemployment return to their natural level; after this adjustment period, the level of economic activity should be independent of the party in office; (iii) the rate of inflation should remain higher throughout the term of a left-wing government; note that this occurs even if  $c^L = c^R$  in (3), as long as  $K^L < K^R$  or  $b^L > b^R$ . That is, the time consistent (but sub-optimal) inflation rate remains higher for left-wing parties even after the level of economic activity returns to its natural level.<sup>7</sup>

## 2.5. Previous empirical results

Most of the empirical studies on political cycles use post-war United States data. The evidence in favour of the RPT is relatively strong; evidence of “opportunistic” PBC is found for certain policy instruments (particularly government transfers) for limited sub-samples: for recent surveys of this empirical literature see Alesina (1988*a*) and Nordhaus (1989).

Multi-country studies are more scarce. Alt (1985) formally tests for partisan patterns in unemployment in twelve OECD democracies and finds evidence quite consistent with this approach. Paldam (1979) finds very weak evidence (if any at all) of Nordhaus’ political business cycle on output and unemployment using a sample of seventeen OECD countries. The same author (1989*a, b*) reports stronger evidence of partisan effects using annual data. Alesina (1989) provides some qualitative tests with annual data using the same sample of countries; his results suggest that the RPT is broadly consistent with the evidence while the same paper does not find clear evidence of PBC on growth and unemployment. Alvarez, Garrett and Lange (1991) suggest that the degree of success of “partisan policies” may depend upon the characteristics of labour market institutions and of unions’ behaviour. On the contrary, Sheffrin (1989) finds inconclusive results for

7. With the exception of Lindbeck (1976), very little attempt has been devoted to build political business cycle models (opportunistic and/or partisan) for small open economies. For such economies the exchange rate regime would greatly influence the options available to the politicians.

the RPT. However, his definition of “unexpected change” of governments is questionable. Sheffrin disregards the fact that in several countries the same party or coalition was elected repeatedly with no electoral uncertainty. (See Alesina (1991)).

The contribution of the present paper is that, unlike its predecessors, it considers all the different theories in a unified framework. Furthermore, unlike the recent work by Alesina, Paldam and Sheffrin, we use quarterly data rather than annual data and make use of different and more robust statistical tests. The use of quarterly data is important since the precise timing of cyclical fluctuations in relation to elections is crucial for the theories.

### 3. PANEL REGRESSIONS

#### 3.1. *Data*

We consider all the OECD countries which have been democracies in the sample period considered, which is 1960 to 1987. The extent of the sample is limited by availability of quarterly data; in fact, for some countries not all the series are available even for this period. The countries included are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Japan, Ireland, Italy, the Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, and the United States.

The economic data are quarterly observations on inflation, output growth, and unemployment. Inflation is defined as the yearly rate of change of the CPI from IMF, IFS. Output growth is obtained as the rate of change of real GNP (or GDP), also from IMF, IFS. For unemployment, we use the total standardized unemployment rate from OECD. More details on country specific data issues can be found in Table A-1 in Appendix. The political data are election dates, the dates of changes of governments, and the political orientation of various governments. Dates of regime changes and elections do not always coincide in parliamentary systems in which changes of coalitions take place not only after elections. This information is summarized in Table A-2. Sources for these political data are Alt (1985) and Banks (1987). The identification of changes of political orientation of governments is usually unambiguous. Whenever ambiguities occurred in the case of coalition governments, we followed Alt's and Banks' conventions. It should be noted the countries for which positive results for the partisan theory are found, are those in which there are no ambiguities about the classification of government political orientation.

#### 3.2. *Specification of empirical tests*

The most direct way of testing the various theories is to run the following panel regressions of time-series cross-section data, for instance on output growth:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} \cdots \alpha_n y_{t-n} + \alpha_{n+1} \text{PDUM}_t + \varepsilon_t \quad (5)$$

$y_t$  is the stacked vector of time-series data on output growth for the countries in the sample and PDUM is a political dummy which captures the implications of the different theories. The autoregressive specification for the dependent variable is chosen as the “best” using standard techniques. Similar regressions have been performed by McCallum (1978), Hibbs (1987), Alesina and Sachs (1988) and Alesina (1988a) on U.S. data. These tests are based upon the assumption that output growth and unemployment are generated

by a covariance-stationary stochastic process that can be expressed in autoregressive form as in (5).

Since the sample includes open economies (most of which are “small”), we must control for the effect of the world economy on domestic economies, for two reasons. First, the “partisan” or opportunistic goals of the politicians are likely to be defined, in small open economies, in relation to the rest of the world. Second, regardless of the governments’ goals, international trade and financial linkages make OECD economies highly interdependent.

We have followed three approaches to capture these effects. The first one is to redefine each country’s variable as a difference between the actual variable and a proxy for the OECD average of the same variable. The second one is to add as a regressor in equation (5) a proxy for a world or OECD average. The third one is to add time dummies in the regression. Our results concerning the relative performance of various political models are insensitive to the procedure used. As an indicator of an OECD average of each economic variable we consider the average of the seven largest economies in our sample, which are the U.S.A., Japan, Germany, France, the U.K., Italy, and Canada, weighted by each country’s share of GNP over the total.<sup>8</sup>

In the remainder of this section we present results of panel regressions on the different political theories of the business cycle. We make use of a fixed-effect model with constant slopes. By doing so we take into account differences in long-term growth rates, unemployment, and inflation across countries but we assume that the other parameters of the model are constant and equal across countries.<sup>9</sup>

### 3.3. The “rational partisan theory” (RPT)

The political dummy used is:

$$DRPTN = \begin{cases} +1 & \text{in the } N \text{ quarters starting with that of} \\ & \text{a change of government toward the right} \\ -1 & \text{in the } N \text{ quarters starting with that of} \\ & \text{a change of government toward the left} \\ 0 & \text{otherwise.} \end{cases}$$

We tested the cases of  $N = 4, 6, 8$ . This choice of number of quarters is consistent with a wage contract model in which contracts have an average length of 1 or 2 years.

Note that the variable DRPTN assumes values different from zero only following actual changes of governments, but not after every election if the same government is reappointed. According to the RPT theory, inflation surprises and thus output fluctuations may occur even if an incumbent is re-appointed unexpectedly (Alesina, 1987). However, for long periods of time in many countries in the sample certain parties repeatedly won elections with virtually no political uncertainty. Furthermore, in countries with

8. In the regressions for the seven countries included in the creation of the proxy for the OECD averages, we have used different proxies which exclude the country in the left-hand side of the regression.

