Public expenditures in Canadian provinces: An empirical study of politico-economic interactions

GENEVIÈVE TELLIER
University of Ottawa, School of Management, 136, Jean-Jacques Lussier st., K1n 6N5, Ottawa, Canada
(e-mail: tellier@management.uottawa.ca)

Abstract. It is widely believed that government ideology and electoral constraints are two major factors that influence the level of public expenditures. However, Frey and Schneider argue that the effects of the two phenomena are not simultaneous. Only when a government is popular can it pursue ideological goals, and when popularity is low, energies must be redirected toward gaining support from voters to win the next election. Data draw from the Canadian provincial case are used to test empirically this hypothesis. The findings support the Frey and Schneider explanation.

1. Introduction

For decades, scholars have shown a keen interest in the study of public expenditures. For the majority, the objective is to understand why public spending, particularly welfare spending, has grown so much during the 20th century (Larkey, Stolp, & Winer, 1981; Delorme & André, 1983; Holsey & Borcherding, 1997; Mueller, 2003). More recently, however, another stream of research is gaining in popularity: interest is now being shown for the analysis of short-term variations of public expenditures. The objective is not so much as to try to explain the evolution of public expenditures over the long-term, but more to gain some understanding about variations in the size of public budgets over short periods, generally from one year to the next.

Two widely accepted explanations of short-term fluctuations of public spending suggest that public budgets vary over time in a cyclical fashion. One explanation, the *electoral cycle*, claims that public expenditures will increase before an election and decrease afterward. The other explanation, the *partisan cycle*, argues that governments' ideology shapes policies and outcomes. Consequently, alternation in power between various political parties induces significant changes in the size of public budgets. It is commonly assumed that left-wing parties favor public spending increases while right-wing parties aim at budget reductions.

Over the years, many have come to accept the idea that the effect of the two cycles on public expenditures should be observed at anytime. This situation can occur since the underlying hypotheses of each of the two explanations

are not incompatible (Hibbs, 1992). However, this view has been challenged by Frey and Schneider (1978a,b, 1979). Although each cycle can explain observed patterns of public spending variations, they argue, their respective influence will only show up one at a time. While the Frey and Schneider hypothesis offers an explanation that deserves to be looked at more closely (Haynes & Stone, 1990; Hibbs, 1992; Paldam, 1997; Franzese, 2002), it has only occasionally been used in empirical tests on short-run variation of public spending. The objective of this paper is to present new empirical evidence with a dataset that has never been used until now.

Our observations are drawn from the Canadian provincial case. Canadian provinces are uniquely suited to this analysis for several reasons. Firstly, Canadian provinces share many common characteristics that make it possible to analyze them jointly. Pooling provincial observations do not necessitate the inclusion of control variables to consider differences between units of analysis, as is often required when data drawn from several countries are used. Consequently, the use of provincial data increases the degrees of freedom, thus making it possible to attain greater statistical significance. Secondly, each province is ruled by an elected autonomous government that has the power to tax, to spend and to borrow. The Canadian Constitution put some restrictions on the sources of revenue that can be used by provincial governments,[1] but not on the amount of spending, revenue, and borrowing. Consequently, provincial governments have enough power to determine autonomously the size of their respective budgets. Moreover, given that the provinces are parliamentary regimes, where policy-making power is concentrated among a small number of political actors, they may experience sharper electoral and partisan cycles than other subnational governments, such as German Länder or American States. Overall, Canadian provinces constitute an excellent experimental laboratory for the analysis of public expenditures, specifically for electoral and partisan cycles. Furthermore, this study is the first attempt to test empirically the Frey and Schneider hypothesis at the subnational level.

The paper is organized as follows. Section 2 presents a brief review of literature on the impact of electoral and partisan cycles on public expenditures. The theoretical model, developed by Frey and Schneider, is presented in Section 3 and tested empirically in Section 4. Section 5 presents some concluding comments.

