

**Politics, political competition, and the political budget cycle in Canada, 1870-2000:**

**a search across alternative fiscal transmission mechanisms**

**by**

**J. Stephen Ferris\***

stephen\_ferris@carleton.ca

and

**Stanley L. Winer\*\***

stan\_winer@carleton.ca

Third Draft, August 8 2006

\* Department of Economics

\*\* School of Public Policy and Department of Economics

Carleton University

Ottawa, Ontario, K1S 5B6

Canada

# **Politics, political competition and the political budget cycle in Canada, 1870 - 2000:**

## **a search across alternative fiscal instruments**

### **Abstract**

In this paper Engel-Granger time series methodology is used to combine trending economic variables with stationary political factors to search for well-defined political influences on central government budgets in Canada over the entire post-Confederation time period from 1870 to 2000. To motivate such an inquiry we first investigate and find evidence of partisan political influence on Canada's macro aggregates. However, because politics can influence economic outcomes only if there is a transmission mechanism through actual public policy choices, our finding of cycles in real output growth begs the question of whether such cycles arise through fiscal policy. Our analysis of three main fiscal policy instruments - public non-interest expenditure, taxation and the deficit net of interest - gives little support to any current political theory of public budgets, but does support the hypothesis that the degree of political competition matters for policy choices in both the long and short run. This new channel for the influence of politics on economic policy has not previously been isolated empirically in Canada and poses new questions in trying to reconcile the previous mixed results with respect to the influence of politics on economic aggregates.

*Key Words:* expenditure size of government, tax-share, government deficits, political competition, political business cycles, political budget cycles, monetary policy, cointegration and error correction analysis.

*JEL Categories:* H1, H3, H5

# **Politics, political competition and the political budget cycle in Canada, 1870 – 2000: a search across alternative fiscal instruments<sup>1</sup>**

## **I. Introduction**

Alesina, Roubini and Cohen (1997), Sapir and Sekkat (2002), and Bartels and Brady (2003) among many others have argued that the macroeconomic data in many countries are broadly suggestive of the cycles predicted by rational opportunistic and/or partisan political theories. These hypotheses argue that overtly political variables, such as the timing of elections and the ideology of the political party in power, can affect systematically such aggregate macroeconomic time series variables as the rate of growth of real output and/or rate of inflation. In this paper we begin an exploration of these interrelationships in Canada by asking whether such cycles can be found in the annual data covering Canada's long post-confederation time period. Because the case for a political cause to these cycles can be made compelling only if we can identify a mechanism through which political influence has been exercised, we then take up the challenge proposed by Bartels and Brady (2003) to further investigate plausible transmission mechanisms and ask whether political control was exercised through fiscal policy.<sup>2</sup> In essence we ask whether historical variations in the different dimensions of government size are consistent with the same political factors that appear to cause Canada's output cycles.

To capture the transmission process, we use Engel-Granger cointegration and error correction methodology to investigate the different ways in which the instruments of fiscal policy (expenditure, taxation, and the deficit) have been influenced by economic and political

---

<sup>1</sup> An earlier version of this paper was presented at the CEA Meetings in Montreal, May 2006. We thank Patrick Coe and Keith Acheson for comments that improved the substance and presentation of our argument.

<sup>2</sup> Bartels and Brady (2003, 159) write, "One might imagine economists reacting to Hibb's work by launching a major effort to understand the processes by which partisan politics shape economic policy and performance. However, no such effort appears underway."

factors over the 1870 to 2000 time period in Canada.<sup>3</sup> In designing our tests we wish to incorporate two potentially competing sets of concerns. First, we wish to model the extent to which both the level and changes in the level of the policy instruments reflect “economic fundamentals”, that is, reflect the underlying economic interests of the community. In addition, we would like the analysis to be able to indicate the presence of, and then distinguish among, three different routes by which distinctly political factors could have shaped economic policy.

While democratic governments would be expected to implement policies that reflect the economic concerns of their electorate, a distinctly political influence on public policy could be expected simply because economic policies are developed and implemented by agents who compete in political as well as economic markets and hence respond to political incentives. To test for this additional dimension to policy, we first use public choice (Downs 1957, Borchering 1985) to suggest a long run model of government size based on economic fundamentals. Then by adding a set of explicit political variables to the model, we can test for the presence of additional political influences on size. Second, there is a long history in economics of relying on political competition to explain why public policy choices should converge on underlying fundamentals (Stigler 1972, Becker 1983). More recently, spatial voting theory (Coughlin 1994, Hettich and Winer 1999) has formalized the role of political party competition in minimizing rent dissipation by focusing on how party platforms that cater strictly to the interests of sub-groups of voters are eliminated. Even more recently, scholars using cross country data have noted that political budget cycles appear more pronounced in newer as compared to older democracies (e.g., Schuknecht 1996, Block 2002) and have attributed this to the inexperience of voters and/or lack of relevant information needed to expose fiscal manipulation (Bender and

---

<sup>3</sup> The length of our time period and the availability of data have meant that we cannot pursue the question of how the composition of government spending/taxation has been influenced by overt political factors.

Drazen 2005). From our perspective, the continued emphasis on political competition suggests that even within a single parliamentary democracy over a long time period, changes in the degree of political competition should matter and this prompts our search for such evidence in the time series processes of fiscal instruments. Finally, there is an extensive literature (following Hibbs 1977 and Nordhaus 1975) that tests the hypotheses that political parties in power will use policy for electoral or ideological advantage, so producing political cycles in aggregate macro data. Such reasoning motivates our search for evidence of the effect of explicitly political variables (election timing, party affiliation, etc.) on Canadian fiscal policy instruments over the short run.

Our approach to analyzing these questions comes from the recognition that government policies have distinctly different long run and short run objectives that upon implementation become co-mingled in time series data. Hence any test of the role of fiscal policy in relation to either the long or short run must do more than mechanically separate deterministic/stochastic trends. Rather the analysis should use theory to derive an explicit long run - short run separation. Here we use public choice theory to model explicitly the long run level of policy instruments. Formally this involves finding a set of variables that span the relevant time period and form an essential part of a theory of long run government expenditure/tax size. Because the typical variables suggested in the literature are all  $I(1)$ , it is natural to test for evidence of a long run equilibrium relationship among that set of  $I(1)$  variables by asking whether there is evidence of cointegration among the variables (Engel and Granger, 1987). Given that a cointegrating relationship can be found, the lagged residuals from that equation can be used to form an error correction model of short run adjustment. These two equations then form our base case representing 'economic fundamentals'. By adding a set of explicit political variables to these equations we can test whether political variables add to the explanatory power of the model and, should they do so, interpret the way in which such variables matter.

Our findings pose somewhat of a paradox for accepted versions of political influence. Our results are consistent with the findings of economists such as Kneebone and MacKenzie (1999 and 2001) who find strong evidence of distinct political influence on economic outcomes. Yet following others, such as Serletis and Afxentiou (1998), we also find no evidence that fiscal policy instruments form part of the transmission process between politics and government policy. On the other hand, we do find evidence consistent with the hypothesis that the degree of political competition does matter for the evolution of government size through time and particularly with respect to fiscal policy in the short run. The latter is a novel discovery that highlights the recent attention given to the role of political competition in the literature (Besley, Persson and Sturm 2005).

The paper proceeds as follows. In Section II we motivate our analysis of fiscal policy instruments by asking if there is any evidence in Canadian time series macro data that politics matters. Our finding that the pattern of real output growth is not inconsistent with partisan political theories of the business cycle leads to our search across fiscal instruments for a mechanism(s) by which political influence has been transmitted through policy into economic outcomes. In section III we undertake that search by building a cointegration model of the long run expenditure and tax size of government. After finding evidence consistent with a long run equilibrium relationship between these measures of government size and a set of fundamental economic variables, we look for evidence of a transitory effect on size coming either from the degree of political competition or any of the other political variables that appear to be successful in explaining real output growth. Section IV extends this analysis to the error correction model and hence to the role of political factors in relation to the short run cycle. Section V reviews the consistency of our major findings for policy with the earlier political business cycle findings of Section II, and Section VI presents our conclusions.

## II. Is there any evidence of a political cycle in Canadian macroeconomic data?

We begin by asking whether there is any evidence that distinctly political factors have played an independent role in determining aggregate macroeconomic outcomes in Canada. The time series variables we consider as aggregate outcomes are real output growth (GROWTH), measured as the rate of growth of real Gross National Product (GNP), and inflation rates (INFLATION), measured as the rate of change of the GNP deflator. The descriptive statistics for these variables are found in Table 1a.<sup>4</sup> However, before we can answer whether political factors explain these measures of macroeconomic performance, we must first control for variations in output growth and inflation that arise for reasons independent of domestic electoral politics. Here we are fortunate. Because Canada is small relative to the U.S. and highly integrated with its economy, and because Canadian political choices would be expected to have little effect on U.S. economic outcomes, the growth rate of the U.S. Index of Industrial Production, USGROWTH, and the growth rate of the U.S. GDP price deflator, USINFLATION, make ideal controls for the importance of nonpolitical economic forces driving the Canadian economy.

[Table 1 here]

Given that the current and lagged values of these variables control for economic factors, the traditional reasons for expecting an independent political effect on aggregate economic outcomes come from either opportunistic or partisan motives for why political parties might

---

<sup>4</sup> Because the unemployment rate is unavailable prior to the 1920's, we cannot use it as an outcome variable. However, Heckelman (2006) finds no evidence of a rational partisan cycle in recent Canadian monthly data (spanning 1960:1 to 1993:12).

want to influence aggregate demand and so output.<sup>5</sup> Hence traditional opportunistic political theories argue that the incumbent political party will use its control over government policy to gain votes opportunistically by increasing aggregate demand in the period leading into each election (Nordhaus, 1975). This incentive is independent of the ideology of the party in power and would be observable through higher rates of real output growth in (or immediately before) the period of the election, followed, perhaps, by somewhat higher rates of inflation in the period of (or immediately following) the election.<sup>6</sup> Rational opportunistic theories invoke the Lucas Critique to critique traditional theory by emphasizing that such spending must be unanticipated to be effective and hence highlight asymmetric information and signaling as alternative reasons for the effectiveness of government spending.<sup>7</sup> To test whether the data are consistent with traditional opportunism, we use the dummy variable, ELECTIONYEAR, taking the value 1 in the year of a federal election and 0 otherwise, and look for a positive effect of ELECTIONYEAR on both GROWTH and INFLATION.<sup>8</sup> The descriptive statistics for this and other political

---

<sup>5</sup> See Alesina, Roubini, and Cohen (1997, particularly pages 36 and 62) for a convenient summary of opportunistic and partisan political theories. Haynes and Stone (1990) suggest that partisan and opportunistic effects may not be separable, where interdependence can be tested for with interaction terms. Experimentation produced no instances where such interaction was significant in our data. Another issue pointed to by Haynes and Stone - that political cycles may persist over time - is allowed for via the error-correction methodology adopted.