9. A priori, the correct dynamic specification of the model could differ across countries but in country by country regressions we found that the same AR specification is the best for almost all the countries in the sample. However, even if the same AR specification applies to each country, the estimates of the coefficients on the dynamic part of the model could differ across countries and suggest the use of a variable-slopes and variable-intercepts model. Given the loss of degrees of freedom involved, this procedure was not adopted. Country specific results are discussed in Section 4, and more extensively in the working paper version of this article.

endogenous timing of elections, which are the large majority of the sample (see Table A-2), in every period there is at least "some" probability that an election is called and that a change of government may occur. In addition, in parliamentary systems sometimes government changes occur in the middle of a term, with no elections. Rather than trying to estimate the degree of political uncertainty in every period, which would be rather difficult, we have chosen to estimate a somewhat weaker form of RPT, testing for temporary effects on real variables after actual *changes* of governments. An additional reason for doing so, is that several macroeconomic models in the "neo-Keynesian" tradition, imply that not only unexpected, but also expected aggregate demand policy may have some real effects. Thus, according to these approaches, stronger effects should be found after actual changes of governments, with actual changes of policies, relative to the case of reappointment of the same government.

Column (1) of Table 1 reports the result of the dynamic panel OLS regressions for the entire sample of countries and the time period for which data are available.<sup>10</sup> Japan and Switzerland are not included since they had no political change in the sample.<sup>11</sup> The dependent variable  $y$  is the rate of GNP growth defined as:

$$y = \left[ \frac{X_t - X_{t-4}}{X_{t-4}} \cdot 100 \right];$$

where  $X_t$  = level of real GNP in quarter  $t$ . The regressors are self explanatory:  $yw_t$  is the world growth average (described above); the AR (2) specification has been chosen as the "best" using standard techniques; the remaining regressors are country dummies.

The political dummy DRPT 6 has the correct sign and is statistically significant at the 1% confidence level: a change in government to the right (left) leads to a transitory fall (increase) in output growth. The one quarter lag in the political dummy is consistent with a reasonable interval between change of regime (in quarter  $t$ ) and change of policy (in period  $t+1$ ). The regressions with DRPT 4 and DRPT 8 (available upon request) yield analogous results: the pattern of the coefficients suggests that partisan effects are observable from about the second to the eighth/ninth quarters after the election. These results are consistent with findings on United States data by Alesina and Sachs (1988) and Alesina (1988a).<sup>12</sup>

In column 2 of the same table we present the result of the same regression for a subset of countries which have either a "pure" two-party system or at least more clearly identifiable "left" and "right" coalitions. There are U.S., U.K., France, Germany, Australia, New Zealand, Sweden, and Canada. The other countries in the sample have more fragmented political systems with governments formed with large coalitions of parties (often centre-left) which sometimes are short-lived and unstable. For obvious reasons, the second group of countries is less likely to exhibit regular partisan cycles. In the

10. It is known that in dynamic fixed-effects panel models the correlation between the error term and the lagged dependent variables might lead to biased and inconsistent estimates of the parameters (Hsiao (1986)). The problem is serious in panel sets where the number of agents ( $N$ ) considered is large but the number of times series observations ( $T$ ) is small. In that case, the maximum likelihood estimator of the dynamic model is inconsistent even if the number of agents becomes very large (Anderson and Hsiao (1982) and Nickell (1981)). The solution to this problem is to use instrumental-variable methods such as those suggested by Bhargava and Sargan (1983) and Pakes and Griliches (1984). Our panel data set, however, does not suffer of the above problem because of the use of a long time series (usually 112 data points). In the case where the time period  $T$  is large, the parameter estimates of the standard fixed-effects dynamic model are consistent (Hsiao (1986)).

11. Our results are unaffected by the inclusion of these two countries.

12. Analogous results on the political dummy available are obtained by using as a dependent variable the difference between domestic and world growth.

TABLE 1  
*Rational partisan theory*  
*Dependent variable: rate of growth of output (Y)*

Independent variables	(1) Coefficient ( <i>t</i> -statistics)	(2) Coefficient ( <i>t</i> -statistics)	(3) Coefficient ( <i>t</i> -statistics)	(4) Coefficient ( <i>t</i> -statistics)
Constant	0.130 (0.55)	-0.180 (-0.81)	0.500 (0.80)	1.282 (3.84)
Y(-1)	0.712 (28.1)	0.610 (17.27)	0.689 (25.59)	0.543 (15.04)
Y(-2)	-0.062 (-2.55)	-0.01 (-0.28)	-0.065 (-2.46)	-0.009 (-0.24)
YW	0.353 (11.82)	0.305 (9.33)	—	—
DRPT 6(-1)	-0.41 (-3.48)	-0.62 (-4.42)	-0.412 (-3.43)	-0.573 (-4.09)
U.S.A.	-0.45 (-1.49)	0.21 (0.81)	-0.376 (-1.19)	0.250 (1.10)
U.K.	-0.63 (-2.08)	-0.02 (-0.07)	-0.703 (-2.21)	-0.118 (-0.53)
Germany	-0.36 (-1.19)	0.28 (1.09)	-0.400 (-1.25)	0.187 (0.81)
France	-0.14 (-0.45)	0.49 (1.81)	-0.205 (-0.60)	0.440 (1.80)
Canada	0.12 (0.40)	0.80 (3.06)	0.073 (0.23)	0.798 (3.44)
Italy	0.04 (0.15)	—	0.000 (0.00)	—
Sweden	-0.56 (-1.63)	—	-0.600 (-1.64)	-0.079 (-0.30)
Belgium	-0.42 (-1.40)	—	-0.443 (-1.38)	—
Austria	0.14 (0.48)	—	0.161 (0.51)	—
Norway	-0.03 (-0.10)	—	0.001 (0.00)	—
Finland	0.05 (0.15)	—	0.005 (0.14)	—
Ireland	0.46 (1.13)	—	0.621 (1.40)	—
Australia	0.03 (-0.10)	0.007 (2.67)	0.000 (0.02)	0.658 (3.44)
New Zealand	-0.48 (-1.59)	0.12 (0.48)	-0.512 (-1.60)	—
Denmark	-0.39 (-1.29)	—	-0.399 (-1.24)	—
R <sup>2</sup>	0.61	0.60	0.63	0.64
S.E.	2.24	1.61	2.23	1.60

second regression, in fact, the coefficients on the political dummy are much larger in absolute value and even more precisely estimated.

The values of the coefficients in the second column of Table 1 imply that about eighteen months after a change of regime toward the right (left) the rate of growth of GNP is about 1.3% below (above) "normal". Thus, the difference in the rate of growth between the beginning of a left-wing government and the beginning of a right-wing government reaches a peak of about 2.6%.

Columns (3) and (4) of Table 1 report the same regressions in which we added time dummies, instead of the world growth variable. The 27 time dummies, one for each year

of our sample, are not reported in the Table. Column (3) includes all the countries; column (4) the same subset of countries of column (2). The coefficient on the DRPT dummy variable is virtually unchanged, relative to columns (1) and (2). Generally, we always found that our results on the political variables are totally unaffected by substituting the "world variable" with time dummies. Therefore, in what follows we report only the result using the world variable. The corresponding results obtained using time dummies are available upon request.