2. Review of Literature

Interest in the electoral and the partisan cycle explanations began in the mid-1970s. The earliest empirical study of electoral cycles on budgetary outcomes is usually attributed to Tufte (1978) for his work on US federal public expenditures. Tufte's findings revealed, among other things, that federal transfer payments to individuals were generally higher during election years. Evidence

of an electoral cycle for macroeconomic indicators, such as unemployment and inflation, were presented in the pioneering work of Nordhaus (1975) and MacRae (1977). Whether budgetary outcomes or economic performance indicators are under scrutiny is of little relevance. In all cases, it is assumed that elections create an incentive for governments to behave *opportunistically*. Because incumbent politicians wish to be re-elected, they will try to use public policy instruments to improve economic conditions, thereby boosting their popularity and their chances of victory in the upcoming election. Consequently, it is believed that public expenditures increase just before an election, and decrease afterwards.

Some theoretical objections have been raised about the true effectiveness of government manipulation of the economy. The rational expectation hypothesis suggests that voters are aware of policymakers' real intentions and, for that reason, do not reward politicians for good economic performances. However, asymmetry of information between the government and voters might explain why the former is able to behave opportunistically: governments are better informed about their own performance than the voters (Rogoff & Sibert, 1988; Rogoff, 1990).

The partisan model developed by Hibbs (1977) is often regarded as the first attempt to formally explain partisan cycles. Although the partisan model was developed to explain fluctuations in macroeconomic indicators, it was also used to analyze budgetary outcomes (Cameron, 1978; Castles, 1982a,b). The partisan model postulates that ruling parties must implement policies consistent with the interest of their core constituencies that elected them. Consequently, politicians are driven by *ideological* motives. It is commonly assumed that left-wing parties favor public spending increases while right-wing parties aim at budget reductions. Because the partisan composition of governments changes over time, the size of public budgets should fluctuate.

Empirical testing of the electoral and the partisan cycles have produced mixed results. Supportive evidence, as well as lack of empirical significance, can be found for each explanation. However, when tested alone, each explanation usually receives empirical validation. For instance, patterns of electoral cycles in public expenditures have been observed in France (Aubin, Berdot, Goyeau, & Lafay, 1988), in Japan (Kohno & Nishizawa, 1990), in Canadian provinces (Blais & Nadeau, 1992), and more recently in developing countries (Schuknecht, 2000). The partisan cycle has also been identified in OECD countries (Blais, Blake, & Dion, 1993; De Haan & Sturm, 1994; Schmidt, 1996; Cusack, 1997; Midtbø, 1999). On the other hand, when the electoral and partisan cycles are tested jointly, empirical findings are far less conclusive. Although some studies do support both explanations (Swank, 1992; Van Dalen & Swank, 1996; Dickson & Yu, 1997; Kneebone & McKenzie, 2001), most reject one or both explanations (Golden & Poterba, 1980; Alt & Chrystal, 1981; Griffin, Devine, & Wallace, 1983; Browning, 1985; Lewis-Beck & Rice,

1985; Rice, 1986; Kamlet & Mowery, 1987; Sørensen, 1988; Hicks & Swank, 1992; Serletis & Afxentiou, 1998; Galli & Rossi, 2002).

Overall, it seems premature to discard either of them as a plausible explanation of public expenditures variations (Imbeau, Pétry, & Lamari, 2001; Franzese, 2002; Mueller, 2003). Moreover, conflicting results might suggest a more complex relationship between the two cycles and policy outcomes. For instance, the presence and magnitude of an electoral and/or partisan cycles might be conditional on specific attributes of political institutions. Some claim that the cycles should be more noticeable in a democracy where policy-making power is less diffuse among various political actors, such as in parliamentary systems (Franzese, 2002). Others have questioned the conventional view that the two cycles are independent one from the other. According to Frey and Schneider (1978a,b, 1979), governments may only behave in an opportunistic fashion when they believe that their chances of winning the next election are small; otherwise, they will follow their ideological stance. Thus, to measure the effect of both the partisan and the electoral cycle on public spending, one should also take into account the uncertainty of governments about their political future.