<sup>6</sup> Here the analysis relies on sticky prices to permit increases in aggregate demand to lead first to real output increases before following through into price effects.

<sup>7</sup> See Rogoff and Silbert, 1988. Such arguments also abstract from real effects that might arise from government redistribution, as might be observable in changes in the composition of government taxation or spending.

<sup>8</sup> In Canada, elections bunch in the spring and fall. Our criterion for dating elections was to have ELECTIONYEAR reflect the first full year in power. Hence elections arising between January 1 and June 30 were considered in the current calendar year, those after July 1 were placed in the following year. With annual dating, it is also unclear in which year the hypothesized increase in aggregate output/inflation should arise. Hence all growth equations were run with ELECTIONYEAR entered first contemporaneously and then with a lag. This produced only minor differences with no significant lagged coefficients. For the inflation equation, ELECTIONYEAR was used first then entered with a lead, the latter because inflation would be viewed by the electorate as a bad.

variables (to be discussed below) are also found in Table 1a. What is important to note is that all these political variables are stationary in levels.<sup>9</sup>

Partisan political theories, following Hibbs (1977) and others, suggest that the ideology of the political party in power will matter. Applying this to Canada, the center-left leaning Liberal Party of Canada would be expected to spend more when in power, while its more conservative rival would be expected to spend less. Hence our test for traditional partisanship is a positive sign for the effect of a one-zero dummy variable, LIBERAL (where each 1 represents a year when the Liberal Party was in power) on both growth and inflation and a negative sign for the conservative alternative (1-LIBERAL).<sup>10</sup> Because any predictable policy should be anticipated and hence incorporated into private behavior, rational partisan theories refine the traditional hypothesis by noting that it is only to the extent that the electoral outcome is uncertain that the realization of a liberal party victory could generate an unexpected boost to aggregate output (Alesina, 1987). To test the rational partisanship hypothesis we must then account for both the ideology of the party winning power and the degree of surprise in the election result. The latter we incorporate by assuming that the degree of surprise in an election is inversely related to the ex-post size of the winning majority and hence measure the degree of surprise as one minus the fraction of seats won by the winning party, (1-SEATS). The direction of the surprise is indicated by the partisan characteristic of the party in power.<sup>11</sup>

---

<sup>9</sup> The correlation among the political variables is typically low. For example, the correlation coefficient between SEATS<sup>A</sup> and SURPRISE<sup>A</sup> is -0.20 and between DURATION and SEATS<sup>A</sup> is -0.09.

<sup>10</sup> Note that because LIBERAL and (1-LIBERAL) sum to one, both cannot be included in the regression equation. For this reason we test whether the composite variable [LIBERAL – (1-LIBERAL)] is positive in its effect on growth. This preserves degrees of freedom at the cost of imposed symmetry of effect.

<sup>11</sup> We do not test whether the size of the surprise is viewed as biased against the incumbent governing party. See Heckelman (2002) who argues that Canadian data (1965-1996) is more consistent with symmetry.

Finally, the significance of partisanship for the business cycle is that depending on which party wins, the growth rate will change in the opposite direction. Hence to preserve this measure of difference, we test the traditional partisan hypothesis through the composite variable,

$$\text{PARTISAN} = \text{LIBERAL} - (1 - \text{LIBERAL}),$$

and test for rational partisanship through the composite variable,

$$\text{SURPRISE} = (1 - \text{SEATS}) * [\text{LIBERAL} - (1 - \text{LIBERAL})].$$

The coefficients of both variables are predicted to have a positive sign.<sup>12</sup>

Lastly, because the effect of a “rational” partisan electoral surprise should diminish through time, we define the following duration variable,

$$\text{DURATION} = \text{ELAPSE} * [\text{LIBERAL} - (1 - \text{LIBERAL})],$$

where ELAPSE represents the number of years since the last election. Because the stimulation to (contraction in) real output/inflation arising from a surprise Liberal (Conservative) party victory should dissipate as its victory is recognized, the coefficient on DURATION is expected to be negative.

The results of our test for political cycles in Canada’s annual macroeconomic data from 1870 through 2000 are presented in the OLS regression equations in Tables 2 and 3. Here each equation was run twice to allow for two measures of political outcome, labeled as definitions A and B. Different interpretations of the surprise in election outcomes arise in Canada (especially in the first half of the 20th century) because closely associated, nominally independent candidates often ran unopposed by the winning political party and, once elected, tended to vote with the winning party. Hence judging whether or not the seats won by these parties formed part

---

<sup>12</sup> Note that following our treatment of PARTISAN, our specification of surprise imposes symmetry on the hypothesized opposing effects of LIBERAL and (1-LIBERAL) on GROWTH and INFLATION. When the two partisan variables were run separately for surprise (corresponding to Table 2 column (2)), the two coefficients were found to have opposite signs (3.14 versus -1.64) and insignificantly different from each other in absolute value. Individually, the two partisan surprise variables were insignificantly different from zero.

of the winning majority/minority is often problematic.<sup>13</sup> In Tables 2 and 3, definition A refers to the combination of Beck's (1968) judgment of the size of the coalition that was durable through 1945 and the official results given by the Chief Electoral Officer from 1945 onwards. Definition B follows the *Canadian Parliamentary Guide* in using official party titles to count the number of seats won by any officially designated political party. The first column of the table represents the test of traditional opportunism with traditional partisanship while the remaining four columns represent the tests of opportunism with rational partisanship. Columns (2) and (4) represent the two definitions of surprise run over the entire 1870-2000 time period whereas Columns (3) and (5) retest rational partisanship over the shorter 1921-2000 sub-period (for which data are more reliable). For robustness, the equations were also run over the 1945 – 2000 time period and with the addition of a zero-one dummy variable to test for the differential importance of periods of fixed exchange rates - 1870-1914, 1926-1931, 1939-1951, 1960-1972.<sup>14</sup> The shorter time period produced no appreciable change in the form of the results (but with diminished significance) and the use of the fixed exchange rate dummy neither improved the regression fit nor was itself significant (nor were experiments interacting fixed exchange rates with different political variables).

[Tables 2 and 3 here]

The results in Table 2 illustrate that despite the importance of purely economic factors in explaining the growth rate of Canadian output, as reflected in the significance of USGROWTH and its lags, the set of political variables does assist in explaining real output growth. Of the

---

<sup>13</sup> For example, in the election of September 1926, the Canadian Parliamentary guide has the Liberal party elected with a minority of 116 out of 245 seats. Beck considers the electoral outcome as a Liberal majority of 116 plus 12 independently affiliated members for 128 out of 245 seats. For the combination of Beck and the Chief Electoral Officer, minority governments arise in 1922-26, 1957, 1962-67, 1973-74, and 1979 (15 of 131 years or 11.5% of the years). The Canadian Parliamentary Guide has minorities in 1922-30, 1957, 1962-67, 1973-74, and 1979 (19 of 131 or 14.5% of the years). The percentage of seats won exhibits a larger number of minor differences.

fourteen different political coefficients in this table, all have their predicted sign with five of the coefficient estimates significantly different from zero. A Wald test rejects the hypothesis that the political variables as a group are jointly insignificant (at ten percent or better) in four of the five equations and the remaining set would reject the null hypothesis of insignificance at the sixteen percent level.

Table 3, on the other hand, shows that the political variables have less success in explaining the movement of the inflation rate. Nevertheless, all of the political coefficient estimates still have their predicted sign and again five coefficient estimates are significantly different from zero at ten percent. On the other hand, none of the political coefficient estimates remain significant at five percent and only in the case of equation (1), the test of opportunism and traditional partisanship, is the hypothesis of no significance for the political variables as a group rejected by the data. We conclude, then, that while Canada's macroeconomic data does not contradict the hypothesis of political cycles in both annual real output growth and inflation rates over the 1870 to 2000 time period, the data gives more support to the hypothesis of political cycles in real growth rates and only limited support to the hypothesis of a political cycle in the inflation rate.<sup>15</sup>

We turn next to which particular hypotheses are consistent with the political cycles found in economic outcomes. First, the hypothesis that opportunistic pre-election spending results in a significantly positive effect on current output growth is not supported by the data. Although the ELECTIONYEAR coefficients had their expected sign in each growth equation, none of the coefficient estimates were significantly different from zero. On the other hand, opportunism

---

<sup>14</sup> These results are available on request. See also Winer (1986b).

<sup>15</sup> This latter finding is also consistent with Winer (1986a) who found weak evidence of political cycles only in higher frequency (quarterly) monetary data in the post-1972 period of exchange rate flexibility.

receives more support in the inflation data with three of the five ELECTIONYEAR coefficient estimates significantly different from zero at ten percent.<sup>16</sup> Note, however, that in both sets of equations as the time period shortens, evidence of opportunism becomes less significant, largely disappearing in the inflation data. Neither of the coefficients in Table 3 (or 2) for the 1921-2000 time period were significant nor were the coefficients when the equations were re-estimated over the even shorter 1945-200 time period (available on request but not reported).

On the other hand, both version of the partisan hypothesis receive strong support from the data. Fully seven of the ten partisan coefficients across the two tables are both positive and significantly different from zero, with all five growth equation coefficients significantly different from zero at ten percent or better. While both partisan hypotheses conform to the data well, in relative terms rational partisanship receives somewhat more support. For the longer 1870-2000 time period, all four of the SURPRISE coefficients (from the growth and inflation tables) are positive and significant, while only one of the two coefficients of PARTISAN (for growth) remains significantly different from zero. These results imply that LIBERAL (Conservative) victories are typically associated with periods of income growth (contraction) and narrower “surprise” victories typically associated with larger increases (decreases) in the output growth and future inflation.

Finally, the political duration hypothesis - the prediction of rational partisan theory that the stimulating (contractionary) effect of a liberal (conservative) partisan victory should wear off through time - is only suggested by the data. In all of the rational partisan equations (columns

---

<sup>16</sup> The use of ELECTIONYEAR lagged in the growth equation and ELECTIONYEAR in the inflation equation produced coefficient estimates that were typically positive but of less significance. None were found to be significantly different from zero.

(2), (3), (4), and (5)) the predicted negative sign does appear consistently, but in all cases the coefficients are insignificantly different from zero.