In Table 2 the dependent variable is the difference ( $U_t^{DIF}$ ) between the domestic unemployment rate, ( $U_t$ ) and the "OECD unemployment rate,"  $UW_t$ , defined analogously to the average GNP growth. In evaluating results on employment one has to be cautious because of problems of hysteresis (see, for instance, Blanchard and Summers (1986)). By taking the difference of domestic unemployment from a world weighted average, unit

TABLE 2  
*Test of rational partisan theory*  
*Dependent variable:  $U^{DIF}$*

Variable	(1) Coefficient ( <i>t</i> -statistic)	(2) Coefficient ( <i>t</i> -statistic)
Constant	0.152 (3.37)	0.101 (2.92)
$U^{DIF}(-1)$	1.284 (42.25)	1.332 (39.35)
$U^{DIF}(-2)$	-0.300 (-11.14)	-0.359 (-10.49)
DRPT 6(-2)	0.063 (3.11)	0.086 (3.20)
Australia	-0.126 (-2.12)	-0.082 (-1.67)
Austria	-0.218 (-3.31)	
Belgium	-0.030 (-0.54)	
Canada	-0.128 (-2.30)	-0.051 (-1.18)
Denmark	-0.093 (-1.51)	
Finland	-0.164 (-2.80)	
France	-0.110 (-1.83)	-0.06 (-1.25)
Germany	-0.140 (-2.31)	-0.116 (-2.17)
Ireland	0.071 (1.05)	
Italy	-0.072 (-1.30)	
Norway	-0.216 (-3.13)	
Sweden	-0.208 (-3.32)	-0.198 (-3.32)
U.K.	-0.132 (-2.34)	-0.082 (-1.80)
U.S.A.	-0.138 (-2.48)	-0.061 (-1.38)
$R^2$	0.99	0.98
S.E.	0.35	0.31

roots problems are somewhat mitigated, but certainly not eliminated. Table 2 shows results which are quite consistent with those on GNP growth. The political dummy is significant at the 1% level and the fit improves when the sample is restricted to seven bi-partisan countries (note that New Zealand is missing from these regressions because of lack of quarterly unemployment data). The dummy DRPT6 is lagged two quarters to capture the slow response of unemployment to policy changes relative to output. In any case, analogous results (available upon request) are obtain if this variable is lagged only one quarter or when DRPT 4 and DRPT 8 are used. The values of the coefficients in the second column of Table 2 imply that about six quarters after a change of regime toward the right (left) the unemployment rate is about 1.5 percentage points above (below) normal.<sup>13</sup>

Let us now turn to inflation. The theory implies that one should observe permanent differences across governments on the inflation rate. Thus, we have defined a political dummy, RADM, as follows:

$$\text{RADM} = \begin{cases} +1 & \text{if a right-wing government is in office, including} \\ & \text{the quarter of the change of government} \\ -1 & \text{if a left-wing government is in office including} \\ & \text{the quarter of the change of government.} \end{cases}$$

In Table 3 the dependent variable is domestic inflation ( $\pi$ ) defined as the rate of change of CPI:

$$\pi_t = \left[ \frac{\text{CPI}_t - \text{CPI}_{t-4}}{\text{CPI}_{t-4}} \cdot 100 \right].$$

The variable for world inflation ( $\pi W$ ) is defined analogously to the world output growth.<sup>14</sup>

In the first regression, which includes the entire sample of countries, the sign of the coefficient on RADM (−1) is correct and it is marginally insignificant at the 10% level ( $t = -1.65$ ). The second regression includes only the eight “bi-partisan” countries: here the coefficient on RADM (−1) is larger and significant at the 5% level.

The value of the coefficients in the second regressions imply a difference in the steady-state inflation rate between the two regimes of about 1.4%. This relatively low value reflects the fact that our sample includes the sixties, with a low and stable inflation and countries, such as Germany, with a low inflation rate throughout the sample period. We have run the same regressions of Table 3 for the post-fixed exchange rates regimes, from 1972 to 1987. In these regressions (available upon request) the coefficient on the RADM dummy is more precisely estimated and implies (in the sample of 8 “bi-partisan” countries) a difference in the inflation rate across political regimes of about 2.5 percent.

In fact, we have tested whether all the regressions of Table 1, 2 and 3 improve in the post-1971 period, since in the fixed exchange rate period (1960–1971 in our sample) the macroeconomic policies of each countries were more constrained and integrated. All the  $t$ -statistics on the political dummies improve and the value of the coefficients increase in absolute value in the post-1971 regressions. However, the problem in pursuing this comparison, pre- and post-1971, is that there are very few changes of regimes in the pre-71 period (see Table A-1); in many countries there are *no* changes of regimes in the

13. The variable  $U_t^{DIF}$  shows a high level of persistence. Thus, even a “temporary” policy shock has rather persistent effects.

14. One could add oil prices to the equation but the inclusion of the world inflation variable already proxies for this role of world-wide oil shocks.

TABLE 3  
*Rational partisan theory*  
*Dependent variable:  $\pi$*

Variable	(1) Coefficient ( <i>t</i> -statistic)	(2) Coefficient ( <i>t</i> -statistic)
Constant	-0.075 (-0.63)	0.593 (4.80)
$\pi(-1)$	1.085 (45.54)	1.210 (35.22)
$\pi(-2)$	-0.136 (-3.92)	-0.272 (-5.15)
$\pi(-3)$	-0.097 (-4.34)	-0.074 (-2.30)
$\pi W$	0.146 (13.15)	0.127 (9.35)
RADM(-1)	-0.05 (-1.65)	-0.084 (-2.17)
Australia	0.329 (2.15)	-0.307 (-2.27)
Austria	-0.064 (-0.42)	
Belgium	0.027 (0.18)	
Canada	0.070 (0.45)	-0.580 (-3.97)
Denmark	0.352 (2.27)	
Finland	0.41 (2.65)	
France	0.333 (2.18)	-0.293 (-2.19)
Germany	-0.255 (-1.66)	-0.853 (-5.68)
Ireland	0.66 (4.22)	
Italy	0.665 (4.13)	
New Zealand	0.66 (4.27)	
Norway	0.299 (1.94)	
Sweden	0.264 (1.69)	-0.405 (-2.83)
U.K.	0.516 (3.34)	-0.14 (-1.07)
U.S.A.	-0.041 (-0.27)	-0.65 (-4.55)
$R^2$	0.94	0.95
S.E.	1.13	0.98

sixties. Thus, the political dummies in the pre-1971 regression are very imprecisely estimated and hard to compare with the post-1971 sample.<sup>15</sup>

15. We also tested whether the dynamic process of inflation has changed moving from the fixed to the flexible rate system. The regressions of Table 3 were computed allowing the coefficients on the lagged dependent variable to be different before and after 1972. The results (available upon request) confirm that inflation is significantly more persistent in the post-1972 period with flexible rates. However, our results concerning the statistical significance of the variable RADM remain unchanged, even when we allow for a structural break in 1972. These results are available.

