

Variable Rational Partisan Business Cycles: theory and some evidence

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Abstract. The Variable Rational Partisan Business Cycle model is developed, where agents face uncertainty regarding the timing and outcome of the next election. The model predicts that partisan influences on the economy persist throughout the government's rule and are further influenced, in the opposite direction, by which party ruled in the previous period. Party popularity also has a causal effect on the business cycle. Finally, the effects from changes in election timing expectations are dependent on which party ruled in the previous period. Empirical results for output and unemployment in Canada, Germany, and United Kingdom yield mixed support for the model. JEL Classification: D72, E32

Le modèle des cycles d'affaires variables fondé sur le comportement du partisan rationnel : théorie et résultats. Le modèle de cycles d'affaires variables fondé sur le comportement du partisan rationnel est développé pour le cas où les agents font face à de l'incertitude quant au moment du déclenchement des élections et quant aux résultats des prochaines élections. Le modèle prédit que les influences partisanses sur l'économie persistent tout au long du mandat du gouvernement, et qu'elles sont influencées, dans la direction opposée, par le type de parti au pouvoir au cours du mandat antérieur. La popularité du parti a un effet de causalité sur le cycle d'affaires. Enfin les effets des changements dans les anticipations du moment du déclenchement des élections dépendent de quel parti était au pouvoir au cours de la période antérieure. Les résultats empiriques de la calibration du modèle pour la production et le chômage au Canada, en Allemagne et au Royaume Uni donnent des résultats mitigés.

1. Introduction

Partisan policy models are predicated on leftist parties generating higher rates of inflation than rightist parties. Hibbs' (1977) Partisan Theory (PT) developed this

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stylized fact by suggesting parties of the left place greater emphasis on controlling unemployment and increasing output, whereas parties of the right are more concerned with inflation itself, and more willing to accept higher unemployment and lower output.

Under rational expectations, such partisan policy implementation should be taken into consideration by economic agents and therefore neutralize any real business cycle effects. Alesina (1987), however, noted that policy may be uncertain in the presence of elections, since the election winner, and therefore future controller of policy, is not known with certainty. In this Rational Partisan Theory (RPT) model, uncertainty due to elections leads to short-term business cycle effects when agents form inflationary expectations as a weighted average of the parties' expected policies, and each election therefore leads to new inflation rates that differ from expectations. After the election, future policy is known until the next election, and uncertainty is absent until this next election.

Alesina's model was originally designed and tested for the United States (Alesina 1988; Alesina and Sachs 1988), but it has also been tested in a variety of OECD nations. The model has been extended by Ellis and Thoma (1991) and Heckelman (2001) to incorporate uncertainty over the timing of elections, since, with the exception of the United States, Norway, and Switzerland, election dates in the OECD nations are not fixed by constitutional law. Rather, only an upper limit is set by which date elections must be called, but they can happen earlier as well. Early elections, in fact, are typical among the OECD nations. From 1961 to 1988 only Luxembourg and New Zealand had failed to hold at least one election a full year ahead of the mandated limit, and 42 per cent of all elections during this time were held at least a full year prior to when the current government's term was set to expire (Heckelman and Berument 1998).

The studies by Ellis and Thoma (1991) and Heckelman (2001) are similar in motivation but differ in their focus. Ellis and Thoma concentrate on determining the conditions under which each party will call for an early election, by following an optimal stopping rule, given their preferences over distributional issues and the type of voter uncertainty. Election timing is exogenous in Heckelman, and comparisons are made for varying degrees of persistence in the real economy. Since there is uncertainty in every period, both predict business cycle effects to last throughout the parties' tenure, although the exact pattern differs. Neither study includes an empirical section.

My purpose in this study is to test the basic implications of this Variable Rational Partisan Theory (VRPT). The model is derived here in a simplifying format to develop empirical implications on output and unemployment, which are then tested for Canada, Germany, and United Kingdom. The results are mixed. The strongest support comes from German unemployment, where it is shown that partisan deviations occur and are maintained throughout the tenure of each party. In addition, expectations on elections, dependent on lagged party control, also affect unemployment. The results are much weaker in Canada and United Kingdom.

2. The variable rational partisan cycle model

Output is governed by the Phillips Curve relationship

$$y[t] = \tilde{y}[t] + \eta(\pi[t] - w[t]) + v[t], \tag{1}$$

where $y[t]$ is the log of real output (abbreviated hereafter simply as output) at time t ; $\tilde{y}[t]$ is the natural trend level of output; $\pi[t]$ is the actual inflation rate; $w[t]$ is the growth in real wages; $v[t]$ represents exogenous shocks, which may be serially correlated; and η is a positive parameter denoting that in the absence of any shocks, output will be above (below) trend when general prices rise faster (more slowly) than wages.