Frey and Schneider presented empirical evidence supporting their hypothesis with data for the US (1978b), Germany (1979) and Britain (1978a). Schneider and Pommerehne (1980) tested the model with Australian data but found only partial support for the hypothesis: evidence of insecure opportunistic governments was uncovered, but not of secure partisan politicians. The nature of the Australian political regime may explain this result: the legislative mandate cannot exceed a period of three years, which may not give enough time to incumbent governments to put their ideological goals into practice. The specific institutional framework of the country has also come into play elsewhere. Analyzing the Frey and Schneider hypothesis with Canadian federal expenditures, Pétry and Harmatz (1995) found evidence of opportunistic behavior when governments are uncertain about their political future and ideological behavior when they are confident in winning the next election, but only when the presence of minority governments and the Prime Minister's province of origin are taken into account. Data from Sweden and the Netherlands were also analyzed, but no empirical support was found (Lybeck, 1986; Renaud & van Winden, 1987). However, the studies relied on monthly observations of public expenditures and, consequently, the results may reflect that partisan and electoral cycles are not detectable within very short periods.

Other studies have suggested that the insecurity of the incumbent party is relevant. For instance, Devine (1985) reported that federal public expenditures were reduced when Republicans enjoyed high popular support and controlled the American Congress. Schultz (1995), examining transfer payments in Great Britain, found evidence of an electoral cycle once the government's lead in voting intention polls over the main opposition party is taken into account.

Pétry, Imbeau, Crête, and Clavet (1999), using Canadian provincial observations, showed that ideology matters but only during non-electoral years.

Overall, empirical evidence seems to support the Frey and Schneider hypothesis, although some studies do not. However, because of the small number of attempts to test the model, generalizations are difficult to make. This calls for more empirical investigations.

3. The Theoretical Model

Frey and Schneider offer a positive model of politico-economic interactions between the economy and the polity. The model aims at describing the interdependency between the government and the state of the economy. The government is one of the major actors of the model. Its objective is to maximize its utility subject to a set of constraints. The government derives utility by establishing public policies that meet its ideological stance. The more it stands to the left, the more it favors public expenditures increases. However, the government can pursue its goals only if it can secure its re-election. Consequently, it faces an electoral constraint. If the government fears defeat in the next general election, it will undertake an expansionary budget policy to stimulate the state of the economy and, therefore, its support among voters. This assumption implies that a governing party may favor a budget reduction, but is unwilling to implement it because of electoral pressures.

A second group of actors in the model are voters. They too are assumed to maximize their utility subject to constraints. Moreover, voters hold the government accountable for the state of the economy and believe that it can use policy instruments to change it. Consequently, they support the incumbent government if they are satisfied with its economic performance. However, voters may find that gathering information about the true competency of the government required time and money at a cost that outweigh the benefits of being well informed. For that reason, it becomes rational for them to use broad macroeconomic indicators, such as unemployment and inflation, to evaluate the performance of the incumbent. Consequently, they give their support to the government if they are satisfied with the current (or slightly lagged) state of the economy and vote against it otherwise.

Whether a government can pursue its ideological goals or must address the electoral constraint can be determined by using the concepts of *surplus* and *deficit of popularity*. It is assumed that there is a critical level of popularity necessary to win the next election. The critical level of popularity is a predefined value that takes into account the characteristics of political institutions (e.g. the number of competing parties) and the degree of risk aversion of the governing party. If the actual level of popularity, as estimated by opinion polls, is greater than the critical value, the government faces a surplus of popularity and is free to pursue its ideological goals. The larger the surplus, and the

farther away the next election, the more freedom the government has to implement preferred policies. However, if the actual level of popularity is less than the critical value, then the government needs to secure its re-election. Once again, the difference between the actual and the critical value of popularity, and the timing of the next election, matters. The larger the deficit, and the closer the next election, the more urgent is the need for the government to act.