While the partisan nature of the party winning power may be statistically significant, is the size of the effect substantial enough to be interesting? To illustrate the importance of the surprise effect we find in the data, we ask what would be the predicted effect of a relatively surprising Liberal election victory on output growth? Using as an example the narrow Liberal victory in late 1926 (registering a surprise value of 0.473), we take the difference between actual and mean SURPRISE ( $0.473 - 0.089 = 0.388$ ) and then multiply the result by the coefficient estimate in column (2) of Table 2 (2.43). The calculation indicates that real growth would have been 0.94 percentage points higher than the 3.69 percent mean growth rate (of the entire period).<sup>17</sup> Stated differently, our results suggest that the surprise Liberal victory in 1926 boosted the annual growth rate by twenty five percent more than the overall period average. The effect of electoral surprise can then be both significant and substantial.

To summarize, whether or not the data reject the hypothesis that political variables have produced a political cycle in inflation, our results are consistent with the hypothesis that a distinct political cycle exists in Canada's aggregate growth rate over the 1870 – 2000 time period. The results are strongest for entire the period and tend to fall in significance as the time period shortens towards the present. In terms of our individual hypotheses two features stand out. First, partisan effects are more evident in the growth data than opportunistic effects.<sup>18</sup> Second, the data has difficulty distinguishing between traditional and rational partisan theories. While the

---

<sup>17</sup> Other elections with similar sized 'surprises' were the 1976 and 1981 Liberal victories.

<sup>18</sup> These results concur with those typically found in the literature for other developed countries (see Drazen, 2000 and Franzese, 2002). On the other hand, many of the features emphasized by opportunism, such as the signaling insider information are hard to capture in a time series setting. In effect, evidence of opportunism may arise more in the anomalies than in the regularities of the data.

surprise coefficients are consistently positive as predicted, the diminution of surprise as predicted under rational partisanship is only suggested rather than confirmed by the data.

The importance of this evidence of a statistical relationship between measures of politics and measures of growth and/or inflation is that it motivates the search for a utilized transmission mechanism in fiscal public choices that can connect explicit political factors with economic outcomes. That is, before we can argue that the Canadian data support the hypothesis that politics have caused real output cycles we need both the presence of a transmission mechanism that has been influenced by politics and the use of that transmission instrument in a manner that is consistent with the observed cycles in real output. Here we look for such evidence in relation to the three instruments of fiscal policy.<sup>19</sup>

### **III. Could Fiscal Policy have been used to transmit Political factors into real output?**

To ask whether there is evidence that political factors played an independent role in fiscal policy in Canada, we use cointegration and error correction analysis a) to develop a base case model of economic fundamentals and b) to separate the long and short run dimensions of fiscal policy.<sup>20</sup> Here Engel-Granger cointegration analysis is applied to three specific fiscal policy instruments (all defined as a proportion of GNP): the logarithm of the expenditure and tax size of government, LNGSIZE and LNTAXSIZE, and the difference between these two logs, LNDEFICIT, as our measure of the size of the federal deficit.<sup>21</sup> These variables are graphed in

---

<sup>19</sup> Here we follow Drazen (2000) who argues that it is easier both conceptually and empirically to justify a political budget cycle in fiscal rather than monetary policy.

<sup>20</sup> See Ferris, Park and Winer (2006) for a more extended discussion of this methodology and a comparison with Hodrick-Prescott methods of decomposing a time series trend and cycle.

<sup>21</sup> The measure of government expenditure size used in this paper is net of interest payments and inclusive of government grants. It should be recognized that the three policies cannot be independent but are linked through the government budget constraint (where the long run No Ponzi Game condition implies the I(0) characteristic of

Figure 1, with LNDEFICIT appearing as the difference between the two primary series. Perhaps the first thing that captures one's attention is the difference in the way the two size measures have grown through time. That is, the time path for LNTAXSIZE appears to increase in two relatively distinct steps, one coinciding with WW1 and the second with WW2, while expenditure size exhibits two distinct peaks for the two world wars and one upward step in the period following WW2.<sup>22</sup> Unlike the growth in size as exhibited by these two variables, LNDEFICIT shows no discernable trend, varying both positively and negatively over the period as a whole. The full descriptive statistics for these variables are given in Table 1b. In terms of their time series properties, the important difference is that while the logarithms of the expenditure (LNFSIZE) and the tax (LNTAXSIZE) size of government are both I(1), the measure of their difference, the federal government deficit (LNDEFICIT), is I(0).

To construct a long run model of the level of government expenditure and taxation (relative to GDP), we require a set of variables that both span the long time period covered (1870-2000) and reflect the deeper structure of the Canadian economy. The variables we adopt are standard in the growth of government literature and have been widely used in studies across different (developed) democratic states.<sup>23</sup> The starting point is almost always Wagner's Law, the hypothesis that the size and scope of government increases more than in proportion as society grows in scale and complexity. This is interpreted as implying an elasticity of real per capita income (RYPC) with respect to size that is positive. Wagner's Law is then enhanced by a

---

LNDEFICIT). See the discussion below linking the deficit to monetary policy through changes in the monetary base.

<sup>22</sup> This implies a difference in the way that the two world wars were financed: WW1 being financed largely by borrowing, while WW2 was financed to a greater extent out of current taxes.

<sup>23</sup> See, for example, Kau and Rubin (1981), Borcharding (1985), Mueller (1986), Ferris and West (1996) and Borcharding, Ferris and Garzoni (2004).

set of public choice and spatial voting hypotheses that suggest variables such as the fraction of the population in agriculture (AGRIC) and who are young (YOUNG) to proxy changes in the structure of the economy and/or the strength of interest groups. As AGRIC declines (urbanization increases) and YOUNG increases, we expect greater demand for government services.<sup>24</sup> To capture other structural features that may promote more (or less) government involvement, we use the immigration rate (IMRATIO) and the openness of the economy through its reliance on foreign trade (OPEN).<sup>25</sup> All of these variables are used in log form, as indicated in the tables by the addition of the prefix LN to the variable names.<sup>26</sup> Descriptive statistics for these variables are presented in Table 1b where it is noted that together with LNGSIZE, LNTAXSIZE, the entire set of explanatory variables for the long run economic model of public sector size is nonstationary I(1) in levels but becomes stationary I(0) in first differences.

Table 4 presents the results of our test for cointegration among the set of key economic variables characterizing long run equilibrium in government's expenditure (columns (1) - (3)) and tax size (columns (4) - (6)). Note, however, that while the cointegrating equations in (1), (2), (4) and (5) produce coefficient estimates that are super consistent, the standard errors of

---

<sup>24</sup> The use of these variables rather than the more traditional variables - the degree of urbanization and the percent of population older than 65 years (OLD) - is dictated by the availability of data for the entire time period. Note that YOUNG and OLD are not necessarily direct complements. A younger population will increase the demand for education and health services, traditionally part of the public sector in Canada.

<sup>25</sup> Immigration played a major role in Canadian history, especially before WWI and in the decade following WWII. The use of OPEN in relation to government size follows the work of Rodrik (1998) and others. There openness led to more government as a form of insurance against external shocks. A competing view is that openness restraining government growth indirectly by imposing external constraints on taxation. We shall see that this later view is more likely to apply in Canada. Population is often used to test for scale economies in government size. Scale economies are often not found (see, Borcherding, Ferris and Garzoni, 2004) and, in Canada, the population time series is of a different order of integration than the other variables, i.e., I(2). For this reason, population was not used. Finally, we note that in preliminary work the share of transfers in total federal spending was used as an additional explanatory variable. Although consistently negative in its effect on size, its presence was never consistent with cointegration.

<sup>26</sup> GSIZE and many of the other explanatory variables (IMRATIO, AGRIC, YOUNG, and OPEN) are all constrained to lie between zero and one. Hence transforming these variables into logarithms (adopting the prefix LN) avoids restrictions on the domain of the error terms in our estimating equations.

these equations are likely biased because of correlations arising among innovations in the I(1) explanatory variables. To correct this, we used Saikkonen's 1991 adjustment. This implies that when looking for the significance of individual hypotheses, the reader should use the t-statistics from columns (3) and (6).

What that Table 4 makes clear is that the structural variables suggested by the public finance literature work well in explaining both the expenditure and tax size of government. The base case equation in column (1) explains roughly ninety percent of the variation in government expenditure size. Moreover, that equation with six explanatory variables and three shift dummies results in residuals that when tested for stationarity produce an adjusted Dickey Fuller test statistic that exceeds (in absolute value) the adjusted MacKinnon (1996) critical value at one percent.<sup>27</sup> Thus while the Durbin-Watson test statistic and other more general considerations suggest that the standard errors of specific regression coefficients will be biased, the residual findings suggest that the equation as a whole is not spurious and hence is consistent with the hypothesis of a stable long-run equilibrium relationship among the set of economic variables (Saikkonen, 1991). The corresponding base case test for the determinants of the tax size of government in column (4) similarly passes the MacKinnon test for stationarity at one percent. The key difference between the two measures of size is that the tax equation is consistent with an additional structural break in the cointegrating equation following WWI. The data suggests that tax size rises in more discrete steps than the corresponding measure of expenditure size.<sup>28</sup>

---

<sup>27</sup> As far as we are aware, there are no tables of critical values for cointegration relationships with structural breaks occurring at known break points. Gregory and Hanson (1996), give approximate critical values for the ADF test of a Engle-Granger type cointegration equation with a single structural break arising at an *unknown* points. Hence despite the relative high (absolute) values of the ADF statistic on our cointegration residuals, the implied degree of significance may be overstated.

<sup>28</sup> This helps to reconcile our earlier inability (in Ferris, Park, and Winer 2006) to find a structural break in expenditure size following WWI with earlier evidence of such a break presented by Dudley and Witt (2004).

Given that we have found evidence of cointegration in our long run theories of LNGSIZE and LNTAXSIZE, we can turn to the hypothesis that because political competition is necessary for actual policy outcomes to converge on the wishes of the electorate, the degree of political competition should matter in the explanation of government size. Here active competition among political parties, it is argued, is necessary to prevent political and/or bureaucratic agents from dissipating economic rents, perhaps simply by preventing government resources from being diverted to private/party uses. To test the hypothesis that the degree of competition matters, we use the proportion of seats in the House of Commons won by the governing party in each election, SEATS, as our (inverse) measure of political competition.<sup>29</sup> This or some similar measure is increasingly being used in the literature (see Levitt and Poterba 1999 and Besley, Persson, and Sturm 2005).<sup>30</sup> The political competition hypothesis then states that the predicted sign on the coefficient of SEATS will be positive.

The descriptive statistics for SEATS can be found with the list of other political variables in Table 1a. The fact that SEATS is  $I(0)$ , however, means that care must be taken interpreting its role in the cointegrating equations of columns (2) and (3) in Table 4. That is, even though it is legitimate to combine SEATS, an  $I(0)$  variable, with a group of  $I(1)$  variables that form a cointegrating equation (that is itself also  $I(0)$ ), its presence in the equation does not mean the same thing as the other  $I(1)$  economic variables. Because the SEATS is  $I(0)$ , a change in political competition does not imply a permanent change in LNGSIZE. Rather changes in SEATS produce only transitory changes in long run government size (for the duration of one election) reflecting temporary changes in the degree of competition about the mean level of political

---

<sup>29</sup> Here we use the Beck definition (definition A) as the size of the winning party's share of seats, SEATS.