Contracts set by monopolistic labour unions stipulate nominal wages for the following period consistent with their preferences to keep real wages steady. As such, nominal wage growth is set to anticipated inflation; that is, $w[t] = E\pi[t]$. Substitution in (1) generates

$$y[t] = \tilde{y}[t] + \eta(\pi[t] - E\pi[t]) + v[t], \tag{2}$$

which reveals that output will deviate from its natural trend only when inflationary expectations are not met or from the presence of exogenous shocks beyond policy-makers' control.

The two major political parties, R and L , favour increased output but recognize the harm caused by inflation. They differ only in the relative weight they place on each. The parties attempt to minimize their loss function of the form

$$\mathcal{L}^j = \sum_{t=0}^{\infty} r^t \left(\frac{a^j}{2} (\pi[t])^2 - b^j y[t] \right); \quad j = R, L. \tag{3}$$

As Hibbs (1977) has suggested, right-wing party (R) constituencies comprise primarily white-collar workers who are hurt more by devaluation of their real assets from inflation, whereas blue-collar workers who support leftist parties (L) are more likely to face unemployment during recessions. Thus, to be in line with constituent interests, $a^L/b^L < a^R/b^R$.

Differentiation of (3) subject to the constraints of (2), taking inflationary expectations of the wage-setters as given, and rearranging terms yields

$$\pi^j[t] = \pi_*^j = (b^j/a^j)\eta; \quad j = R, L, \tag{4}$$

which implies the time-consistent target inflation rates for each party are such that $\pi_*^L > \pi_*^R$. The targets for each party are higher than the socially optimal zero inflation rate, owing to their inability to commit credibly to such a target, and they represent the 'inflationary bias' present from discretionary policy. If a zero inflation rate were announced by each party, and agents accepted it, then, in the absence of exogenous shocks, output would continue at trend levels in each period. But the government would then have an incentive to raise inflation to the targets established above, causing output to grow above trend and lower the values generated in (3).

Since rational agents are aware of the parties' incentives, they expect each party instead to follow their optimal targets regardless of any announced policy.

Denoting $L[t] = 1 - R[t]$ to be equal to 1 when party L is the majority party and 0 when party L is not the majority party, inflation can be found by

$$\pi[t] = \sum_j \pi_*^j[t]; \quad j = R, L. \quad (5)$$

In nations where electoral terms are not fixed by constitution, in every period rational wage-setters know that the party in control in the current period, when contracts are being formed, may not be in power for the following period in which the contract will be enforced. Although they do not incorporate this uncertainty on election timing into the RPT framework or empirical methodology, Alesina and Roubini note that for most nations, 'in every period there is at least "some" probability that an election is called and that a change of government may occur' (1992, 670).

If no election occurs in the next period, the inflation rate will remain the same as current. If an election does occur, however, the inflation rate may change, but only if the current majority party is voted out. Denote the probability of an election's occurring in period t conditional on there not being an election in the previous $t - 1$ periods as $\rho[t]$, and the probability of each party j 's becoming the majority party conditional on there being an election in period t as $\psi^j[t]$. Then inflation expectations take the form of

$$E\pi[t] = (1 - \rho[t]) \left(\sum_j \pi_*^j[t-1] \right) + \rho[t] \left(\sum_j \pi_*^j \psi^j[t] \right);$$

$$\sum_j \psi^j[t] = 1; \quad j = R, L. \quad (6)$$

The first term is based on the expected inflation in the event that no election occurs, in which case the party in control when the contract is formed in period $t - 1$ will also determine next period's inflation. The second term reveals that the expected inflation to prevail should an election occur depends on the predicted winning party. Thus, in any given period, as long as there is a positive probability of an election occurring, that is, $\rho[t] > 0$, the actual inflation rate that will prevail will not be equal to the expected inflation rate. This is the fundamental difference under VRPT, which can be contrasted to the RPT model, where the timing of elections is known with certainty, and thus $\rho[t] = 1$ when there is an election, and $\rho[t] = 0$ when there is not an election. In RPT, actual inflation deviates from expectations only in the election period.

The impact of this electoral uncertainty on the overall economy can be found by substituting equations (5) and (6) into (2). After some minor algebra, the reduced-form equation takes the form of

$$y[t] - \check{y}[t] = \eta(\pi_*^L - \pi_*^R)(L[t] - L[t - 1]) + \rho[t](L[t - 1] - \psi^L[t]) + v[t]. \tag{7}$$

This equation is in general form, and RPT can be seen to be a special case of the VRPT model with appropriate specification of $\rho[t]$. In particular,

$$y[t] - \check{y}[t] = \begin{cases} \eta(\pi_*^L - \pi_*^R)(L[t] - \psi^L[t]) + v[t], & \text{election period} \\ v[t], & \text{no election.} \end{cases} \tag{8}$$

In the absence of exogenous shocks, output will deviate from trend only when there is electoral uncertainty. In RPT, electoral uncertainty exists only in the electoral period, and, as such, output will deviate from its natural trend only in the electoral period. VRPT allows for electoral uncertainty to exist in any period, and, as such, output will typically differ from its natural trend even between elections.