Finally, it is worth noting that in the inflation regression several of the coefficients on the country dummies are statistically significant, indicating, as it is well known, that different countries have had substantially different average inflation rates in the sample period considered here. An often cited explanation for these country differences is the degree of Central Bank independence (Alesina (1989), Grilli, Masciandaro and Tabellini (1991), Alesina and Summers (1992)). More independent Central Banks appear to have been associated with lower average inflation rates.<sup>16</sup>

In summary, these results are quite favourable to the RPT. The implication of this hypothesis is not rejected on both the level of economic activity (growth and unemployment) and inflation, particularly for a subset of countries with more clearly identifiable government changes from left to right and vice versa.<sup>17</sup>

### 3.4. "Partisan theory" with permanent effects

Hibbs' PT implies permanent differences in output and unemployment in addition to permanent differences in inflation across governments. Thus, one way of comparing the Hibbs' PT with the RPT is to run the same regressions of Tables 1 and 2 using the "permanent" partisan dummy RADM rather than the "transitory" political dummy DRPTN. The results are shown in Tables 4 and 5: all the coefficients on the political dummy are insignificant, even though with the right sign. In these tables the fixed effects coefficients are not reported since they are very similar to those of Tables 1 and 2. Additional regressions with alternative lag structures (for instance lagging RADM more than one quarter) yield no support for the theory.

TABLE 4  
*Partisan theory (Hibbs)*  
*Dependent variable: Y*

Variable*	(1) Coefficient (t-statistic)	(2) Coefficient (t-statistic)
Constant	0.12 (0.51)	-0.17 (-0.79)
Y(-1)	0.720 (28.47)	0.629 (17.76)
Y(-2)	-0.061 (-2.53)	-0.01 (-0.26)
YW	0.349 (11.62)	0.289 (8.77)
RADM (-1)	-0.03 (-0.54)	-0.02 (-0.35)
R <sup>2</sup>	0.61	0.59
S.E.	2.25	1.61

\* The estimated regression includes country fixed effects that are not reported in the table.

16. We thought about adding as a regressor in the inflation equation one of the index of Central Bank independence; (see for instance Alesina and Summers (1992)). However, such index assign numerical values to different countries and these numbers do not vary over time. Therefore, the country dummies which are already included in the regression capture the same effect.

17. The significance of the coefficients of the political dummies in Tables 1, 2 and 3 is not due to the predominant influence of any single country. If one drops any of the 16 countries and retains the other 15, the coefficients on the political dummies remain significant.

TABLE 5  
*Partisan theory (Hibbs)*  
 Dependent variable:  $U^{DIF}$

Variable	(1) Coefficient ( <i>t</i> -statistics)	(2) Coefficient ( <i>t</i> -statistics)
Constant	0.14 (3.41)	0.016 (0.62)
$U^{DIF}(-1)$	1.29 (49.0)	1.43 (41.1)
$U^{DIF}(-1)$	-0.20 (-11.3)	-0.45 (-12.7)
RADM(-1)	0.009 (1.00)	0.0009 (-0.09)
$R^2$	0.98	0.98
S.E.	0.33	0.24

\* The estimated regression includes country fixed effects that are not reported in the table.

An additional test confirmed our results. We defined a new dummy variable DPRTNX, which is the "complement" of the DRPTN variable; that is, it takes the value of 1 during right-wing governments *after* the first  $N$  quarters, and -1 *after* the first  $N$  quarters of left-wing governments. We added this new variable in our panel regressions of Tables 1 and 2. The coefficient on this variable has the opposite sign to the DRPTN dummies and is statistically insignificant. The coefficients on the DRPTN dummies, instead, remain statistically highly significant. This test confirms that the effects of changes of governments on growth and unemployment are transitory.

The results on the RPT and PT viewed together, indirectly provide some empirical support to the inflation-bias model of Kydland and Prescott (1977) and Barro and Gordon (1983*a, b*). In fact, our regressions show that a permanent difference in inflation rate is associated with temporary deviations of output and unemployment from trend. Thus, the governments that are more concerned about growth and unemployment relative to inflation, after a temporary initial expansion, are caught in the sub-optimal equilibrium with an inflation bias. In fact, inflation remains high even though the level of economic activity returns to its "natural" value. This is precisely the feature of the sub-optimal time-consistent equilibrium.

### 3.5. The "political business cycle"

Nordhaus' (1975) PBC model can be tested on growth and unemployment by constructing a political dummy of the following form:

$$NRDN = \begin{cases} 1 & \text{in the } (N-1) \text{ quarters preceding an election} \\ & \text{and in the election quarter} \\ 0 & \text{otherwise.} \end{cases}$$

We have chosen  $N=4, 6$  and  $8$ . A relatively short pre-electoral output expansion is consistent with this theory, which views the electorate as short-sighted, Nordhaus (1975, 1989). Furthermore, since in many countries in the sample several elections occur in less

than four year intervals, a longer specification of the pre-electoral period seems unreasonable.

Tables 6 and 7 report the results on output and unemployment for the 18 countries in the sample, using NRD 6. (The fixed-effect coefficients are not reported.) In both tables the coefficients of NRD 6 are insignificant; in the growth regression the coefficients has the opposite sign from the theory prediction. Several alternative specifications with NRD 4 and NRD 8, using the difference of domestic growth from the world as the dependent variable and alternative lag structures, yield no support for the theory. In fact, the coefficient on the political dummy has the "wrong" sign in the majority of the regressions.

We also tested whether the NRD dummy approaches statistical significance, when partisan effects are held constant. Regressions including both the DRPT and the NRD

TABLE 6  
*Test for political business cycle theory*  
*Dependent variable: Y*

Variable*	(1) Coefficient ( <i>t</i> -statistic)	(2) Coefficient ( <i>t</i> -statistic)
Constant	0.12 (0.49)	-0.19 (-0.81)
Y(-1)	0.732 (29.49)	0.631 (17.27)
Y(-2)	-0.059 (-2.48)	-0.015 (-0.43)
YW	0.344 (12.02)	0.280 (8.47)
NRD 6	-0.09 (-0.78)	0.06 (0.49)
R <sup>2</sup>	0.65	0.60
S.E.	2.25	1.73

\* The estimated regression includes country fixed effects that are not reported in the table.