<sup>30</sup> In a British style parliamentary governments it is the proportion of seats that matters, whatever the size of the popular vote. Hence we use SEATS rather than the proportion of the popular vote, won by the governing party (as do Besley et al. 2005).

competition associated with Canada's system of parliamentary democracy and its associated political institutions. The results presented in columns (2) and (3) are then consistent with the hypothesis that changes in the degree of political competition produce transitory effects on the long run level of government expenditure and in this restricted sense form an integral part of the stochastic process describing the long run evolution of government size.

When the remaining set of  $I(0)$  explicit political variables are added to the cointegration equation for LNGSIZE, however, none were found to enhance the explanatory power of the equation nor give evidence of producing a transitory effect on the cointegrating relation.<sup>31</sup> That is, neither the year prior to an election, ELECTIONYEAR(-1),<sup>32</sup> nor the time period when the more liberal political party formed the government, LIBERAL; nor the times corresponding to minority government, MINORITY; nor the time in power, ELAPSE; nor the partisan weighted time in power, DURATION, enhanced the adjusted  $R^2$  or the ADF test statistic on the equation's residual. Hence among the set of all potential political variables, only the size of the majority of the winning party, SEATS, was found to increase the long run explanatory power of the equation and produce equation residuals consistent with stationarity. Moreover, because SEATS is a measure independent of party affiliation, this is consistent with neither partisan nor opportunistic political theories of the cycle. Rather it is consistent with the hypothesis that less political competition (through a larger ex post majority) weakens the effective constraint on spending and thus is reflected in the relative expansion of government services. These findings then confirm the findings of Ferris, Park, and Winer (2006) for this broader measure of federal government expenditure size (here inclusive of intergovernmental grants).

---

<sup>31</sup> In the fifteen permutations of political variables that could be combined with SEATS, none were found to be more significant than SEATS nor were any found significant in their own right.

<sup>32</sup> Note that ELECTIONYEAR lagged is used in the test to reflect the fact that the policy instrument must be used prior to its opportunistic effect on real output.

On the other hand, SEATS does not work in the same way to enhance the explanation of the long run share of federal taxes in GNP. Rather, the time period in which there was a minority government is the sole political variable that becomes significant in the LNTAXSIZE equation. As the coefficient estimate in column (6) attests, minority governments in Canada tend to reduce temporarily the government's tax share of GNP. Thus while authors such as Kontopolous and Perotti (1999) and Persson, Roland and Tabellini (2004) use common-pooling to motivate higher than normal levels of spending for coalition governments, our results suggest that, at least for Canada, tax reductions have been the mechanism of choice for incumbent minority governments (of all persuasions) to curry favor with the electorate.

Periods of minority government are, of course, time periods in which the effective degree of competition among political parties is so intense that no political party has been able to win a majority. Viewed from this perspective, our results imply that taxation levels are reduced in time periods when political competition is particularly strong. As such the tax equation finding for MINORITY complements our earlier result in the expenditure equation for SEATS. That is, the MINORITY finding is consistent with the hypothesis that as the degree of political competition increases, the overall size of government falls.<sup>33</sup> In Canada this appears to arise first in the form of a tightening of government expenditure levels and then, as competition passes some threshold of intensity, through a fall in taxation.

#### **IV. Is there a Political Budget Cycle?**

In Table 5 we use the residuals from the long run cointegrating equations of Table 4 to develop the corresponding error correction models of short run adjustment about the long run

---

<sup>33</sup> Haynes and Stone (1990) find U.S. evidence consistent with the hypothesis that the minority party is constrained by competition while the majority party is freer to pursue partisan objectives.

expenditure and tax size of government. Because our political variables are  $I(0)$  it is primarily in these stationary short run adjustment processes that we should have our best opportunity of finding evidence of opportunistic or partisan political influence. We also include in Table 4 an equation for the deficit as a proportion of GNP.<sup>34</sup> This allows us to assess whether any particular political effect that is only suggested by either the expenditure or tax size equation individually combine for significance in the deficit. Finally, an explicit focus on the deficit allows us to connect fiscal policy directly with monetary policy through changes in the monetary base and thus test whether the different arms of economic policy have moved in tandem or in contrast over the cycle.

Columns (1) and (2) present the base case error correction models that correspond to the long run cointegration equations found in columns (1) and (4) of Table 4. They form the final stage of a testing procedure that originally added all political variables to the base case error correction model and then dropped successively the least significant political variable until only those variables that retained significance remained. As the extreme bounds test presented in the appendix illustrates, SEATS was the only political variable that remained significant. As such these results complement our earlier finding of a transitory effect in the expenditure cointegrating equation and reinforce the importance of political competition in bringing about the convergence of fiscal policy instruments on fundamentals – the tastes and technology that form the wishes of the electorate in relation to policy. The same pattern holds when the error correction models arising from the political version of the cointegrating equations in columns (2) and (5) of Table 4 are used. Note that even though MINORITY produced a transitory effect on

---

<sup>34</sup> Because LNDEFICIT is  $I(0)$  there can be no direct correspondence with the level analysis undertaken for expenditure and tax size. However, LNDEFICIT can be combined with the other  $I(0)$  variables – the first differences of the model’s “economic fundamentals” and all of the political variables – to assess whether short run policy actions are better reflected net rather than separately.

the long run tax size of government, there is no evidence in Table 4 that minority governments use short run tax policy any differently than do majority governments. SEATS, on the other hand, is both positive and significantly different from zero in all equations.

Because of the apparent significance of partisan effects on the political business cycle described in section II, it is important to emphasize that neither LIBERAL nor PARTISAN add to the explanatory power of short run adjustment as represented by either the expenditure or tax error correction equations. For example, the addition of LIBERAL to equations (1) and (3) in Table 5 yields coefficient estimates of 0.024 (1.13) and 0.025 (1.19), respectively (where t-statistics follow in brackets). The corresponding estimates in the tax equations for columns (2) and (4) were 0.001 (0.096) and 0.001 (0.112).<sup>35</sup>

When we look at the nature of short-run fiscal policy as described by these equations, clear evidence of its counter-cyclical role appears in the two expenditure equations. The short run relationship between government expenditure and per capita income is consistently negative (and significantly so), an effect that is completely opposite to its significant positive effect over the long run. There is much less evidence of a counter-cyclical role for taxation. If anything, our findings suggest the tax size of government is more likely to move with income and hence represent a slightly pro-cyclical role for taxation.

The equations for the deficit in columns (5) and (6) examine the net effect of expenditure and tax policy on the cycle. Here the second row of the table (corresponding to the coefficients of the short run change in per capita income) indicates that while government spending has been strongly counter-cyclical and taxation pro-cyclical, their net effect has been significantly

---

<sup>35</sup> Similar results are found for PARTISAN. For example, the same four coefficient estimates (with t-statistics) are: 0.010 (0.914), 0.010 (0.924), 0.0007 (0.117), and 0.0005 (0.102). Ironically, the addition of either LIBERAL or PARTISAN to the deficit equation results in a significant coefficient but of the wrong sign for explaining the variation in output growth outlined in section II. That is, the addition of PARTISAN to (5) and (6) results in coefficients (t-statistics) of -0.032 (2.08) for (5) and -0.35 (2.00) for (6).

counter-cyclical. In addition, the deficit equation in (6) is also consistent with the hypothesis that political competition matters, adding to the explanatory power of the deficit model implied by economic fundamentals. Thus while a fall in political competition (rise in SEATS) typically increases both government spending and taxation, the deficit equation tells us that expenditure consistently rises by more than taxes such that the size of the deficit increases significantly.

It follows that a decline in political competition, by raising both the short run rate of growth of government spending and the size of the deficit, will mute the counter-cyclical role of fiscal policy by adding an expansionary asymmetry to policy instrument use in relation to the cycle. Moreover, that short run asymmetry is reinforced by the fact that equations (5) and (6) show considerably more persistence than do either of the separate equations for expenditure or taxation. Such persistence in the size of the deficit adds to the overall expansionary impact transmitted by the lack of political competition and thus reinforces the asymmetric nature of fiscal policy in relation to the cycle.

In summary, while there is no evidence to confirm the role of political opportunism or partisanship in the budget cycle, there is considerable evidence that political competition, as measured (inversely) by the size of the majority (in seats) won by the governing political party, does matter, particularly in relation to the shorter run adjustment processes about long run policy levels. Moreover, that evidence is consistent not only with the hypotheses that political competition restrains the growth rate of government size (and the deficit) temporarily, but with the hypothesis that the absence of political competition will impart a bias into short run counter-cyclical policy. In this sense, a weakening of the degree of effective political competition may help to explain what is often seen as a growing asymmetry in the impact of federal economic policy – stronger in promoting expansion than in imposing restraint.

Finally, because the government's deficit must be financed, the way the deficit is financed may, in itself, have consequences for the performance of the economy. In this respect it is often argued that greater private market borrowing will raise market interest rates and so crowd out the expansionary power of any new fiscal spending. Such crowding out, it is also argued, can be minimized to the extent that the new debt issue is purchased by the Bank of Canada.<sup>36</sup> In such cases the Bank accommodates fiscal policy and this monetization becomes observable as an increase in the stock of high powered or base money, in circulation. In equation (6), we test for the accommodation of fiscal policy by the Bank of Canada by adding the change in the money base as a fraction of GNP to the deficit equation in column (5).<sup>37</sup> The result, appearing as the significant positive coefficient in the last row of column (6), indicates that increases in the money base are associated with increases in the deficit and thus is consistent with accommodation. Stated alternatively, there is evidence that monetary and fiscal policy worked together (were coordinated) over our time period.

#### **V. Does the political business cycle coincide with the political budget cycle?**

While we used the evidence from our test of theories of the political business cycle in Canada to motivate our search for the role of politics in relation to the different instruments of fiscal policy, it is useful at this point to review the extent to which the two sets of findings are consistent with each other. That is, for political factors to drive real output, there must be a sympathetic correspondence in policy instruments.

---

<sup>36</sup> Because the Bank of Canada was created only in 1935, the application of this argument to the Bank of Canada is applicable only from that date onward.

<sup>37</sup> The money base ratio had no significant effect on spending or taxation per se, only on the deficit. It is not logged like the rest of the variables because its change sometimes becomes negative.