3. Estimation of the reduced-form equations

The empirical VRPT model for output based on equation (7) is given by

$$Y[t] = k + \lambda Z[t] + v[t], \tag{9}$$

where $Y[t] = y[t] - \check{y}[t]$, $\lambda = \eta (\pi_*^L - \pi_*^R)$ and $Z[t] = \{L[t] - L[t-1] + \rho[t](L[t - 1] - \psi^L[t])\}$. Recall that $\eta > 0$ by assumption in (1) and that $\pi_*^L > \pi_*^R$ from (4). The model thus predicts that $\lambda > 0$. An analogous model can also be derived for the unemployment rate,¹ in which case $\eta < 0$ in (1), since unemployment should be below (above) trend when inflation outpaces (lags) wage growth, and thus the unemployment VRPT model would predict $\lambda < 0$.²

3.1. Data and methodology

The model will be tested using quarterly data from Canada, Germany, and the United Kingdom. As explained below, these nations are chosen because of the availability of continuous poll data needed to proxy for the expected election winner. Seasonally adjusted real GDP and seasonally adjusted civilian unemployment rates are taken from the OECD Main Economic Indicators data bank. The output data are quarterly, and to match them a quarterly unemployment series is created as an average of the monthly OECD reported rates. Trend components are estimated using the Hodrick-Prescott filtering procedure. The value of $Z[t]$ depends on which party runs the government in the current and previous quarters and the manner in which agents construct their expectations on election timing and possible election outcome.

1 For an RPT model of unemployment specific to the case of fixed elections, see Chappell and Keech (1988).

2 The only other difference in the unemployment model is that unemployment enters into the loss function in (3) as a positive additive, so the parties' target inflation rates are set to $\pi_*^L = -(b^L/a^L)\eta > \pi_*^R = -(b^R/a^R)\eta$. Equations (5) and (6) remain the same, and thus equation (7) is the same except for the sign of η .

Ellis and Thoma (1991) attempt to endogenize the timing of elections within a rational expectations partisan framework. In their model, governments call early elections 'if a stochastic noneconomic event raises its probability of success above some critical value' (731). They are able to determine that the right party's probability of calling an election is a monotonic function of time. For the left party, however, the critical value results in a non-linear differential equation for which closed-form solutions are not available. They are able to determine 'that the critical probability follows a non-linear time path' (736). Empirically, Alesina, Cohen, and Roubini (1993) determine that election timing is not a function of growth or inflation but is significantly related to the number of quarters elapsed since the previous election, which may be non-linear. Their results are consistent with the Ellis and Thoma model.

To reflect the main essence of these findings, expectations on election timing are measured by a simple counter variable. In the model $\rho[t]$ measures the continuously updated probability that an election will occur in the next period conditional on an election's not yet having been held in the previous $t - 1$ periods. For tractability this variable is proxied by the square of the ratio of number of quarters elapsed since the last election to the maximal allowable number of quarters. In this way, the conditional probability of a new election quickly following an election is low but increases at an increasing rate in every subsequent period throughout the tenure of the current government. If an election has not occurred by the next to last quarter allowed, a new election can be accurately predicted with probability 1 for the next quarter.

In their study of RPT for the United States, Chappell and Keech (1988) estimate the stochastic probability of the leftist party's winning a presidential election by predicting vote shares for the Democratic and Republican candidates based on polling surveys of presidential approval rates. This proxy measure appears to be very reasonable but is more difficult to estimate for the VRPT model, since electoral uncertainty exists in every period, not only during actual election periods. Poll responses are thus necessary for periods between elections as well, when survey results are less frequently available. Continuous poll data are not readily available for many nations, but have been collected for the three nations under consideration here.

In Germany, the Politbarometer conducts a (roughly) monthly survey in which they ask what is popularly known as 'The Sunday Question.'³ Respondents are asked, 'If an election were held this Sunday, which party would you vote for?' Survey results are available through Inter-university Consortium for Political and Social Research (ICPSR) for 1977-94. To match the availability of GNP data and cover for a few scattered missing months, the percentage of respondents favouring the Social Democratic Party (SDP) and the Christian Democratic Union (CDU) are averaged on a quarterly basis. The probability that a left government will emerge

3 I thank Helga Welsh for alerting me to this source and Dieter Roth for help in tracking down the data.

TABLE 1
Dickey-Fuller statistics for a random walk hypothesis on party popularity

	Left	Right	Left/(left + right)
Canada	-0.30	-0.98	-0.01
Germany	-0.13	-0.76	0.10
United Kingdom	-0.15	-0.96	0.28

victorious from a potential election, $\psi^L[t]$, is then defined by the ratio of poll respondents choosing SDP as a percentage of those choosing either major party. Similar poll data are taken for Canada from Gallup Canada⁴ for 1965–94 covering the Liberal and Conservative parties, and Gallup results for the United Kingdom come from Butler and Butler (1994) for 1960–93⁵ on the Labour and Conservative parties.