TABLE 7  
*Political business cycle theory*  
*Dependent variable: U<sup>DIF</sup>*

Variable*	(1) Coefficient ( <i>t</i> -statistic)	(2) Coefficient ( <i>t</i> -statistic)
Constant	0.166 (3.75)	0.020 (0.68)
U <sup>DIF</sup> (-1)	1.323 (51.02)	1.433 (39.67)
U <sup>DIF</sup> (-2)	-0.336 (-12.81)	-0.446 (-12.08)
NRD 6	-0.011 (-0.64)	-0.001 (-0.63)
R <sup>2</sup>	0.99	0.98
S.E.	0.32	0.24

\* The estimated regression includes country fixed effects that are not reported in the table.

dummies were run, with no support for the PBC, while the DRPT dummy remained statistically significant (results are available).<sup>18</sup>

The PBC not only as formulated in Nordhaus (1975) but also, with caveats discussed above, in the "rational" models by Rogoff and Sibert (1988) and Persson and Tabellini (1990) implies an increase of the inflation rate around elections. Furthermore, governments may prefer to raise prices under their direct control after, rather than before elections, thus directly contributing to a post-electoral upward jump in inflation. We have tested this implication in Table 8, where the dummy ELE is defined as follows:

$$\text{ELE} = \begin{cases} 1 & \text{in the 4 quarters following an election, and in} \\ & \text{the election quarter.} \\ 0 & \text{otherwise.} \end{cases}$$

The dummy ELE is significant at the one per cent level. Additional regressions (available upon request) confirm that the upward jump in inflation does not occur before the election, but only in the election quarter and lasts three to five quarters.<sup>19</sup> If confirmed by direct findings on policy instruments, this result suggests that around elections monetary and fiscal policy instruments may be manipulated, even though these policies do not seem to affect real economic activity, as implied by Rogoff and Sibert (1988) and Rogoff (1990). Alesina, Cohen and Roubini (1992) present evidence on monetary and fiscal policy instruments which is consistent with this hypothesis.

Up to this point, the different theories have been tested separately, that is by including only one political dummy variable in each regression. Our results were also confirmed

TABLE 8  
*Political business cycle*  
*Dependent variable:  $\pi$*

Variable	Coefficient ( <i>t</i> -statistic)
Constant	-0.131 (-1.08)
$\pi(-1)$	1.078 (46.90)
$\pi(-2)$	-0.113 (-3.36)
$\pi(-3)$	-0.113 (-5.23)
$\pi W$	0.141 (13.09)
ELE	0.263 (4.61)
$R^2$	0.93
S.E.	1.14

\* The estimated regression includes country fixed effects that are not reported in the table.

18. An even more extreme version of this model of voters' myopia would imply that they ignore the influence of the world economy on their countries' performance and thus politicians simply attempt to expand their economies, regardless of the world economy. This hypothesis can be tested running the same regressions of Tables 6, 7 without correcting for the effect of the world economy. The results (available upon request) show no support for the PBC.

19. The statistical significance of the coefficient on ELE is unaffected by allowing for a structural break of the inflation process in 1972. See also footnote 15.

when we ran a general nesting model. Specifically, we estimated regressions on growth and unemployment in which all three dummy variables, DRPT, RADM and NRD were included. Only the DRPT variable was significant. We also calculated an *F*-test comparing the unrestricted model with all the three political variables and the restricted model with only the DRPT: for both samples of countries we could not reject the restricted model, at very high levels of significance.

As far as inflation is concerned, we tested whether the two dummies RADM and ELE remain jointly significant when used as regressors in the same equation. For the smaller group of eight countries we reject the hypotheses that either one and both variables are zero. *F*-tests reject models in which either one or both variables are excluded. For the complete sample of countries, our *F*-tests continue to reject the hypothesis that the coefficient on ELE is zero, but we cannot reject, at standard levels of confidence, the hypothesis that the coefficient on RADM is zero. These different results on the two samples of countries are consistent with the evidence presented in Tables 3 and 8 above.<sup>20</sup>

#### 4. COUNTRY RESULTS

In this section we summarize the results obtained by performing country by country regressions with the same specification of the panel regressions. These results are presented more extensively in the working paper version of this article (NBER Working Paper no. 3478).

We begin with the RPT. Growth and unemployment regressions were run for each country using six dummies DRPTN ( $-J$ ) with  $N = 4, 6, 8$  and  $J = 1, 2$ . Countries may differ with regard to the time delay in implementing a new policy after a regime change or with regard to how persistent the transitory increase in output will be after the policy change. This is why the most appropriate specification for the DRPTN dummy may vary across countries. For inflation we run regressions using the dummy RADM ( $-J$ )  $J = 1, \dots, 5$ . Longer lags for inflation, relative to the growth regression, can be easily explained by the lag between output and inflation movements following changes in macroeconomic policies. Our results can be summarized in three points.<sup>21</sup>

(1) In seven countries, Australia, Denmark, Germany, France, New Zealand, the U.S., and the U.K., all the regressions on growth, inflation and unemployment show evidence favourable to the RPT, although not all the coefficients on the political variables are significant at the usual confidence levels (5 or 10%) in every regression. The results on the U.K. are greatly strengthened if the sample is restricted to the post-fixed rates period.<sup>22</sup>

(2) In seven other countries, Austria, Belgium, Finland, Ireland, the Netherlands, Norway, Sweden, the coefficients on the political dummies exhibit the sign predicted by the theory sometimes approaching statistical significance, in either the growth and/or the unemployment regressions. No significant results were found in the inflation regressions. For example, Sweden has a very strongly significant coefficient on DRPT 6 in the growth equation.

20. All the results of these *F*-tests are available from the authors. Also, there is no difference in the results of these tests regardless of whether we use time dummies or "world variables".

21. All the regressions from which the following results are derived are displayed in the NBER Working Paper version of this paper.

22. The significant difference between the pre- and post-1971 results for the U.K. is explained primarily by the observation of the Labour government elected in October 1964. This government, constrained by a commitment not to devalue the pound, could not pursue expansionary policies.

(3) Canada and Italy show no significant coefficients in any regressions. The case of Canada, however, is explained by the almost perfect correlation between the U.S. and Canadian business cycle. In fact the U.S. political dummies are statistically quite significant (five percent confidence level) in the Canadian equations! Thus, it is not clear whether for the purpose of this paper Canada really provides an independent observation.

In summary, six of the eight countries with more clearly identifiable left-right governments (that is the U.S., Germany, France, the U.K., Australia, and New Zealand) plus Denmark exhibit evidence of RPT effects.<sup>23</sup> All the parliamentary systems with large coalition governments show little sign of RPT, particularly on inflation.<sup>24</sup>

We find that the implications for growth and unemployment of the PT with permanent effects are rejected in every country except for Germany and for the borderline case of Sweden. All the other countries clearly reject the theory; in several cases the sign of the coefficient on the political dummy is opposite to the theory prediction.

In order to test the implication of the PBC model, we run the unemployment and growth regressions trying both the NRD 4 and NRD 6 dummies. In four countries, Germany, Japan, U.K. and New Zealand the coefficient on at least one of the NRD's is significant. In Australia and France the coefficients have the sign inconsistent with the theory and are statistically significant. In all the other countries the coefficients are insignificant.