When applying this test to our set of fiscal policy instruments, it is clear that there is no simple one-to-one correspondence between the two sets of results. For example, there is no counterpart in the analysis of the political business cycle to the multiple roles found for political competition in relation to fiscal policy instruments and hence no variable that directly tests the relationship between political competition and final output. Moreover, if we simply add SEATS as an explanatory variable back into the equation testing opportunism and traditional partisanship (equation (1) of Table 2), SEATS is found to be negative and insignificant (without diminishing the significance of PARTISAN).<sup>38</sup> While a positive effect might have been expected from SEATS (increasing government size, aggregate demand and so output), the negative coefficient found underscores our contention that less political competition (higher SEATS) results in greater rent dissipation that diminishes the efficiency of any expenditure level of government service. This would lower the effective real size of government and so diminish real output growth. The insignificance of that suggested relationship means that any such relationship must remain speculative.

Similarly, MINORITY has yet to appear in our analysis of the political business cycle. However, the significance of MINORITY in the long run cointegrating equation for the tax size of government in Table 4 does imply that taxation levels will be lower in periods of minority government (independent of partisan affiliation). This suggests that the use of the dummy variable MINORITY in the growth equation should yield a positive coefficient without otherwise diminishing the significance of the partisan effect. When MINORITY is added to equation (1) of Table 2, the coefficient is indeed positive but also insignificantly different from

---

<sup>38</sup> The coefficient estimates and associated t-statistics (in brackets) when SEATS<sup>A</sup> and SEATS<sup>B</sup> are added to equation (1) of Table 2 are, respectively, -1.23 (0.309) and -0.846 (0.225).

zero.<sup>39</sup> Perhaps because of the relatively few periods of minority government (only five episodes of seven minority government over our 131 year), the hypothesized asymmetric behavior of governments in minority in relation to output growth remains problematic.

Our findings then pose a series of significant puzzles. The political variables found to be significant in the policy equations - SEATS and MINORITY – show little sign of significance when incorporated into the pattern of real output growth arising in the political business cycle equations.<sup>40</sup> Moreover, despite reasonably strong evidence of political partisanship in output, there is no trace of a corresponding partisan response in any of our fiscal policy instruments over either the short or long run. Nor is there evidence of opportunism, at least at the aggregate level. The juxtaposition of these two sets of findings leaves an important puzzle for economists and political scientists alike. Unless evidence can be presented for a significant political influence on either monetary policy or compositional changes in government spending or taxation and their link to final output, the evidence is more consistent with the hypothesis that causality runs in the opposite direction--from economic circumstance to political outcome.<sup>41</sup> Should expected good times signal a greater willingness to vote for more liberal political parties, both the correlation between politics and outcomes and the absence of a correlation between policy and politics would be explained.

## **VI. Conclusion**

In their review of work on the political business cycle, Bartels and Brady (2003, 159) wonder why, despite strong evidence of political influences on output growth, so little work has been done by economists to link political influences to policy to outcomes. In exploring this

---

<sup>39</sup> More specifically, its coefficient is 0.650 with a t-statistic of 1.09.

<sup>40</sup> Of the two, MINORITY, enters typically with its expected sign and a higher level of significance.

question for Canada, our analysis suggests that easy answers will not be forthcoming. What we have shown is that at least for Canada, the most likely routes by which political influence could have been used to affect economic outcomes have not been utilized. Thus while more indirect connections between politics and outcomes may well be present, greater insight and analysis will be needed to tease out propositions that allow new tests of empirical relevance.

In Canada, much of the previous work seeking to link political and economic outcomes has used Hodrick-Prescott filtered variables to test time series data for the short run relationships implied by the various political theories of the cycle. Here the findings have been mixed. Kneebone and McKenzie (1999, 2001) use Hodrick-Prescott filters to control for the long run factors behind federal and provincial government deficits and find evidence of ‘pronounced’ opportunism and ‘strong evidence’ of partisanship at all levels of government and in all stages of the fiscal structure. This stands in strong contrast to the findings of Serletis and Afxentiou (1998) who, using annual data from 1926 to 1994, find no evidence of any regularity arising between their set of Hodrick-Prescott filtered policy target variables (output and unemployment) and a set of similarly filtered government policy instruments (government consumption and investment). More recently, Heckelman (2006) has used unemployment data to re-examine the evidence on rational partisan cycles in Canada and finds no support for rational political cycles.

We reexamine these questions using Engel-Granger cointegration analysis over a long time period. Our findings come closer to Serletis and Afxentiou (1998) and Heckelman (2006) than to Kneebone and McKenzie (2001) by adding to the growing evidence that suggests that partisan and opportunistic political theories cannot explain the fiscal policy variations needed to explain the observed “political” cycle in Canadian macro data. Nevertheless, the paradox presented by the presence of a political business cycle and the absence of a political budget cycle

---

<sup>41</sup> On the latter point see the recent work of Malley, Philippopoulos and Woitek (2005).

is quite striking and suggests either that partisan effects work through another arm or dimension of economic policy (such as the composition of spending or taxation) or that the results appearing in Tables 2 and 3 are more likely to reflect reverse causation – the election of more liberal (more conservative) governments when times are expected to be better (worse).

Of greater independent interest, our paper presents evidence of a different set of channels by which political factors do interact with policy and evidence of that interaction occurs at all stages of the analysis through what we have called political competition. Thus we find evidence that the degree of political competition produces not only transitory effects on long run size but also more permanent effects on the variance of short run fiscal policy instruments about long run equilibrium values. Hence what is insightful in our findings is the implication that greater political competition not only reduces the amount of dissipation in the provision of any particular level of government service but also makes its short run impact more focused and symmetric – whether considered automatic or discretionary – in response to the cycle.

What remains to be answered is whether partisan and opportunistic aspects of politics interaction in more complicated ways with other dimensions of economic policy or whether the correlations implied by the political cycle reflect reverse causation. In either case, what does seem clear from our analysis is that in connecting politics to policy, the degree of political competition matters.

## Data Appendix

The data used in this study come from four basic sources: *Canadian Historical Statistics*, for the structural variables in the earliest time period (1870 through 1921); *Cansim*, the statistical database maintained by Statistics Canada, for these variables in the later time period (1921-2001); Gillespie's (1991) reworking of the Federal public accounts from 1870 to 1990, updated by Ferris and Winer (2003); and for the political variables Beck (1968), Office of the Chief Electoral Officer of Canada (at <http://www.parl.gc.ca/information/>) and the *Canadian Parliamentary Guide* (1997, 2002).

### 1. List of Economic Variable Names and Data Sources:

**AGRIC** = proportion of the labor force in agriculture. 1871-1926: Urquhart, (1993), 24-55; 1926-1995 Cansim series D31251 divided by D31252; 1996-2001: Cansim II series V2710106 divided by V2710104.

**D** = first difference operator

**EXPORTS** and **IMPORTS** = exports and imports. 1870-1926, Urquhart, (1993) Table 1.4; 1927-1960, Leacy, et al, 1983, Series G383, 384; 1961-2001: CANSIM series D14833 & D14836.

**OPEN** = openness. Calculated as:  $(\mathbf{EXPORTS} + \mathbf{IMPORTS}) / \mathbf{GNP}$ .

**GNP** = gross national product in current dollars. 1870-1926: Urquhart (1993), pp. 24-25 (in millions); 1927-1938: Leacy et al (1983), Series E12, p.130; 1939-1960 *Canadian Economic Observer, Historical Statistical Supplement 1986*, Statistics Canada Catalogue 11-210 Table 1.4. CANSIM D11073 = GNP at market prices. 1961-2001 Cansim I D16466 = Cansim II V499724 (aggregated from quarterly data).

**GOV** = total government expenditure net of interest payments. 1870-1989: Gillespie (1991), pp.284-286; 1990-1996: Public Accounts of Canada 1996-97; 1997-2000: Federal Government Public Accounts, Table 3 Budgetary Revenues Department of Finance web site, September 2001. To this we add the return on government investment (**ROI**) originally subtracted by Gillespie for his own purposes. Expenditure is net of interest paid to the private sector. Data on **ROI**: 1870 to 1915: Public Accounts 1917 p.64; 1915-1967: Dominion Government Revenue and Expenditure: Details of Adjustments 1915-1967 Table W-1; 1916-17 to 1966-67: Securing Economic Renewal - The Fiscal Plan, Feb 10, 1988, Table XI; 1987-88 to 1996-97: Public Accounts 1996, Table 2.2. Interest on the Debt (**ID**) was subtracted out (with adjustment for interest paid to the Bank of Canada (**BCI**) ultimately returned to the government). Data on **ID**: 1870-1926: Historical Statistics of Canada, Series H19-34: Federal Government budgetary expenditures, classified by function, 1867-1975; 1926-1995: Cansim D11166. 1996-2000: Cansim D18445. Finally, data for **BCI**: copied by hand from the Annual Reports of The Bank of Canada, Statement of Income and Expense, Annually, 1935-2000. Net Income paid to the Receiver General (for the Consolidated Revenue Acct). Note: all government data had to be converted from fiscal to calendar years.

**GSIZE** = the relative size of non-interest central government public expenditure, calculated as  $\mathbf{GOV} / \mathbf{GNP}$ .

**IMMIG** = immigration numbers. 1868 – 1953: Firestone (1958), Table 83, Population, Families, Births, Deaths; Updated by Cansim D27 (1955 to 1996). Cansim Sum of X100615 (Females) plus X100614 (Men) for 1954; 1997-2001, Cansim D27 (sum of quarters).

**IMRATIO** = IMMIG/POP.

**LN** = the log operator.

**LNDEFICIT** = LNFSIZE - LNTAXSIZE

**MB = Money Base.** Metcalfe, Redish and Shearer, New Estimates of the Canadian Money Stock 1871-1967; 1967-2002, Cansim B1646 (annual average of monthly data).

**MBRATIO** = (MB- MB(-1))/GNP

**P** = GNP deflator before 1927 and GDP deflator after (1986 = 100). 1870-1926: Urquhart, (1993), 24-25; 1927-1995 (1986=100): Cansim data label D14476; 1996-2001 Cansim D140668. All indexes converted to 1986 = 100 basis.

**POP** = Canadian population. 1870-1926: Urquhart, (1993), 24-25; 1927 - 1995: CANSIM data label D31248; 1995 - 2001: Cansim D1 (average of four quarters).