Kirchgässner (1985) is unable to reject a random walk model for party popularity using German monthly poll data (from a different source) for 1971–82. Under a random walk, the best prediction of party popularity for the next period would simply be the current popularity of each party. Any deviation in the next period would be due only to purely random innovations. As shown in table 1, Dickey-Fuller tests are also unable to reject the random walk hypothesis for the quarterly Politbarometer data used here from 1977:1–1994:2 for the SDP and CDU series, or for the ratio. The same holds true for the polling data from Canada for 1965:2–1994:2 and United Kingdom for 1960:1–1993:4. (These sample dates will be used in all regressions that follow.) Therefore, since we do not reject the random walk specification, the expected probability for the left party to win is proxied simply by the actual ratio of respondents favouring the left party compared with either of the two major parties, in the previous quarter when contracts are assumed to be created.

3.2. Institutional considerations

For Germany, the proxy for the probability of left party victory is somewhat problematic in that neither of the major parties comprises a majority in parliament by itself and instead forms a coalition with the Free Democrats (FDP).⁶ A further complication arises, since the FDP had aligned itself with the SDP until October 1982, when a dispute over the anticipated size of the next year's budget deficit led them to break from the existing governing coalition and throw their support behind

4 I thank Theresa Prystanski and Dorothy Hu from Gallup Canada for sending these data in a very timely fashion.

5 Additional poll data in Butler and Butler (1994) are available prior to the start of OECD data in 1960.

6 In the context of the model, it is assumed the relative weight a/b is smaller for the SDP-FDP coalition than for the CDU-FDP coalition.

CDU (Banks 1994), which in effect transformed the government from left to right without an election. For our purposes here, this transition is treated the same as an early election except that the counter-variable is not reset. (An early election was later called in March 1983.)

Germany rarely calls early elections; during the sample period only the 1982 and 1983 events occurred before the mandated four-year limit. Early elections are more frequent in Canada and Britain, where the limit is five years, but the mere theoretical possibility of partisan change in a nation before the constitutionally determined legislative limits is all that is necessary to create electoral uncertainty in the model. Since partisan change has occurred in Germany before elections had to be called, it appears reasonable that rational agents would consider the possibility.

Another consideration is that Germany was generally thought to have had a very independent Central Bank during the sample time period, which might limit the ability for the government to generate partisan inflationary policies. Even if Germany's Central Bank were committed to low inflation in general, partisan differences may still remain. Alesina (1988) presents direct evidence that inflation was not as low under the leftist governments in Germany compared with the right, although both parties achieved inflation rates lower on average than either party did for the United Kingdom or the United States, and the partisan differences were smaller. In their influential time-series empirical tests for PT and RPT, Alesina and Roubini (1992) treated Germany the same as all other nations in the pooled OECD sample, thereby discounting the importance of central bank independence.

Finally, it should be noted that the differences among the two major parties in Canada during the sample period were thought to be small (Thorburn 1995; Brodie and Jenson 1988) and that whichever party was not in power was considered only as a true opposition party waiting to take control in the event of scandal or other incompetence, but not offering radically different policy positions.⁷ Policy differences were not expected to be as drastic as European partisan differences. Alesina and Roubini (1992) did not find evidence of significantly different partisan inflation rates under the two parties in Canada.

3.3. The model estimates

The model makes predictions on deviations from the natural trend. The Hodrick-Prescott (HP) filter is used to obtain a smooth estimate of the long-term trend component. The difference between the realized series and its filtered values are treated as the dependent variable to be explained in all the presented regressions.

The detrended series for log output and unemployment shows signs of serial correlation. Breusch-Godfrey Lagrange-multiplier tests (LM) suggest the absence

7 According to Thorburn, '[t]he role of the Conservative party . . . was a guarantee against any show of Liberal arrogance or incompetence. The Conservatives were close enough to the Liberals, ideologically and in the interests they represented, that, should the Liberals become excessively corrupt, susceptible to minority pressures, radical, or incompetent, they provided a ready alternative. One did not need to move beyond the ideologically conventional to replace the old government with a new one' (1995, 208).

of remaining serial correlation when the output regressions include a first-order autoregressive residual term, as is also true for the German unemployment regression, but the Canadian unemployment regression requires an additional second-order autoregressive residual term, and the U.K. unemployment regression also includes a third-order autoregressive residual term.

Estimates for the λ coefficient are presented in table 2 for each country for detrended log output and detrended unemployment. The output regressions do not support the model for any nation, while the estimated λ coefficients in the unemployment regressions are borderline significant for Canada, strongly significant for Germany, but not significant for United Kingdom. In the next section, comparative-statics are developed which will help to illuminate the information in the reduced form of equation (7) and provide additional implications, which can be tested.