Finally, we performed the PBC regressions on inflation, using the dummy ELE as for the panel regressions of Table 8. Several countries, such as Denmark, France, Germany, Italy, and New Zealand show significant (ten percent or better) post-electoral upward jumps in the inflation rate. In several other countries (e.g. Japan, Norway, and U.K.) the sign is correct but the *t*-statistic does not reach a significant level, although is above 1.

In summary, in only two countries, Germany and New Zealand, both the level of economic activity and the inflation rate follow the predictions of Nordhaus' PBC model. The results for New Zealand are not too unexpected, given that, until recently this country had one of the least independent Central Banks. On the contrary, the case of Germany, with a Central Bank with a strong reputation for independence, appears somewhat surprising.<sup>25</sup>

## 5. TESTS OF THE RPT MODEL USING HAMILTON'S MODEL

One of the strongest and most interesting results which we have highlighted thus far, is that downturns and upsurges in growth tend to follow changes of governments, as predicted by the RPT. In this section we pursue this observation further by deriving direct measures of the dating of the business cycle in different countries and study their relation to the dates of government changes. From a conceptual point of view, the recent

23. Our results regarding the RPT theory on output growth and unemployment are confirmed by another set of regressions in which we used a distributed lag of the variable representing the changes in partisan regime, instead of the DRPT variable. For the countries with a significant DRPT effect we find that an *F*-test on the distributed lag variable rejects the null hypothesis that the sum of all coefficients is equal to zero.

24. A referee has noted that in this group of eight countries we have several "large" economies, while many of the countries with coalition governments are small and very open economies and has suggested that it may be the size and the degree of openness of the economy which affect the government's ability to implement partisan macroeconomic policies.

25. It is interesting to note that in his original paper, Nordhaus (1975) had found support for his theory precisely on these two countries!

literature on unit roots and GNP has offered a number of alternative approaches to the problem of distinguishing between trend and cyclical components of output. Most of the literature<sup>26</sup> is based on the assumption that GNP growth is characterized by a linear stationary process.

TABLE 9

*Test of the RPT model using Hamilton's filter for the business cycle*  
*Dependent variable: probability of being in a low (relative to average*  
*OECD) growth state. Panel regressions on seven bi-partisan countries*

Variable	Estimated coefficient	t-statistic
Constant	0.09	4.74
PROBS ( $t-1$ )	0.82	38.43
DRPT 6	0.046	3.10
United States	-0.08	-3.26
Germany	0.05	2.33
France	0.002	0.01
Australia	-0.024	-1.05
Canada	-0.020	-0.891
Sweden	-0.029	-1.14
$R^2 = 0.80$		
S.E. = 0.167		

TABLE 10

*Test of the RPT model using Hamilton's filter for the business cycle*  
*Dependent variable: probability of being in a low (relative to average OECD) growth state. Time series regressions*  
*on seven bi-partisan countries*

Country	Constant	Lagged dep. variable	DRPTN	R <sup>2</sup>	D.W.
United States	0.02 (1.55)	0.73 (12.0)	0.08 <sup>a</sup> (3.07)	0.67	2.08
Germany	0.14 (3.31)	0.83 (16.9)	0.06 <sup>a</sup> (1.59)	0.80	1.60
France	0.04 (1.65)	0.92 (23.9)	0.09 <sup>b</sup> (2.10)	0.88	1.83
Australia	0.11 (3.04)	0.71 (10.4)	0.10 <sup>c</sup> (1.83)	0.53	1.98
Canada	0.05 (2.01)	0.85 (16.7)	0.04 <sup>b</sup> (0.71)	0.73	1.93
Sweden	0.13 (3.80)	0.62 (6.66)	0.05 <sup>c</sup> (2.04)	0.51	1.96
United Kingdom	0.20 (4.68)	0.61 (7.73)	0.02 <sup>b</sup> (0.81)	0.37	1.95
United Kingdom	0.21 (4.52)	0.56 (6.19)	0.06 <sup>a</sup> (1.87)	0.41	1.93

<sup>a</sup> DRPT 6.

<sup>b</sup> DRPT 4.

<sup>c</sup> DRPT 8.

<sup>d</sup> 1967-1987 Sample.

26. See Nelson and Plosser (1982), Campbell and Mankiw (1987), Watson (1986), Clark (1987), King, Plosser, Stock and Watson (1987).

Hamilton (1989) studies the implications of specifying the first differences of log GNP as a non-linear stationary process. His idea is to view the economy as characterized by two states, a high-growth (expansion) state and a low-growth (recession) state and model the switch between these two states as being governed by a Markov process. One of the bi-products of the estimation of the model is a non-linear filter that delivers optimal estimates of the dating of the business cycle based on past observations on output. In particular, for each quarter the filter provides an estimate of the probability that the economy is in a recession (or a boom) given the information available in the data. Given Hamilton's success in characterizing the U.S. business cycles, using his filter, we used the same statistical approach to derive estimates of the dating of the business cycle for other OECD countries in our sample. After having done that, we tested the relation between these estimates of the business cycle and the changes of governments.

Given the positive evidence in favour of the RPT model for countries with a political system close to a two-party structure, we have considered only these countries.<sup>27</sup> To control for the effects of the world business cycle on the growth rate of the various economies, in our maximum likelihood estimates of Hamilton's model we use  $y^{DIF}$  (defined as the difference between country  $i$  growth rate and the average growth rate of the major OECD countries) as the two-state variable to be explained.

Once we have obtained an estimate of the dating of the business cycle, we perform a regression of the estimated probability (PROBS) of being in a low-growth state (relative to the OECD average) on a constant, the dummy for the RPT model (DRPTN) and the first lag of the dependent variable. The latter is introduced to capture the observed persistence of the probability of being in a particular state of the world. The basic regressions is:

$$\text{PROBS}_t = \alpha_0 + \alpha_1 \text{PROBS}_{t-1} + \alpha_2 \text{DRPTN}_{t-1} + \varepsilon_t. \quad (6)$$

Table 9 reports the results of fixed-effects panel regressions of equation (6) above for 7 countries with a political structure close enough to a two-party system, as discussed above.<sup>28</sup> The political variable (DRPT 6), used to capture the effects of the RPT model, has the correct sign and is statistically significant at the 1% confidence level.

In Table 10 we report the results of separate time series regressions for each of the seven countries considered. The coefficient on the RPT dummy (DRPT) is significant at the 10% confidence level or better in five of the seven countries: United States, Germany, France, Australia and Sweden. The DRPT coefficient for the United Kingdom is significant (at the 10% level) only if we start the sample in 1970 (as discussed in Section 4). The seventh country, Canada does not show statistical significance for the RPT variable, as discussed in the previous section.