**ROI** = Return on Investment that Irwin subtracted from revenues and receipts.

Sources: 1867-68 to 1915-16: Public Accounts 1917 p.64; 1915-1967: Dominion Government Revenue and Expenditure: Details of Adjustments 1915-1967 Table W-1; 1916-17 to 1966-67: Securing Economic Renewal - The Fiscal Plan, Feb 10, 1988, Table XI; 1987-88 to 1996-97: Public Accounts 1996, Table 2.2

**RGNP** = real GNP = GNP/P; **RYPC** = real income per capita = GNP/(P\*POP).

**TAXSUM** = the sum of the fourteen different categories of taxes collected in Canada. The fourteen categories include: 1. Custom Duties - Customs Import Duties (in Public Accounts); 2. Excise Duties - Excise Duties (in Public Accounts), included in Excise Taxes after 1990; 3. Sales Tax - Sales Tax (in Public Accounts). GST replaces Sales Tax from 1991; 4. Excise Taxes - Other (in Public Accounts), includes Excise Duties after 1990; 5. Personal Income Tax - Income Tax, Personal (in Public Accounts); 6. Corporate Income Tax - Income Tax, Corporate (in Public Accounts); 7. Non Resident - Non-resident Income Tax (in Public Accounts), included in Other Income Tax Revenues after 1994; 8. Excess Profits - Energy Taxes (in Public Accounts); 9. Estates Taxes - 0 after 1977; 10. Post Office Revenues - 0 after 1983; 11. Misc. Revenues - Other Non Tax Revenues (in Public Accounts); 12. Special Recipient and Other Credits - Refunds of previous year's expenditure, Services and service fees, Privileges, licences and permits, Proceeds from Sales, Bullion and coinage. Excludes premium and discount on exchange. This category listed as Misc.Revenues after 1989; 13. UIC Taxes - Unemployment Insurance Contribution, Government Contribution (in Public Accounts); 14. Old Age Security - 0 after 1977; **Sources:** 1868-1989: W. Irwin Gillespie, *Tax, Borrow and Spend: Financing Federal Spending in Canada, 1867 - 1990*, Carleton University Press, 1991, pp.284-286; 1996-97,

Public Accounts of Canada; 1997-2000: Federal Government Public Accounts, Table 3 Budgetary Revenues Department of Finance web site, September 2001.

**TAXES = TAXSUM + ROI;**

**TAXSIZE = TAXES/GNP**

**WWI** = 1 for 1914 - 1919; = 0 otherwise. **WW1after** = 1 for 1919-1921; = 0 otherwise.

**WWII** = 1 for 1940 - 1945; ½ for 1939 and 1946 = 0 otherwise. **WW2after** = 1 for 1946-1949; = 0 otherwise. **WWIIAftermath** = 1 from 1946 onward; = 0 otherwise.

**YOUNG** = percentage of the population below 17. 1870-1920 Leacey et al (1983). Interpolated from Census figures Table A28- 45 sum of columns 29, 30, 31, and 32 all divided by 28 (adjusted to make 1921 the same); 1921-2001 Cansim C892547.

## 2. List of Political Variable Names and Data Sources:

The dating of each election was chosen to reflect the first year that each elected party was in power (when elections concentrate in the early summer and late fall time periods). Thus if an election was held between January and July, the election was viewed as in the actual calendar year of the election. However, if the election was held between August and December, the election was attributed to the following year. On this basis:

**DURATION** = ELAPSE\*[LIBERAL – (1-LIBERAL)].

**ELAPSE** = the number of years since the last election.

**ELECTIONYEAR** = 1 if an election year; = 0 otherwise.

**LIBERAL** = 1 if governing party was the Liberal Party; = 0 if any other (more conservative) party.

**MINORITY** = 1 if the governing party was part of a minority government; = 0 otherwise.

**PARTISAN** = [LIBERAL – (1-LIBERAL)]

**SEATS** = percentage of the seats won by the governing party.

**LIBERAL SURPRISE** = (1-SEATS)\*[LIBERAL – (1-LIBERAL)]

### Data Sources for political variables:

Beck, Murray, J. (1968). *Pendulum of Power*. Scarborough: Prentice Hall of Canada.

*Canadian Parliamentary Guide*. Various years (1997, 2002, 2006).

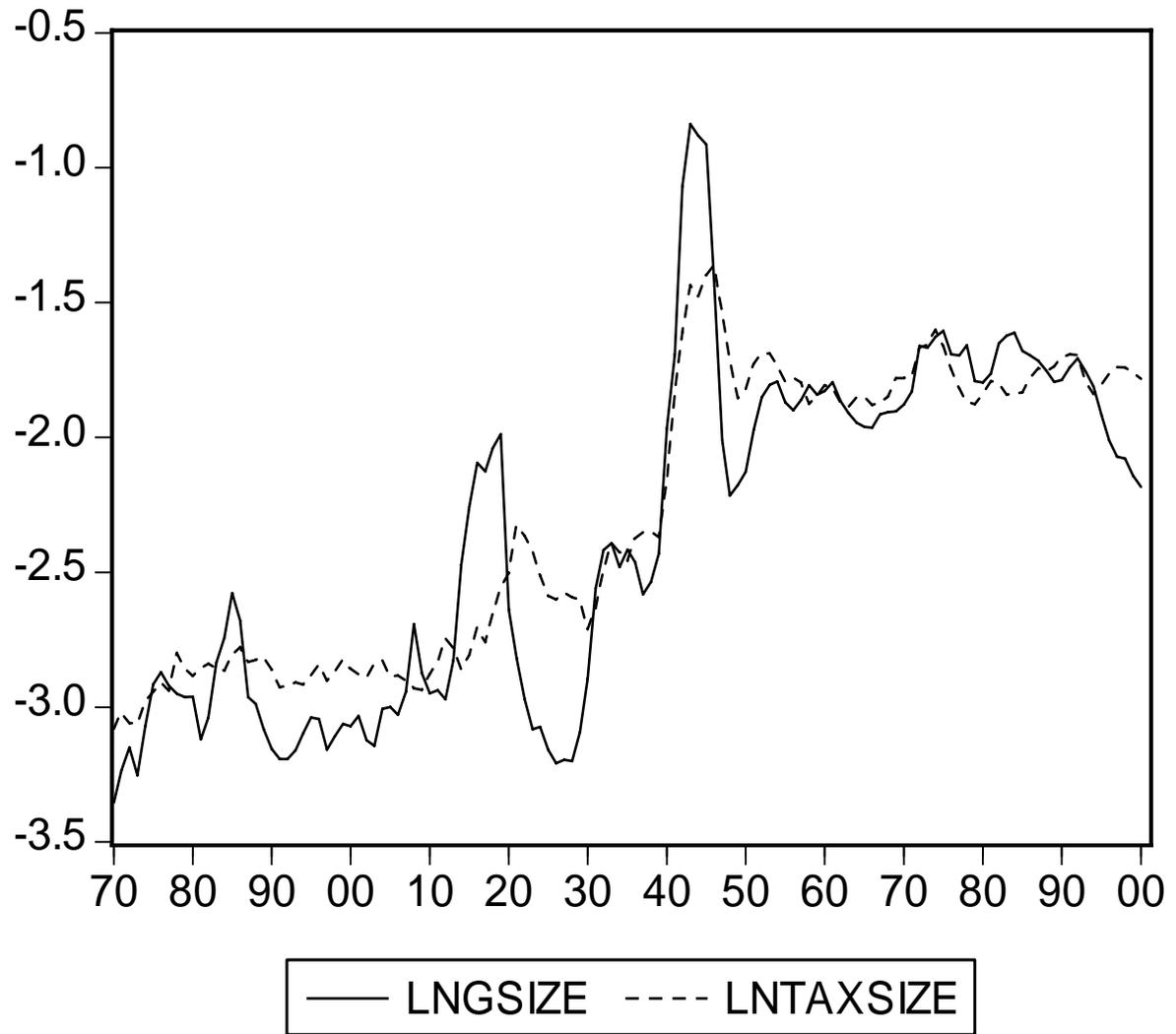
Elections Canada (2001). *Thirty Seventh General Election*. Ottawa.

Scarow, Howard A.(1962). *Canada Votes: A Handbook of Federal and Provincial Election Data*.

Hauser Printing Company.

Web site of the Parliament of Canada: <http://www.parl.gc.ca/information/>

Figure 1: Expenditure and Tax Size of Government



**Table 1a**  
**Descriptive Statistics for Economic Outcomes and Political Variables, 1870 – 2000**

	GROWTH	INFLATION	USGROWTH	USINFLATION	ELECTION YEAR	ELAPSE	LIBERAL	MINORITY <sup>A</sup>	SEATS <sup>A</sup>	SURPRISE <sup>A</sup>	DURATION	SURPRISE <sup>B</sup>
Mean	3.69	2.39	4.06	1.95	0.27	1.687	0.595	0.11	0.60	0.089	0.237	0.091
Median	4.23	2.23	5.24	1.73	0	2	1	0	0.59	0.294	0	0.302
Maximum	16.5	16.7	22.9	17.98	1	5	1	1	0.79	0.587	4	0.587
Minimum	-12.5	-12.3	-24.8	-13.89	0	0	0	0	0.41	-0.577	-5	-0.577
Std. Dev.	5.1	4.68	9.64	4.71	0.44	1.38	0.493	0.310	0.086	0.400	2.16	0.360
ADF (var. lags) <sup>#</sup>	-8.65*	-6.22*	-11.71*	-5.28*	-11.86*	-10.48*	-4.23*	-5.66*	-5.02*	-4.77*	-5.34*	-4.80*

**Notes:** \* = significant at one percent. ADF critical value at 1% = - 3.48 (MacKinnon 1996). # uses the Schwarz Criteria for choosing the appropriate number of lags.

<sup>A(B)</sup> = Definition A (B) for MINORITY, SEATS, SURPRISE and DURATION. See notes to Table 2.

PARTISAN = [LIBERAL- (1-LIBERAL)]; SURPRISE = (1-SEATS)\*[LIBERAL- (1-LIBERAL)];

DURATION = ELAPSE\*[LIBERAL-(1-LIBERAL)].

**Table 1b**  
**Descriptive Statistics of Macroeconomic Aggregates and Government Size Variables, 1871 - 2000**

	LNGSIZE	LNTAXSIZE	LNRYPC	LNAGRIC	LNIMRATIO	LN YOUNG	LNOPEN	LNDEFICIT	MBRATIO
Mean	-2.36	-2.29	8.67	-1.64	-4.90	3.59	-0.83	-0.07	0.004
Median	-2.26	-2.37	8.47	-1.09	-4.90	3.65	-0.87	-0.08	0.003
Maximum	-0.838	-1.36	10.1	-0.54	-2.95	3.88	-0.13	0.63	0.024
Minimum	-3.35	-3.08	7.39	-3.61	-7.28	3.14	-1.18	-0.66	-0.009
Std. Dev.	0.625	0.527	0.81	1.02	0.89	0.19	0.22	0.26	0.005
ADF <sup>#</sup> (var. lags): Levels	-2.58	-1.38	0.17	2.37	-2.96	-0.105	-0.74	-5.22*	-4.10*
ADF <sup>#</sup> (var. lags): Differences	-7.13*	-7.30*	-8.96*	-7.87*	-9.65*	-2.55***	-8.07*		

**Notes:** \* (\*\*)(\*\*\*) = significant at one (five)(ten) percent. ADF critical value at 5% = - 2.88 (MacKinnon 1996).