Constraints that are independent of the government's ideology and electoral pressures may also affect the use of policy instruments. Frey and Schneider pointed out that bureaucrats have a strong influence on budgetary decisions, and that their interest lies primarily in the continuous expansion of state activities. Consequently, they can be an element of resistance to change, which is consistent with the observed incremental approach of the fiscal decision-making process. In addition, it is expected that governments aim for balanced budgets. It is possible for governments to borrow money if revenues collected from taxation to finance public expenditures turn out to be insufficient, but deficits cannot be carried on indefinitely. Finally, some increases in the size of public expenditures may simply be the result of increasing costs of providing goods and services to the population. This phenomenon arises because the productivity of the public sector is normally considered lower than the productivity of the private sector.[2]

The model formulated by Frey and Schneider can be represented by the following equation:

$$\Delta Spending_t = \beta_0 + \beta_1 \Delta Revenue_{t-1} + \beta_2(1-Q) \cdot Election_t$$
$$+ \beta_3(1-Q) \cdot Popularity^2_{t-1} + \beta_4 Q \cdot Left \cdot Popularity^2_{t-1}$$
$$+ \beta_5 Q \cdot Center \cdot Popularity^2_{t-1}$$
$$+ \beta_6 Q \cdot Right \cdot Popularity^2_{t-1} + \varepsilon_t \qquad (1)$$

The dependent variable ($\Delta Spending$) is the annual percentage change of total provincial public expenditures, in constant dollars. This measure takes care of two constraints introduced above: the bureaucratic constraint, represented by the incremental nature of public expenditures variations (corresponding to annual changes), and the productivity lag between the public and the private sectors: expenditures are deflated with a specific public sector price index instead of one that assumes that price variations are the same for the public and the private sectors, for instance, the GDP implicit price index (see the appendix for more detail).

The budgetary constraint is taken into account by the variable $\Delta Revenue$, the annual variations of public revenue, expressed in real terms. The variable is lagged one period to allow for the time needed by the government to react to fiscal changes. A positive relationship between revenues and expenditures is expected, thus $\beta_1 > 0$.

The presence of a surplus or a deficit of popularity is captured by the variable Q, a dummy variable equal to 1 in the case of a surplus of popularity, and 0 in the case of a deficit of popularity. To determine if a government faces a surplus or a deficit of popularity, a critical value of popularity must first be established. In Canada, governments are elected with the simple majority rule, so an incumbent only needs to receive more votes than its main opponent to remain in power. Consequently, as long as the government is the most popular party, it can be confident at winning the next election. Thus, the government's popularity can be defined as its lead over its main opponent, as expressed in opinion polls. The critical value of the popularity lead is then equal to zero.[3]

If there is a deficit of popularity ($Q = 0$), the government uses public expenditures to secure its re-election. It is supposed that the government react more strongly if the deficit of popularity is high and the date of the next general election is near. The variables *Election* and *Popularity* measure, respectively, the amount of time that has elapsed since the last general election, and the support received by the government from the electorate, as expressed by opinion polls. Consequently, the estimated values of the coefficients are expected to be positive, $\beta_2 > 0$ and $\beta_3 > 0$. The model uses a lagged squared measure for the variable *Popularity* to give more weight to higher values, and to take into account the time needed by the government to react to the situation.[4]

If there is a surplus of popularity ($Q = 1$), the government is free to put its ideological goals into practice. It is a common procedure to distinguish between two major ideological stances, the left and the right, when partisanship is measured. However, the model can be extended to more than two categories. When Canadian provinces are analyzed, three distinct types of political parties are generally identified (McAllister, 1989; Abizadeh & Gray, 1992; Pétry et al., 1999): those of the left (the New Democratic Party and the *Parti Québécois*), of center (The Liberal Party), and of the right (the Progressive Conservative Party and the Social Credit Party). In Eq. (1), each of the three categories is represented by a dummy variable (*Left*, *Center* and *Right*), taking the value 1 if the governing party belongs to the group identified, and 0 otherwise. Since it is assumed that the government has more leeway when its popularity is high, each ideological variable is multiplied by the squared value of *Popularity*. Once again, the variable is lagged one period to take into consideration the reaction time needed by the government to adjust to the situation. It is generally assumed that left-wing governments favor budget increases and right-wing governments seek to cut public expenditures. Therefore, we should expect $\beta_4 > 0$, $\beta_6 < 0$, and $\beta_4 > \beta_5 > \beta_6$.