4. Implications from the VRPT model

The comparative-statics in this section will focus exclusively on the reduced-form output equation given in equation (7), whereas the unemployment implications would simply yield reversed signs.

4.1. Partisan differences

Consider, first, how the economy performs under each party overall.

$$y[t]|_{L[t]=1} = \check{y}[t] + \eta(\pi_*^L - \pi_*^R)\{1 - L[t - 1] + \rho[t](L[t - 1] - \psi^L[t])\} + v[t] \tag{10}$$

$$y[t]|_{L[t]=0} = \check{y}[t] + \eta(\pi_*^L - \pi_*^R)\{-L[t - 1] + \rho[t](L[t - 1] - \psi^L[t])\} + v[t]. \tag{11}$$

These equations suggest that in a counter-factual framework, for set expectations on election timing and winning majority party probabilities, party L would always generate higher output, compared with party R rule in that same given period. For either value of $L[t - 1]$, it holds that $y[t]|_{L[t]=1} > y[t]|_{L[t]=0}$. This implication is consistent with PT but not with RPT, in which the improved economic performance of the left party exists only in the electoral period. In all other periods in RPT, $\rho[t] = 0$ and $L[t] = L[t - 1]$, resulting in $y[t]|_{L[t]=1} = y[t]|_{L[t]=0} = \check{y}[t] + v[t]$.

These results also suggest that in VRPT the expected popularity of each party plays a role in the economy, owing to its impact on inflation expectations. Specifically,

$$\partial y[t] / \partial \psi[t] = -\eta(\pi_*^L - \pi_*^R)\rho[t] < 0, \tag{12}$$

which implies that the economy will grow more slowly the more popular is party L compared with party R . The more popular is party L , the greater the weight assigned to the high inflation state, for any non-zero probability of an election's occurring. Thus, high inflation in the next period will have a smaller impact, and a low infla-

TABLE 2
 Reduced-form estimates for the Variable Rational Partisan Cycles model

	Detrended output			Detrended unemployment		
	Canada	Germany	United Kingdom	Canada	Germany	United Kingdom
λ (t-ratio)	0.00063 (0.22)	0.0024 (0.86)	-0.00020 (-0.024)	-0.11 (1.67)	-1.51 (-3.83)	0.0080 (0.23)
D.W.	1.81	1.87	1.96	2.02	2.09	1.93
LM-test for serial correlation (p-value)	1.77 (0.18)	0.26 (0.61)	0.0023 (0.96)	0.053 (0.82)	0.97 (0.32)	0.35 (0.55)

NOTES: Estimate of λ is expected to be positive for output, and negative for unemployment. Output and unemployment are detrended using an HP filter. Regressions include a constant and first-order autoregressive error component for all output series and German unemployment, an additional second-order term included for Canada unemployment, and additional second- and third-order terms included for U.K. unemployment.

tion state will be deemed a larger surprise, relative to lower popularity for party L . In this framework, voters' perceptions of the political parties actually have a causal effect on output levels. Again, this is true in RPT only in the electoral period, whereas in standard PT, party popularity should have no direct causal effect.

To capture the dynamics of predicted fluctuations compared with natural trend, define the variable Party as a binary holding the values of +1 for periods when leftist parties govern, and -1 for periods when rightist parties govern. The coefficient on the Party variable then represents an estimate of the average partisan differences in GDP (or unemployment) around natural trend levels. VRPT predicts a negative coefficient for the popularity variable and a positive coefficient for the Party variable on GDP and the opposite for both on unemployment. PT also predicts that output will be higher on average under parties of the left, but the popularity of the party is not expected to have any impact. Under RPT, output diverges from trend only in the electoral period, but consequently is still higher *as an average* for the left. Likewise, party popularity should have an impact only during the electoral period. Regression results for each nation are presented in columns (I) of tables 3 and 4. As before, the dependent variable is alternatively the detrended log of seasonally adjusted real GDP or the detrended seasonally adjusted civilian unemployment rate, and coefficients on the error terms are not reported.

The party popularity variable coefficient is estimated to have the predicted sign in four of the six cases but is significant, at the 10 per cent level, only in the Canadian unemployment regression. The party variable always generates the predicted sign but is never statistically significant. Thus, there is not much support for partisan impacts on the economy.