GSIZE = central government spending after netting out interest payments to the private sector (but including grants to lower levels of government).

# uses the Schwarz Criteria for choosing the appropriate number of lags

**Table 2**  
**The Effect of Political Variables on the Growth Rate in Canada: 1870 - 2000**  
(Newey-West HAC t-statistics in brackets).

<b>Dependent Variable</b>	(1) GROWTH of RGNP 1873 - 2000	(2) GROWTH of RGNP 1873 - 2000	(3) GROWTH of RGNP 1921-2000	(4) GROWTH of RGNP 1873-2000	(5) GROWTH of RGNP 1921-2000
Constant	1.14** (2.69)	1.09** (2.35)	1.34* (2.84)	1.08** (2.52)	1.34* (2.87)
ELECTION YEAR	0.961 (1.36)	0.925 (1.23)	0.705 (0.917)	0.927 (1.33)	0.706 (1.01)
PARTISAN	0.809** (2.40)				
SURPRISE (definition A)		2.43** (1.99)	2.24*** (1.85)		
SURPRISE (definition B)				2.32*** (1.92)	2.22** (2.15)
DURATION		-0.109 (0.464)	-0.085 (0.350)	-0.097 (0.461)	-0.083 (0.446)
USGROWTH	0.320* (6.74)	0.320* (9.22)	0.352* (10.03)	0.321* (6.80)	0.352* (7.40)
USGROWTH(-1)	0.147* (3.05)	0.150* (4.35)	0.122* (3.49)	0.150* (3.19)	0.122*** (1.84)
USGROWTH(-2)	0.071** (2.05)	0.074** (2.13)	0.069** (1.97)	0.074** (2.18)	0.069*** (1.94)
<b>Statistics:</b>					
No. of Observations	128	128	80	128	80
Adj. R <sup>2</sup>	0.471	0.468	0.631	0.467	0.631
D.W.	2.16	2.15	2.28	2.15	2.28
Akaike info criterion	5.52	5.53	5.12	5.53	5.12
Wald Prob [c(2) = c(3) = c(4) = 0]	0.008*	0.07***	0.16	0.015**	0.038**

**Notes:** \* (\*\*)(\*\*\*) significantly different from zero at 1% (5%) (10%).

**PARTISAN** = [LIBERAL-(1-LIBERAL)]; **SURPRISE** = (1-SEATS)\*[LIBERAL-(1-LIBERAL)];

**DURATION** = ELAPSE\*[LIBERAL-(1-LIBERAL)].

**Definition A** - Fraction of Seats won by the governing party and minority status as determined by Beck (1968): 1870-1944; Canadian Parliament Web Site (2006): 1945-2000.

**Definition B** - Fraction of Seats won by the governing party and minority status as determined by the *Canadian Parliamentary Guide* (2002): 1870-2000.

**Note on the dating of elections:** Elections occurring between January 1 and July 30 are part of the current calendar year; otherwise they are considered to be in the following year.

**Table 3**  
**The Effect of Political Variables on the Inflation Rate in Canada: 1870 - 2000**  
(Newey-West HAC t-statistics in brackets)

<b>Dependent Variable</b>	(1) Inflation Rate 1872-2000	(2) Inflation Rate 1872-2000	(3) Inflation Rate 1921-2000	(4) Inflation Rate 1872-2000	(5) Inflation Rate 1921-2000
Constant	0.388 (1.64)	0.330 (1.31)	0.292 (0.727)	0.330 (1.18)	0.292 (0.879)
ELECTION YEAR(+1)	0.825*** (1.94)	0.927*** (1.92)	0.314 (0.560)	0.923*** (1.86)	0.308 (0.575)
PARTISAN	0.258 (1.23)				
SURPRISE (definition A)		1.42*** (1.72)	1.29 (1.17)		
SURPRISE (definition B)				1.36*** (1.70)	1.24 (1.45)
DURATION		-0.182 (0.929)	-0.094 (0.448)	-0.175 (1.16)	-0.090 (0.535)
USINFLATION	0.807* (14.31)	0.801* (13.13)	0.812* (10.08)	0.802* (13.24)	0.813* (12.82)
USINFLATION(-1)	0.061 (1.18)	0.066 (1.32)	0.076 (1.21)	0.066 (1.09)	0.076 (1.27)
<b>Statistics:</b>					
No. of Obs	129	129	80	129	80
Adj. R <sup>2</sup>	0.729	0.730	0.780	0.730	0.779
D.W.	1.76	1.77	1.03	1.77	1.03
Akaike Info criterion	4.67	4.67	4.34	4.67	4.34
WALD Prob[c(2)=c(3) = c(4) = c(5)= 0]	0.049**	0.11	0.50	0.14	0.47

**Notes:** \* (\*\*)(\*\*\*) significantly different from zero at 1% (5%) (10%).

For definitions, see Table 2.

**Table 4**  
**Engle-Granger Cointegrating Equations for LNGSIZE and TAXSIZE: 1870-2000**  
(Absolute value of t-statistics in brackets)

	<b>G</b> <b>S</b> <b>I</b> <b>Z</b> <b>E</b> (1)	<b>G</b> <b>S</b> <b>I</b> <b>Z</b> <b>E</b> (Political) (2)	<b>G</b> <b>S</b> <b>I</b> <b>Z</b> <b>E</b> (Saikkonen) <sup>#</sup> (3)	<b>T</b> <b>A</b> <b>X</b> <b>S</b> <b>I</b> <b>Z</b> <b>E</b> (4)	<b>T</b> <b>A</b> <b>X</b> <b>S</b> <b>I</b> <b>Z</b> <b>E</b> (Political) (5)	<b>T</b> <b>A</b> <b>X</b> <b>S</b> <b>I</b> <b>Z</b> <b>E</b> (Saikkonen) <sup>#</sup> (6)
Constant	-4.29 (2.97)	-5.54 (3.75)	-10.34* (6.72)	-2.52 (2.71)	-2.66 (2.76)	-3.61* (2.84)
LNRYPC	0.113 (1.12)	0.164 (1.65)	0.506* (5.31)	0.060 (0.814)	0.063 (0.854)	0.065 (0.748)
LNAGRIC	-0.057 (0.791)	-0.077 (1.08)	0.186** (2.11)	0.101 (2.34)	0.097 (2.14)	0.022 (0.364)
LNIMRATIO	-0.090 (4.17)	-0.090 (4.29)	-0.090* (4.18)	0.006 (0.480)	0.007 (0.543)	-0.011 (0.620)
LN YOUNG	-0.090 (0.357)	0.053 (0.212)	0.495*** (1.83)	-0.162 (1.21)	-0.132 (0.513)	0.050 (0.277)
LNOPEN	-0.503 (3.78)	-0.477 (3.67)	-0.310** (2.24)	0.033 (0.493)	0.035 (0.916)	-0.039 (0.443)
FIXED_EXCH	-0.201 (4.45)	-0.179 (4.01)	-0.130* (3.36)	-0.088 (3.71)	-0.087 (3.64)	-0.042 (1.68)
WW1	0.723 (8.30)	0.704 (8.26)	0.541* (6.48)	0.058 (1.01)	0.059 (1.02)	0.159** (2.30)
WW1Aftermath				0.327 (7.90)	0.333 (7.76)	0.399* (7.18)
WW2	1.69 (14.87)	1.61 (14.14)	1.37* (12.72)	0.951 (16.48)	0.948 (16.36)	0.830* (12.31)
WW2Aftermath	0.767 (9.35)	0.705 (8.49)	0.777* (7.87)	0.755 (18.71)	0.749 (18.03)	0.644* (9.47)
SEATS_a		0.508 (2.76)	1.78* (6.70)			
MINORITY_a					-0.016 (0.575)	-0.115** (2.33)
Statistics:						
Observations	131	131		131	131	
Adj R <sup>2</sup>	0.927	0.931		.975	0.975	
D.W.	0.778	0.826		0.948	0.948	
ADF test statistics						
MacKinnon (1996) critical values						
1% for 6 var = -5.12	-5.75*			-6.63*		
5% for 7 var = -5.44		-5.98*			-6.64*	

\* (\*\*)[\*\*\*] significant at 1% (5%) [10%].

# Saikkonen's (1991) estimator adjusts for inconsistency in the standard errors of the I(1) variables in the cointegrating equation by including the contemporaneous, lagged and led values of the first differences of both left and right hand side variables (with the exception of the dummy variables). Only the coefficients of the level terms are relevant and so presented. In addition, the standard errors and t-statistics were adjusted for the presence of correlation among the innovations of the I(1) variables by a factor formed by the ratio of two standard errors a) the standard error of the augmented equation divided by b) the "long run standard error". The latter is calculated as the square root of the variance plus two times the weighted sum of the significant autocovariances among the residuals (Saikkonen, 1991). This adjustment led to the originally estimated t-statistics in column (3) being multiplied by the factor .933 and the t-stats in (6) by the factor .874.