However, the assumption about the objective of right-wing governments may be too restrictive. The expenditures of several public programs tend to increase automatically because the size of the eligible population receiving public services is also increasing (this is the case for several services provided in the health care, education, and social services sectors, which together account

for more than half of the total provincial budgets in Canada). For that reason, right-wing governments may not be in a position to cut the total amount of public spending as much as they desire. However, it should be expected that the values of the estimated coefficients, associated with the measures of ideology, respect the following conditions: $\beta_4 > 0$, and $\beta_4 > \beta_5 > \beta_6$.

4. Empirical Testing

The model was tested with annual observations measuring public spending in six provinces over the period 1983–1995. The six provinces are Quebec, Ontario, Manitoba, Saskatchewan, Alberta, and British Colombia. A total of 65 annual observations were used.[5] We would have liked to include the four Maritime Provinces in our data set (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick), but reliable information on public attitudes toward provincial governments is unavailable. Table 1 provides descriptive statistics of the variables used in this study. The appendix gives more details on variables operationalization and data sources.

The observations were pooled into a single database to take full advantage of the time-series cross-section (TSCS) design that is available. However, TSCS data are likely to produce error terms that are in violation with basic assumptions when ordinary least squares (OLS) estimators are computed. Indeed, such is the case with our dataset. OLS regression estimates indicate that error disturbances are characterized by heteroscedasticity and autocorrelation. We used the procedure recommended by Beck and Katz (1995), which is ordinary least squares corrected for AR(1) disturbances, and panel-corrected

Table 1. Descriptive statistics of variables used in the regressions ($N = 65$)

Variable	Mean	Standard deviation	Minimum value	Maximum value
$\Delta Spending$	1.966	4.784	−13.79	14.83
$\Delta Revenue$	2.695	6.198	−24.16	19.02
Q	0.477	0.503	0.00	1.00
Popularity	0.228	22.746	−44.20	50.80
Election	32.692	16.654	6.00	60.00
Left	0.262	0.443	0.00	1.00
Center	0.169	0.378	0.00	1.00
Right	0.569	0.499	0.00	1.00
Budgetary Balance	−7.869	7.627	−26.83	13.82
$\Delta Transfers$	1.571	8.730	−13.27	18.52
$\Delta Personal\ Income$	1.677	3.081	−3.98	8.60

standard errors (PCSE) used to generate *t statistics*.[6] Beck and Katz argued that this method yields more robust estimates that the Parks–Kmenta feasible generalized least squares model, frequently used with TSCS data with non-spherical error terms.[7]

The estimates for Eq. (1) are displayed in Table 2 (second column). As indicated by the coefficient of determination (*Buse R^2*),[8] the model explains 40% of the variance of annual variation of provincial public spending. Furthermore, five of the six estimated parameters have the expected sign and are statistically significant at a level of 1%. The coefficient of the budgetary constraint indicates a positive relationship between public revenue and expenditures. However, it can be noted that the impact of a change in revenue is not totally transmitted to expenditures: a one percentage-point increase in real revenue increases public provincial budget by less than one quarter of a point ($b_1 = 0.2214$). Therefore, the impact of the budgetary constraint, when measured by the variable $\Delta Revenue$, although statistically significant, seems of little magnitude, at least if balanced budgets are the target.