4.2. Transitions and continuity

There are four possible combinations of party control during any consecutive two periods. Party L in both, party R in both, transition from party L to party R , and transition from party R to party L . First, it is necessary to evaluate whether it is better to write future contracts when the left or the right party controls policy.

$$y[t]|_{L[t-1]=1} = \check{y}[t] + \eta(\pi_*^L - \pi_*^R)\{L[t] - 1 + \rho[t](1 - \psi^L[t])\} + v[t] \quad (13)$$

$$y[t]|_{L[t-1]=0} = \check{y}[t] + \eta(\pi_*^L - \pi_*^R)\{L[t] - \rho[t]\psi^L[t]\} + v[t]. \quad (14)$$

No direct comparison can be made between equations (13) and (14), since different values of $L[t]$ will alter the conclusions.⁸ Thus, under VRPT, although party L will always generate higher output levels than party R in the current period, this does

8 Requiring $L[t]$ to hold the same values in equations (13) and (14) would force a comparison between a transition in one case, which requires an election to take place, and party continuity in the other case, which could mean either re-election or no election. This is detailed in equations (15)–(18), below.

TABLE 3
Variable Rational Partisan Cycles on detrended log output (t-ratios)

	Canada			Germany			United Kingdom		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Constant	-0.0093 (-0.069)	-0.012 (-0.13)	-0.035 (-0.22)	0.44 (0.76)	0.64 (1.04)	0.64 (1.06)	-0.028 (-0.12)	-0.029 (-0.13)	0.016 (0.074)
Left popularity ratio (lagged)	-0.023 (-0.65)	-0.023 (-0.66)	0.0098 (0.49)	0.031 (0.90)	0.048 (1.32)	0.048 (1.31)	-0.0031 (-0.58)	0.0010 (0.040)	0.0030 (0.12)
Party	0.95E-3 (0.46)	0.94E-3 (0.47)	-0.0048 (-0.73)	0.031 (0.22)	0.0021 (0.85)	0.0021 (0.84)	0.48E-3 (0.15)	-0.0031 (-0.59)	-0.0026 (-0.49)
Party (lagged)		0.18E-3 (0.070)	-0.0024 (-0.68)		-0.0061 (-3.33)	-0.0061 (-3.27)		0.51E-3 (0.16)	-0.0039 (-1.29)
Election probability \times party (lagged)			0.038 (1.14)			0.048 (1.32)			0.014 (2.31)
D.W.	1.83	1.83	1.81	1.84	1.82	1.82	1.97	1.97	1.96
LM-test for serial correlation (p-value)	1.51 (0.22)	1.51 (0.22)	1.86 (0.17)	0.42 (0.52)	0.55 (0.46)	0.54 (0.46)	0.023 (0.88)	0.023 (0.87)	0.079 (0.78)
SSR	0.047	0.047	0.043	0.0036	0.0034	0.0034	0.013	0.013	0.013
AIC	-4.87	-4.86	-4.94	-6.84	-6.84	-6.81	-6.30	-6.16	-6.31

NOTES: Party defined as +1 for left governments and -1 for right governments. Variance-covariance matrix adjusted for possible heteroscedasticity using White procedure. Regressions include a first-order autoregressive term (not shown).

TABLE 4
Variable Rational Partisan Cycles on detrended unemployment (t-ratios)

	Canada			Germany			United Kingdom		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Constant	-0.45 (-0.56)	-0.70 (-0.88)	-0.80 (-1.01)	0.49 (0.20)	0.61 (0.28)	0.76 (0.35)	0.057 (0.24)	0.11 (0.46)	0.11 (0.46)
Left popularity ratio (lagged)	0.70 (1.82)	0.52 (1.20)	0.58 (1.37)	-1.64 (-0.56)	-3.45 (-1.25)	-3.27 (-1.26)	-0.20 (-0.83)	-0.27 (-1.06)	-0.26 (-1.06)
Party	-0.057 (-1.03)	-0.020 (-0.31)	-0.022 (-0.39)	-0.33 (-0.77)	-0.98 (-3.91)	-0.97 (-3.80)	-0.0045 (-0.17)	-0.018 (-0.64)	-0.018 (-0.64)
Party (lagged)		0.11 (1.43)	0.11 (1.38)		0.92 (5.56)	1.09 (5.12)		-0.038 (-1.56)	-0.040 (-1.47)
Election probability \times party (lagged)			0.13 (0.92)			-0.72 (2.12)			0.0058 (0.13)
D.W.	2.00	2.02	2.03	2.07	2.05	2.04	1.93	1.91	1.91
LM-test for serial correlation (p-value)	0.030 (0.86)	0.14 (0.70)	0.19 (0.67)	1.02 (0.31)	1.40 (0.24)	0.80 (0.37)	0.35 (0.55)	1.16 (0.28)	1.15 (0.28)
SSR	10.10	9.95	9.88	30.72	27.34	25.87	2.31	2.29	2.29
AIC	0.52	0.52	0.53	2.37	2.32	2.10	-1.10	-1.10	-1.08

NOTES: Party defined as +1 for left governments and -1 for right governments. Variance-covariance matrix adjusted for possible heteroscedasticity using White procedure. Regressions include a first- and second-order autoregressive component for the Canada regressions, a first-order autoregressive error component for the Germany regressions, and first-, second-, and third-order autoregressive components for United Kingdom regressions (not shown.)

not necessarily hold for future output levels. Economic performance therefore depends on which party controls policy when contracts are formed in the previous period and also on which party controls policy in the current period.