**Table 5**  
**Error Correction Models of Fiscal Policy**  
**Changes in Federal Government Expenditures/Taxes and Deficit as a Fraction of GDP: 1871 - 2000**  
(Absolute value of t-statistics in brackets)

	(1) Base Case 1871 - 2000	(2) Equations 1871 - 2000	(3) Political 1871 - 2000	(4) Variables 1871 - 2000	(5) Deficit 1871-2000	(6) Deficit 1871 - 2000
<b>Dependent Variable</b>	<b>D(LNGSIZE)</b>	<b>D(LNTAXSIZE)</b>	<b>D(LNGSIZE)</b>	<b>D(LNTAXSIZE)</b>	<b>LNDEFICIT</b>	<b>LNDEFICIT</b>
Error Correction term	-0.243* (3.88)	-0.234* (3.75)	-0.252* (3.68)	-0.238* (3.81)		
D(LNRYPC)	-0.741* (3.43)	-0.188*** (1.75)	-0.730* (3.39)	-0.185*** (1.73)	-0.869* (2.94)	-1.43* (4.34)
D(LNAGRIC)	-0.567*** (1.84)	-0.177 (1.15)	-0.529*** (1.72)	-0.176 (1.14)	-0.372 (0.730)	-0.397 (0.849)
D(LNYOUNG)	-2.94** (2.41)	-1.37** (2.29)	-3.04* (2.48)	-1.35** (2.28)	-7.82* (4.77)	-5.54* (2.95)
D(LNIMRATIO)	-0.083* (3.16)	0.017 (1.25)	-0.085* (3.32)	0.017 (1.29)	0.066*** (1.80)	-0.014 (0.353)
D(LNOPEN)	-0.108 (0.601)	0.152*** (1.69)	-0.085 (0.478)	0.153*** (1.71)	0.435*** (1.74)	0.334 (1.21)
Constant	-0.323* (3.96)	-0.133* (3.43)	-0.293* (3.68)	-0.132* (3.40)	-0.544* (4.14)	-0.553* (4.56)
WWI	0.195* (3.99)	0.019 (0.944)	0.194* (3.97)	0.019 (0.782)	0.626* (8.08)	0.530* (5.78)
WWIAfter	-0.312* (4.48)	0.111* (3.22)	-0.308* (4.42)	0.111* (3.22)	-0.213* (4.34)	-0.150 (1.37)
WWII	0.178* (3.62)	0.144* (5.93)	0.175* (3.56)	0.144* (5.93)	0.777* (9.46)	0.347* (3.35)
WWIIAfter	-0.308* (5.23)	-0.098* (3.27)	-0.282 (4.69)	-0.097* (3.28)	-0.236* (5.57)	-0.219** (2.45)
FIXED EXCHANGE RATES	0.052** (2.58)	0.009 (0.944)	0.052* (2.57)	0.010 (0.951)	-0.056 (1.38)	-0.046 (1.48)
SEATS_a	0.479* (3.77)	0.203* (3.37)	0.428* (3.47)	0.200** (3.33)	0.754* (4.25)	0.682* (3.58)
MBRATIO						14.47* (3.13)
<b>Statistics:</b>						
No. of Observations	130	130	130	130	130	129
Adj. R <sup>2</sup>	0.532	0.470	0.533	0.472	0.685	0.643
D.W.	1.66	1.69	1.65	1.68	0.830	0.820
Akaike info criterion	-1.59	-2.99	-1.59	-3.00	-0.897	-0.756

**Notes:** \* (\*\*) [\*\*\*] significant at 1% (5%) (10%).

The error correction term used for each equation was the lagged residual from the corresponding column in Table 2.

**Appendix:****Extreme Bound Analysis Concerning the Role of Opportunistic  
and Partisan Political Factors in Public Expenditure**

(using Table 5, column 1)

	<b>Seats<sup>A</sup></b>	<b>Minority</b>	<b>Election year Lagged</b>	<b>Elapse</b>	<b>Liberal</b>
Eq0	0.479*				
Eq1	0.533*	0.022			
Eq2	0.481*		-0.005		
Eq3	0.473*			0.002	
Eq4	0.492*				0.024
Eq5	0.535*	0.023	-0.006		
Eq6	0.531*	0.025		0.003	
Eq7	0.549*	0.024			0.024
Eq8	0.475*		-0.003	0.002	
Eq9	0.486*			0.003	0.024
Eq10	0.495*		-0.008		0.025
Eq11	0.532*	0.025	-0.004	0.003	
Eq12	0.489*		-0.006	0.002	0.025
Eq13	0.548*	0.027		0.003	0.024
Eq14	0.553*	0.024	-0.009		0.026
Eq15	0.550*	0.027	-0.006	0.003	0.025
<b>Average</b>	0.513	0.025	-0.006	0.003	0.025
<b>Std. Dev</b>	0.031	0.0018	0.002	0.0005	0.0007

\*significantly different from zero at one per cent.

**Extreme Bounds Analysis Table**

<b>Variable Name</b>	<b>Lower Bound</b>	<b>Upper Bound</b>	<b>% Sign. at 1%</b>	<b>% Sign at 10%</b>	<b>Standard Deviation</b>
Seats <sup>A</sup>	0.473	0.553	100%	100%	0.031
Minority	0.022	0.027	0	0	0.025
Election year	-0.009	-0.003	0	0	0.002
Elapse	0.002	0.003	0	0	0.003
Liberal	0.024	0.026	0	0	0.0007

## References

- Alesina, A. (1987) "Macroeconomic Policy in a Two-Party System as a Repeated Game", *Quarterly Journal of Economics* 106: 651-78.
- Alesina, A., N. Roubini, with G.D. Cohen (1997) *Political Business Cycles and the Macroeconomy*, Cambridge: MIT Press.
- Bartels, L.M., and H.E. Brady (2003) "Economic Behavior in Political Context", *American Economic Review*, 93: 156 - 161.
- Becker, G. S. (1983) "A Theory of Competition among Pressure Groups for Political Influence", *Quarterly Journal of Economics* 98: 371-400.
- Besley, Timothy, Torsten Persson and Daniel Sturm (2005). "Political Competition and Economic Performance: Theory and Evidence from the United States". Unpublished.
- Block, S., (2002) "Political business cycles, democratization, and economic reform: the case of Africa", *Journal of Development Economics* 67: 205-28.
- Borcherding, T.E., (1985) "The causes of government expenditure growth: A survey of the U.S. evidence", *Journal of Public Economics* 28(3), 359-382.
- Borcherding, T. E., Ferris, J. S. and Garzoni, A., (2004) "Changes in the Real Size of Government Since 1970", in Juergen Backhaus and Richard Wagner (eds.), *Kluwer Handbook in Public Finance* New York: Kluwer Academic Press, 77-108.
- Brender, A., and Drazen, A., (2005) "Political Budget Cycles in New and Established Democracies", *Bank of Israel Research Department Discussion Paper No. 2005.04*.
- Coughlin, P., (1994) *Probabilistic Voting Theory*. Cambridge University Press.
- Downs, A., (1957) *An Economic Theory of Democracy*. Harper and Row
- Drazen, A., (2000) "The Political Business Cycle after 25 years" *NBER Macroeconomics Annual*, Cambridge, MA: MIT Press, 75-117.
- Dudley, L. and Witt U., (2004) "Arms and the Man: World War I and the Rise of the Welfare State", *University of Montreal manuscript*, 35 pages.
- Engle, R.F. and Granger, C.W.J., (1987) "Co-integration and Error Correction: Representation, Estimation, and Testing," *Econometrica* 55, 2: 251-276.
- Ferris, J. S., Park, S. and Winer, S. L., (2005) "Political Competition and Convergence to Fundamentals: With Application to the Political Business Cycle and the Size of the Public Sector" <http://ssrn.com/abstract=833864>
- Ferris, J. S. and West, E.G., (1996) "Testing theories of real government size: U.S. experience, 1959-89", *Southern Economic Journal* 62, 3: 537-53.
- Ferris, J.S. and Winer S.L., (2003) "Searching for Keynes: With Application to Canada, 19870 - 2000" *CESifo Working Paper No. 1016*, 35 pages.
- Franzese, R. J., (2002) "Electoral and Partisan Cycles in Economic Policies and Outcomes" *Annual Review of Political Science* 5: 369-421.

- Haynes S.E. and J. A. Stone (1990) "Political Models of the Business Cycle Should Be Revived" *Economic Inquiry*, 28 ,3: 442-65.
- Heckelman, J.C., (2002) "Electoral uncertainty and the macroeconomy: the evidence from Canada", *Public Choice* 113: 179-189.
- Heckelman, J.C., (2006) "Another look at the evidence for rational partisan cycles", *Public Choice* 126: 257-274.
- Hettich, W. and Winer, S.L., (1999). *Democratic Choice and Taxation*. Cambridge University Press.
- Hibbs, D. (1977) "Political Parties and Macroeconomic Policy", *American Political Science Review* 71: 1467- 87.
- Kau, J. B. and Rubin P. H., (1981), "The Size of Government", *Public Choice* 37: 261-74.
- Kneebone, R. D. and McKenzie K. J., (1999) *Past (In) Discretions: Canadian Federal and Provincial Fiscal Policy*, Toronto: University of Toronto Press.
- Kneebone, R.D. and McKenzie, K.J., (2001) "Electoral and Partisan Cycles in Fiscal Policy: An examination of Canadian provinces" *International Tax and Public Finance* 8: 753-74.
- Kontopolous, Y. and Perotti, R., (1999) "Government Fragmentation and Fiscal Policy Outcomes: Evidence from OECD Countries" in Poterba J. and J. von Hagen, eds. *Fiscal Institutions and Fiscal Performance*, Chicago: University of Chicago Press, 81-102.
- Levitt, S. D. and J. M. Poterba (1999) "Congressional Distributive Politics and State Economic Performance", *Public Choice* 99: 185 - 215
- MacKinnon, J. G., (1996) "Numerical Distribution Functions for Unit Root and Cointegration Tests", *Journal of Applied Econometrics* 11, 6: 601-618.
- Malley, J., Philippopoulos, A., and Woitek, U., (2005) "Electoral Uncertainty, Fiscal Policy and Macroeconomic Fluctuations", *CESifo Working Papers* No. 1593.
- Metcalf, C., Redish, A., and Shearer R., (1998) "New Estimates of the Canadian Money Stock 1871-1967", *Canadian Journal of Economics* 31, 1: 104-124.
- Mueller, D., (1986) "Interest groups and the size of governments", *Public Choice* 48, 2: 125-145.
- Nordhaus, W. (1975) "The Political Business Cycle", *Review of Economic Studies* 42: 169-190.
- Persson, T., Roland, G. and Tabellini, G., (2004) "How do Electoral Rules Shape Party Structures, Government Coalitions, and Economic Policies." *CESifo Working Papers* No.1115.
- Rodrik, D. (1998) "Why do more open economies have bigger governments?" *Journal of Political Economy* 106, 997-1032.
- Rogoff, R. and Silbert A., (1988) "Elections and Macroeconomic Policy Cycles" *Review of Economic Studies* 55, 1: 1-16.
- Sapir, A. and K. Sekkat (2002) "Political cycles, fiscal deficits, and output spillovers in Europe" *Public Choice* 111: 195-205.

- Saikkonen, P., (1991) "Asymptotically Efficient Estimation of Cointegration Regressions", *Econometric Theory* 7, 1: 1-21.
- Schknecht, L., (1996) "Political business cycles in developing countries", *Kyklos*, 49: 155-70.
- Serletis, A. and Afxentiou, P.C., (1998) "Electoral and Partisan Cycle Regularities in Canada" *Canadian Journal of Economics* 31, 1: 28-46.
- Stigler, G.J. (1972) "Economic Competition and Political Competition", *Public Choice*, 13: 91-106.
- Urquhart, M. C., (1993) *Gross National Product, 1870-1926*, McGill-Queen's University Press.
- Winer, Stanley. L. (1986a) "Money and Politics in a Small Open Economy". *Public Choice* 51,2: 221-39.
- Winer, Stanley. L. (1986b) "The Role of Exchange Rate Flexibility in the International Transmission of Inflation in Long and Shorter Runs: Canada 1953 to 1981." *Canadian Journal of Economics*, 19, 62-86.