The estimates also confirm the presence of a positive relationship between public spending and the proximity of the next election when the government faces a deficit of popularity. The closer the next election, the more the government will increase public expenditures. It can be said that if a government is struggling with a deficit of popularity during a whole year, it will increase its budget on average by about 1.3 percentage points during its first year in office ($b_2 = 0.1113 \times 12$ months), and up to 6.7 percentage points during its last year (60 months). Overall, our estimates seem to indicate that the electoral constraint can have an important effect on the growth of public expenditures (as indicated in Table 1, the average annual variation of public spending was equal to 1.066 percentage points).

The signs and values of the three estimated coefficients related to ideology are also as predicted by the model. Our findings reveal that left-wing governments increase public expenditures more than twice as much as centrist and right-wing governments do ($b_4 > b_5 > b_6$) when they have a surplus of popularity. Increases in public expenditures are also higher under centrist governments compared to the right ($b_5 > b_6$). Our estimates indicate, for instance, that a left-wing government, having a 10 percentage-point lead in opinion polls, will increase public expenditures by 1.22% per year compared to 0.55% for a centrist government and 0.40% for a right-wing government receiving similar support from the electorate. If the lead is equal to 20 percentage points (a situation that has occurred on many occasions; as shown in Table 1, *Popularity* has reached a maximum of 50.8 percentage points during the period under investigation), the annual increase will be 4.88, 2.2 and 1.6% for the left, the center and the right, respectively. It can be noted that the sign of the coefficient associated with the presence of a right-wing government is positive: public spending does increase even when a right-wing

Table 2. Regression estimates for the Frey and Schneider hypothesis

Variable	Equation (1)	Equation (2)	Equation (3)	Equation (4)	Equation (5)
$\Delta Revenue$	0.2214 (2.68)***	0.2022 (1.89)*	0.2019 (1.99)*	0.1980 (1.90)*	0.0872 (4.86)***
$(1 - Q) \cdot Election$	0.1113 (4.70)***				
$(1 - Q) \cdot Popularity^2$	−0.0009 (−0.80)				
$Q \cdot Left \cdot Popularity^2$	0.0122 (2.75)***				0.0102 (2.97)***
$Q \cdot Center \cdot Popularity^2$	0.0055 (3.63)***				0.0032 (2.41)**
$Q \cdot Right \cdot Popularity^2$	0.0040 (4.06)***				0.0027 (3.91)***
$Election$		0.0551 (1.62)	0.0651 (1.92)*	0.0619 (1.77)*	
$Left$		−1.7105 (−1.02)	−1.6413 (−0.98)		
$Center$		0.9933 (0.85)	0.2268 (0.18)		
$Right$		−0.1705 (−0.13)	−0.5585 (−0.40)		
$Popularity^2$			0.0011 (1.30)		
$Left \cdot Popularity^2$				0.0010 (1.10)	
$Center \cdot Popularity^2$				0.0024 (1.53)	
$Right \cdot Popularity^2$				0.0014 (1.18)	
$Budgetary\ Balance^2$					0.0128 (4.49)***
$\Delta Transfers$					0.1771 (3.46)***
$\Delta Personal\ income^2$					0.0871 (3.53)***
$Constant$	−1.8108 (−2.37)**			−0.7147 (−0.56)	−0.2503 (−0.37)
N	65	65	65	65	65
Buse R^2	0.4005	0.1554	0.1815	0.1676	0.6208

t statistics in parentheses. ***p-value < 0.01; **p-value < 0.05; *p-value < 0.10.

government has the opportunity to implement its political program. This finding is not necessarily contradictory to prediction, as public budgets might increase because of an augmentation in the number of individuals eligible to receive public services.

The only variable that fails the statistical significance test is the popularity of the government when it faces a deficit of popularity. In other words, popularity alone is not a factor that seems to incite a government to increase spending when it is less popular than its main contender. Should we therefore conclude that the whole concept of popularity and, more generally, of government insecurity is irrelevant in explaining annual variations in public expenditures? If such is the case, then the electoral and the partisan cycles might have an effect on public expenditures at all time, and the Frey and Schneider hypothesis would be invalid. Consequently, the subject must be investigated in more depth.