## 6. CONCLUSIONS

The most interesting result of this paper is that the more recent models of political cycles significantly outperform their predecessors. The rational partisan model by Alesina (1987) and the rational "opportunistic" model by Rogoff and Sibert (1988) are consistent with the overall pattern of results for several countries.

27. Given our country results, Hamilton's tests on the other countries are not likely to support the theory.

28. New Zealand is excluded because of lack of quarterly data.

The main findings of this paper can be summarized as follows:

(1) With the exception of two countries (Germany and New Zealand), we found no evidence of a systematic opportunistic cycle of the Nordhaus type either for output or unemployment.<sup>29</sup>

(2) The data show an electoral cycle on the inflation rate, consistent with the models of budget cycles of Rogoff and Sibert (1988).

(3) The implications of the “rational partisan theory” are consistent with the empirical evidence particularly for a subset of countries with a bi-partisan system or with clearly identifiable movements from left to right and vice-versa. This theory is less applicable, and in fact tends to fail, in countries with large coalition governments with frequent government collapses.

(4) The “partisan theory” with permanent effects on output and unemployment is generally rejected.

Thus, a political cycle which seems to appear fairly consistently in several countries is the following: left-wing governments expand the economy when elected; for a while (about 2 years) they succeed, then inflation expectations adjust and the economy returns to its natural rate of growth. At this point, left-wing governments are trapped into the time-consistent equilibrium with an inflation bias à la Barro and Gordon (1983*b*). Note that, when left-wing governments approach the new election in this high inflation, they may try to reduce the latter, particularly if inflation is perceived as the main economic problem of the time (Lindbeck (1976)). When right-wing governments are elected they fight inflation, causing a recession or a growth slowdown. Later in their term, the economy goes back at its natural rate of growth and inflation remains low.

Two explanations can account for the relatively little evidence of a Nordhaus-type opportunistic cycle on growth and unemployment: first, a “rational” electorate imposes a limit on this behaviour; an excessive attempt to pursue opportunistic policies may be perceived as counterproductive by policymakers. Second, it may be quite difficult to create expansions precisely timed before elections.

However, the results on post-electoral inflation increase may signal the occurrence of pre-electoral opportunistic budget policies. In fact, Alesina (1989) and Alesina, Cohen and Roubini (1992) show that budget deficits and money growth tend to increase in election years in several OECD democracies. Similar evidence on budget cycles in the U.S. is also discussed in Tufte (1978), Alesina (1988*a*), and Nordhaus (1989). Pre-electoral fiscal “favours” to key constituencies may be electorally very useful and easy to implement, relative to an attempt to increase the rate of growth of GNP. These opportunistic monetary and fiscal policies can very well co-exist with the partisan cycles found in the data. Even “partisan” politicians prefer to be in office, rather than out; by being in office they can implement their desired goals. Thus, they may engage in short term pre-electoral opportunistic policies if the latter enhance their chances for re-election.

29. Following Ito (1990), in the Working Paper version of this article, we also tested for an opportunistic model with “endogenous timing of elections.” We checked whether the probability that early elections are called is affected by the state of the economy. We confirmed Ito’s results on Japan, but we did not find supporting evidence for this hypothesis in any other country in our sample.

## APPENDIX

TABLE A-1

*Description of data*

*Inflation:* Inflation is obtained as:  $\pi_t = [(P_t - P_{t-4}) / P_{t-4}] \times 100$  where  $P_t$  is the Consumer Price Index in quarter  $t$ . For all countries the sample is 1960:1, 1987:4, and CPI is taken from line 64 of IMF-IFS.

*Output and Unemployment:* Country-by-country sample and sources.

*Note:* Countries which use other measures of GDP do so because real quarterly GDP is not available.

Australia	GDP—real quarterly GDP from OECDMEI (1960:1–1987:4). Unemployment—unemployment rate—adjusted—OECDMEI (1965:1–1987:4).
Austria	GDP—real quarterly GDP from IMF-IFS (1960:1–1987:4). Unemployment—unemployment rate—total—adjusted—OECDMEI (1969:1–1986:4).
Belgium	GDP—quarterly Industrial Production from OECDMEI (1960:1–1987:4). Unemployment—unemployment rate—total insured—adjusted—OECDMEI (1960:1–1987:4).
Canada	GDP—real quarterly GDP from IMF-IFS (1960:1–1987:4). Unemployment—unemployment rate—total—adjusted—OECDMEI (1960:1–1987:4).
Denmark	GDP—real ANNUAL GDP from IMF-IFS (1960:1–1987:4) (converted into quarterly data by assuming that quarter-to-quarter annual change corresponds to year-to-year change). Unemployment—unemployment rate—registered unemployed—adjusted—OECDMEI (1970:1–1987:4).
Finland	GDP—real quarterly GDP from IMF-IFS (1970:1–1987:4). Unemployment—unemployment rate—total—adjusted—OECDMEI (1960:1–1987:4).
France	GDP—real quarterly GDP from IMF-IFS (1965:1–1987:4). Unemployment—unemployment rate—total—adjusted—OECDMEI (1967:1–1987:4).
Germany	GDP—real quarterly GDP from IMF-IFS (1960:1–1987:4). Unemployment—unemployment rate—adjusted—OECDMEI (1965:1–1987:4).
Ireland	GDP—quarterly Industrial Production from OECDMEI (1975:1–1986:4). Unemployment—unemployment rate—adjusted—OECDMEI (1975:1–1987:4).
Italy	GDP—real quarterly GDP from IMF-IFS (1960:1–1987:4). Unemployment—unemployment rate—adjusted—OECDMEI (1960:1–1987:4).
Japan	GDP—real quarterly GDP from IMF-IFS (1960:1–1987:4). Unemployment—unemployment rate—adjusted—OECDMEI (1965:1–1987:4).
Netherlands	GDP—quarterly Industrial Production from OECDMEI (1960:1–1987:4). Unemployment—unemployment rate—registered unemployed—OECDMEI (1971:1–1987:4), no adjusted available.
New Zealand	GDP—real ANNUAL GDP from IMF-IFS (1960:1–1987:4) (converted into quarterly data by assuming that quarter-to-quarter annual change corresponds to year-to-year change). Unemployment—not available.
Norway	GDP—real ANNUAL GDP from IMF-IFS (1960:1–1987:4) (converted into quarterly data by assuming that quarter-to-quarter annual change corresponds to year-to-year change). Unemployment—unemployment rate—adjusted—OECDMEI (1972:1–1987:4).
Sweden	GDP—real quarterly GDP from IMF-IFS (1969:1–1987:4). Unemployment—unemployment rate—total insured—adjusted—OECDMEI (1969:1–1983:4).
Switzerland	GDP—real quarterly GDP from IMF-IFS (1967:1–1986:4). Unemployment—ratio of total unemployed to labor force—adjusted—OECDMEI (1974:4–1987:3).
U.K.	GDP—real quarterly GDP from IMF-IFS (1960:1–1987:4). Unemployment—unemployment rate—registered—civilian—adjusted—OECDMEI (1960:1–1987:4).
U.S.A.	GDP—real quarterly GDP from IMF-IFS (1960:1–1987:4). Unemployment—unemployment rate—total—adjusted—OECDMEI (1960:1–1987:4).