Specifically, if the same party retains power for both periods we have

$$y[t]|_{L[t-1]=L[t]=1} = \check{y}[t] + \eta(\pi_*^L - \pi_*^R)\{\rho[t](1 - \psi^L[t])\} + v[t] \tag{15}$$

under continuous left-party rule, or

$$y[t]|_{L[t-1]=L[t]=0} = \check{y}[t] + \eta(\pi_*^L - \pi_*^R)\{-\rho[t]\psi^L[t]\} + v[t] \tag{16}$$

under continuous right-party rule. Similarly, the effect of party change is found by either

$$y[t]|_{L[t-1]=1, L[t]=0} = \check{y}[t] + \eta(\pi_*^L - \pi_*^R)\{-1 + \rho[t](1 - \psi^L[t])\} + v[t] \tag{17}$$

or

$$y[t]|_{L[t-1]=0, L[t]=1} = \check{y}[t] + \eta(\pi_*^L - \pi_*^R)\{1 - \rho[t]\psi^L[t]\} + v[t]. \tag{18}$$

For shorthand ease, denote the equations in (15)–(18) as a – d , respectively. Then, for given expectations on election timing and winning probabilities, and ignoring the impact of exogenous shocks, $d > a > b > c$. The effects are summarized in table 5.

As shown above, regardless of which party controlled policy when contracts were written in the previous period, party L will be expected to generate higher output levels than party R . But for a given party rule in the following period, higher output will occur if the contract was written under party R control, since this will lower inflationary expectations, the exception being when an election is predicted with probability 1 (as in RPT), in which case the parties’ inflation targets in the contract-forming period are irrelevant. Of course, whichever party rules in any given period $t - 1$, it is also more likely to be in power in period t as well (except when an election must occur in period t), and continuous rule leads to lower output levels under party R compared with party L .

In RPT, however, $\rho[t]$ is constrained to hold the binary values of 0 (no election) or 1 (election). Party continuity, represented by equations (15) and (16), can occur for either case. Continuity from re-election yields the same implications as in VRPT, although the magnitudes of the economic impacts will be enhanced. Continuity without an election has no economic impact in RPT regardless of which party is in power, since there is no uncertainty without an election. The transition equations of (17) and (18) can occur in RPT only when $\rho[t] = 1$ and, as in VRPT, transition to the left has a positive impact on output, whereas transition to the right has a negative impact on output. The effect of a transition under RPT is identical to the effect of the new party’s being re-elected and will typically be smaller than in VRPT (except when the election is held in the last possible period, so $\rho[t] = 1$). Thus, in RPT, only the current party is relevant for determining the partisan impact.

TABLE 5
Rational Partisan Theory and Variable Rational Partisan Theory model predictions for party impact

Party in power in period $t - 1$	Party in power in period t	Partisan impact		
		VRPT	RPT: $\rho[t] = 0$	RPT: $\rho[t] = 1$
L	L	$\eta(\pi_*^L - \pi_*^R) * \rho[t](1 - \psi^L[t]) > 0$	0	$\eta(\pi_*^L - \pi_*^R) * (1 - \psi^L[t]) > 0$
R	R	$-\eta(\pi_*^L - \pi_*^R) * (\rho[t]\psi^L[t]) < 0$	0	$-\eta(\pi_*^L - \pi_*^R)\psi^L[t] < 0$
L	R	$-\eta(\pi_*^L - \pi_*^R) * \{1 - \rho[t](1 - \psi^L[t])\} < 0$	-	$-\eta(\pi_*^L - \pi_*^R)\psi^L[t] < 0$
R	L	$\eta(\pi_*^L - \pi_*^R) * (1 - \rho[t]\psi^L[t]) > 0$	-	$\eta(\pi_*^L - \pi_*^R) * (1 - \psi^L[t]) > 0$

SOURCE: Equations (15)–(18)

In VRPT, party re-election has the same effect as no election, and output will be farthest above natural trend levels under a change from R to L and farthest below natural trend for a change from L to R . Future output, however, will distinguish between re-election and no election if the expected probability of a new election depends on the length of time elapsed since the last election.

VRPT also makes predictions based on party control in the previous period when contracts are written if the current party control is identified. The performance of party L depends upon whether the government is continuing or in transition, in which case the single party variable representation in (I) is underspecified. When we control for the current party, contracts written under the right party rule will tend to raise GDP more than contracts written under the left party rule. Thus, the coefficient on the lagged party variable should be negative for the output regressions and positive for the unemployment regressions, whereas PT and RPT would reject its importance.