Removing all indicators of popularity (*Popularity* and *Q*) from Eq. (1) we can estimate the following equation (Eq. (2)) and verify if the effect of the two cycles are independent of each other. If they are, Eq. (2) should produce estimates that have the predicted sign (as described above), are statistically significant and explain a larger amount of the variance in public expenditures.

$$\Delta Spending_t = \beta_1 \Delta Revenue_{t-1} + \beta_2 Election_t + \beta_3 Left_{t-1}$$
$$+ \beta_4 Center_{t-1} + \beta_5 Right_{t-1} + \varepsilon_t \qquad (2)$$

The estimates for Eq. (2)[9] are presented in the third column of Table 2. We can see that the explanatory power of the regression drops to about 16% (compared to 40% for Eq. (1)) and that none of the estimated coefficients are statistically significant at the 5% level (although $\Delta Revenue$ is statistically significant at a level of 10%). Moreover, some estimated coefficients linked with ideology display values contrary to prediction. For instance, our findings indicate that left-wing governments reduce public spending ten times more than right-wing governments. Clearly, Eq. (2) does not provide support for a refutation of the Frey and Schneider hypothesis.

Our initial findings could also suggest that the behavior of governments might by influenced by the level of popularity, but not by the presence of a surplus or a deficit of popularity. Once again, the underlying assumption would be that the electoral and the partisan cycles are independent from each other. Dropping only the variable *Q* from Eq. (1) and assuming that there is no interaction between the level of popularity of the government and its ideology, the model can be rewritten in the following way:

$$\Delta Spending_t = \beta_1 \Delta Revenue_{t-1} + \beta_2 Election_t + \beta_3 Left_{t-1}$$
$$+ \beta_4 Center_{t-1} + \beta_5 Right_{t-1} + \beta_6 Popularity_{t-1}^2 + \varepsilon_t \qquad (3)$$

Some have suggested that popularity can nonetheless interact with ideology (Devine, 1985). If such is the case, the model of estimation can be represented by Eq. (4):

$$\Delta Spending_t = \beta_0 + \beta_1 \Delta Revenue_{t-1} + \beta_2 Election_t$$
$$+ \beta_3 Left \cdot Popularity_{t-1}^2 + \beta_4 Center \cdot Popularity_{t-1}^2$$
$$+ \beta_5 Right \cdot Popularity_{t-1}^2 + \varepsilon_t \qquad (4)$$

The estimates for Eqs. (3) and (4) are presented in columns 4 and 5 of Table 2. These additional estimates do not provide better explanations for changes in public spending than Eq. (1). In both cases, the explanatory power is lower, and several estimated coefficients have a sign or value contrary to predictions, and are not statistically significant. Overall, the sensitivity analysis presented here gives additional support to the Frey and Schneider hypothesis: the existence of an electoral or a partisan cycle is conditional to the presence of a surplus or a deficit of popularity. However, it must be pointed out that, contrary to what has been observed elsewhere (in Germany, the United States, the United Kingdom, and in Canada for the federal government), the value of the popularity deficit alone does not induce provincial governments to increase their budget.

Although our analysis indicates that both the ideological goals of the government and the electoral constraint influence annual variations in public expenditures, we may wonder if the model, as formulated by Frey and Schneider, is well adapted to the Canadian provincial case. The overall explanatory power of our estimates (40%) may suggest that some additional characteristics, related to the Canadian provincial case, should be added to the model. It seems relevant to look more closely at the budgetary constraint. The estimated coefficient associated to the variable $\Delta Revenue$ was surprisingly low: if a government wants to balance its budget, as the model assumes, then the estimated value should be close to unity. However, our estimate is far from this value (around 0.22 or less). It may be that our choice of indicator is inappropriate. Some authors (Schneider & Pommerehne, 1980, for instance) suggest using past deficits instead of public revenue to measure the budgetary constraint. In addition, the impact of federal transfers on provincial expenditures may be important. Several studies have shown evidence supporting the presence of this relationship in Canada (Simeon & Miller, 1980; Abizadeh & Gray, 1992; Lachapelle, 1994; Pétry et al., 1999). Finally, since nearly 50% of total provincial revenue comes from personal income and consumption taxes (in addition, about 15% is financed by federal transfers, 10% by investment income, and 6% by corporate taxes), it seems that the capacity of taxpayers to finance public budgets should also be taken into account. For this reason, three new indicators of the budgetary constraint can be substituted for the