TABLE A-2

*Election and regime change*

E = Election; CH L = Change Left; CH R = Change Right

**AUSTRALIA: Endogenous Timing, 3 Yrs**

1961:4	E	RIGHT	a
1963:4	E		
1966:4	E		
1969:4	E		
1972:4	E	CH L	
1974:2	E		(*)b
1975:4	E	CH R	
1977:4	E		
1980:4	E		
1983:1	E	CH L	
1984:4	E		(*)
1987:3	E		

**BELGIUM: Endogenous Timing, 4 Yrs**

1961:1	E	RIGHT	
1965:2	E		
1968:1	E	CH L	
1971:4	E		
1973:1		CH R	
1974:1	E		
1977:2	E	CH L	
1978:4	E		(*)
1981:4	E	CH R	
1985:4	E	CH L	
1987:4	E		

**DENMARK: Endogenous Timing, 4 Yrs**

1960:4	E	LEFT	
1964:3	E		
1966:4	E		
1968:1	E	CH R	(*)
1971:3	E	CH L	
1973:4	E	CH R	
1975:1	E	CH L	(*)
1977:1	E		
1979:4	E		
1981:4	E		
1982:3		CH R	
1984:1	E		
1987:3	E		

**FRANCE: Endogenous Timing, 5 Yrs**

1962:4	E	RIGHT	
1967:1	E		
1968:2	E		(*)
1973:1	E		
1978:1	E		
1981:2	E	CH L	
1984:3		CH R	
1986:1	E	CH R	

**AUSTRIA: Endogenous Timing, 4 Yrs**

1959:2	E	RIGHT	c
1962:4	E	E	
1966:1	E	CH R	
1970:1	E	CH L	
1971:4	E		(*)
1975:4	E		
1979:2	E		
1983:2	E	CH R	c
1986:4	E	CH R	

**CANADA: Endogenous Timing, 5 Yrs**

1962:2	E	RIGHT	
1963:2	E	CH L	(*)
1965:4	E		
1968:2	E		
1972:4	E		
1974:3	E		(*)
1979:2	E	CH R	
1980:1	E	CH L	(*)
1984:3	E	CH R	

**FINLAND: Endogenous Timing, 4 Yrs**

1962:1	E	LEFT	
1963:4		CH R	
1966:1	E	CH L	
1970:1	E		
1972:1	E		
1975:3	E	CH R	
1977:2		CH L	
1979:1	E		
1983:1	E	CH R	
1987:1	E	CH R	

**GERMANY: Endogenous Timing, 4 Yrs**

1961:3	E	RIGHT	
1965:3	E		
1966:4		CH L	c
1969:3	E	CH L	
1972:4	E	CH R	
1976:4	E		
1980:4	E		
1982:4		CH R	
1983:1	E		
1987:1	E		

## IRELAND: Endogenous Timing, 5 Yrs

1961:4	E	RIGHT	
1965:2	E		
1969:2	E		
1973:1	E	CH L	
1977:2	E	CH R	
1981:2	E	CH L	
1982:1	E	CH R	(*)
1982:4	E	CH L	(*)
1987:1	E		

## ITALY: Endogenous Timing, 5 Yrs

		RIGHT	
1962:4		CH L	
1963:2	E		
1968:2	E		
1972:2	E		
1974:4		CH R	
1976:2	E	CH L	
1979:2	E		
1983:2	E		
1987:2	E		

## JAPAN: Endogenous Timing, 4 Yrs

1960:4	E	RIGHT	
1963:4	E		
1967:1	E		
1969:4	E		
1972:4	E		
1976:4	E		
1979:4	E		
1980:2	E		(*)
1983:4	E		
1986:3	E		

## NETHERLANDS: Endogenous Timing, 4 Yrs

1959:1	E	RIGHT	
1963:2	E		
1965:2		CH L	
1967:1	E	CH R	
1971:1	E		
1972:4	E		(*)
1973:2		CH L	
1977:2	E		
1977:4		CH R	
1981:2	E	CH L	
1982:3	E	CH R	(*)
1986:2	E		

## NEW ZEALAND: Endogenous Timing, 3 Yrs

1960:4	E	RIGHT	
1963:4	E		
1966:4	E		
1969:4	E		
1972:4	E	CH L	
1975:4	E	CH R	
1978:4	E		
1981:4	E		
1984:3	E	CH L	
1987:3	E		

## NORWAY: Exogenous Timing, 4 Yrs

1961:3	E	LEFT	
1965:3	E	CH R	
1969:3	E		
1971:4		CH L	
1972:4		CH R	
1973:3	E	CH L	
1977:3	E		
1981:3	E	CH R	
1985:3	E		
1986:2		CH L	

SWEDEN: Exogenous Timing, 3 Yrs  
since late 60s, constitutional reform

1960:3	E	LEFT	
1964:3	E		
1968:3	E		
1970:3	E		
1973:3	E		
1976:3	E	CH R	
1979:3	E		
1982:3	E	CH L	
1985:3	E		

## SWITZERLAND: Exogenous Timing, 4 Yrs

1959:4	E	RIGHT	
1963:4	E		
1967:4	E		
1971:4	E		
1975:4	E		
1979:4	E		
1983:4	E		
1987:4	E		

## U.K.: Endogenous Timing, 5 Yrs

## U.S.A.: Exogenous Timing, 4 Yrs

					RIGHT
1959:4	E	RIGHT		1960:4	E CH L
1964:4	E	CH L		1964:4	E
1966:1	E		(*)	1968:4	E CH R
1970:2	E	CH R		1972:4	E
1974:1	E			1976:4	E CH L
1974:3	E	CH L	(*)	1980:4	E CH R
1979:2	E	CH R		1984:4	E
1983:2	E				
1987:2	E				

a RIGHT or LEFT indicates the type of government in power at the beginning of the sample which is 1959:1. We also indicate for each country whether elections dates are endogenous or exogenous and the official number of years between two elections.

b Elections denoted with an asterisk "\*" are not included in tests of the political business cycle theory because they are too close (less than two years) to previous elections. They are however included in tests of the opportunistic endogenous election model.

c Both Germany and Austria had grand coalitions of Left and Right parties. Thus, a finer administration variable was used in the the RPT inflation and partisan (Hibbs) regressions. This also explains the occurrence of a rightward shift from an already central Right leaning party.

Source: Election Dates are obtained from Banks (1989); dates of changes of government and their classification of "Right" and "Left" are obtained from Alt (1985) and Banks (1989).

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