This specification is presented in columns (II) of tables 3 and 4. Adding the lagged party variable eliminates the significance of the party popularity variable in the Canadian unemployment regression and makes the party variable significant in the German unemployment regression. The lagged party variable itself is significant and of the predicted sign in the German output and unemployment regressions. The party variable is significant only when its lag is also significant, suggesting that VRPT receives its strongest support in the case of German unemployment.

Including the lagged value of party also allows the regressions to differentiate between the four effects summarized in table 5. Highest output should occur following a transition from right to left, and the lowest output follows a transition from left to right. This would also be predicted by RPT. VRPT makes the further claim that a continuation for the leftists is more beneficial for output than a continuation under the right. RPT makes this distinction only for a re-election, since normal party continuation between elections should have no further effect. In order for the ranking of VRPT to be supported, it must be the case that the marginal impact from party control for the current period exceeds the impact from party control during the previous period (in absolute value). The point estimates suggest that this may hold true in the German unemployment regression, but a Wald test fails to reject their equivalence.⁹

4.3. Electoral uncertainty on election timing

Finally, the primary distinction in the VRPT model is the additional uncertainty associated with when partisan control of policy may change. The effect of uncertainty over the election timing is found from

$$\partial y[t]/\partial \rho[t] = \eta(\pi_*^L - \pi_*^R)(L[t-1] - \psi^L[t]). \quad (19)$$

The sign of this is indeterminate, since it depends on which party is in office when contracts are formed in the previous period. Specifically, the impact of the proba-

⁹ The Wald statistic is 0.38, with a p-value of 0.85.

bility of an election when party *L* was in power is

$$\partial y[t] / \partial \rho[t] |_{L[t-1]=1} = \eta(\pi_*^L - \pi_*^R)(1 - \psi^L[t]) > 0, \tag{20}$$

and the impact when party *R* was in power is

$$\partial y[t] / \partial \rho[t] |_{L[t-1]=0} = -\eta(\pi_*^L - \pi_*^R)\psi^L[t] < 0. \tag{21}$$

These evaluated derivatives are as expected. When party *L* controls policy, an increase in the expected probability of an election implies a higher likelihood for a change in policy, for a given popularity of party *L*. Thus, more weight is placed on the low inflation state prevailing in the next period. Specifically, from (6),

$$\partial E\pi[t] / \partial \rho[t] |_{L[t-1]=1} = -(\pi_*^L - \pi_*^R)(1 - \psi^L[t]) < 0. \tag{22}$$

If the left retains control in the next period, owing to either no election or winning an election, the ‘surprise inflation’ is greater and the economy temporarily grows faster. If an election is held and the right takes control, the subsequent surprise is not as large and the economic contraction will be lessened, compared with the situation under a lower election probability. Of course, as seen in (21), the reverse occurs if party *R* is in control when the contract is developed. The higher election probability causes the inflationary expectation to rise in (6), and thus continued lower inflation in the next period is more harmful to output, while a change to the high inflation state from a leftist victory is less unexpected and leads to a smaller expansion compared with the situation under a more unexpected election. As shown above, the election effect depends on which party controls policy when contracts are formed. The threat of an election improves output prospects (i.e., output is less hindered) under party *R* compared with the situation of no election possibility, and vice versa for party *L*.

The sign of the marginal impact of changes in the probability of an election depends on which party was in control in the previous period. To capture this dynamic, an interaction term is created between the probability of an election proxy and the lagged party variable. Since Party is constructed to have a higher value for the left, then according to equations (20) and (21), the estimated coefficient on this interaction term should be positive in the output regressions and therefore negative in the unemployment regressions. This final specification is presented in columns (III) in tables 3 and 4.

The interaction term is positive and significant only in the U.K. output regression, and negative and significant only in the German unemployment regression. Its inclusion does not affect the significance of the other variables in any of the regressions. Thus, in this final specification, all the VRPT variables are significant, except for party popularity, in the case of German unemployment. There is very little support for the model in any of the other five regressions.

5. Summary

VRPT represents the logical extension to the RPT model by incorporating a second type of electoral uncertainty, namely, uncertainty over the timing of elections in

parliamentary nations, which is present in every period. The VRPT model also answers a potential criticism of the rational expectations approach to policy. If, as in RPT, expansionist policies are expected to further expand the economy for only a short time relative to the life of each party's tenure, but inflation will be a permanent fixture of its tenure, there seems to be little incentive for leftist parties to pursue the ill-fated expansion. In the case of variable election timing, however, the partisan deviations to output are maintained.

The model incorporates several assumptions: two ideologically divergent dominant parties, a not very independent central bank that follows the governing party's intentions, and the prevalence of early elections called before the constitutional limit. It is perhaps surprising, then, that the strongest support for VRPT is in Germany, which does not fit the assumptions particularly well. The evidence is much weaker for the cases of the United Kingdom and Canada.

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