variable $\Delta Revenue$. The model can now be estimated as follows:

$$
\begin{aligned}
\Delta Spending_t = {} & \beta_0 + \beta_1(1-Q) \cdot Election_t + \beta_2 Q \cdot Left \cdot Popularity_{t-1}^2 \\
& + \beta_3 Q \cdot Center \cdot Popularity_{t-1}^2 + \beta_4 Q \cdot Right \cdot Popularity_{t-1}^2 \\
& + \beta_5 Budgetary\,Balance_{t-1}^2 + \beta_6 \Delta Transfers_t \\
& + \beta_7 \Delta Personal\,Income_{t-1}^2 + \varepsilon_t
\end{aligned}
\tag{5}
$$

where *Budgetary Balance* is the ratio of public provincial deficit in percentage of total public expenditures,[10] $\Delta Transfers$, the annual variation in percentage of federal transfers (in real terms) to the provincial government, and $\Delta Personal\ Income$, the annual variation in percentage of provincial personal income (also in real terms). It is expected that all coefficients related to the budgetary constraint will be positive ($\beta_5 > 0$, $\beta_6 > 0$, $\beta_7 > 0$).

The estimates for Eq. (5) are presented in the last column of Table 2. The modified model now explains about 60% of the variance in annual variations of provincial public spending. In addition, all of the seven estimated parameters have the expected sign and are statistically significant at the 1% level for all parameters, except $Q{\cdot}Center{\cdot}Popularity^2$, which is significant at the 5% level. All of the fundamental assumptions identified in the initial model (Eq. (1)) are supported when the three new variables, related to the budgetary constraint, are incorporated in the model (Eq. (5)).

5. Summary and Concluding Remarks

The purpose of this paper was to investigate whether the hypothesis, formulated by Frey and Schneider, on the interaction between the electoral cycle and the partisan cycle could be validated empirically for Canadian provinces. According to Frey and Schneider, the governments should be treated as endogenous actors of our economic system when fiscal policies are under investigation. Public interventions cannot solely be understood as a response to society needs; they are also shaped by politicians' preferences. Governments act opportunistically when they believe that their chances of winning the next election are small, and behave according to their ideological stance otherwise. Therefore, electoral and partisan cycles should be observed only when uncertainty of governments about their political future is accounted for.

Using Canadian provincial public spending over the 1983–1995 period, we found empirical support for the Frey and Schneider explanation, validated by our sensitivity analyses. Provincial governments' ideology has an impact on public expenditures, the Left spending more than the Center and the Right. However, our analysis shows that two constraints limit the ability of incumbents to act ideologically. Furthermore, these two constraints can have

opposing effects. On the one hand, the need to be re-elected incites provincial governments to increase their spending, notwithstanding their partisan view. Should this constraint be the only one faced by elected officials, then the model would predict a permanent growth of public expenditures in Canadian provinces. On the other hand, however, fiscal pressures can compel governing parties, of all political hues, to reduce public spending. Consequently, budgetary increases are not inevitable. This fact is supported by our data: during 17 of the 65 years investigated here, annual variations in provincial total budgets were negative.

In addition, the model presented in this study shows that one, and only one, of the two constraints comes into conflict with the partisan stance of the ruling party. Fiscal pressures can force left-wing governments to cut expenditures, while the electoral constraint pushes right-wing governments to increase spending. Therefore, if incumbents want to take full advantage of the model's implications, they should plan when to adopt ideology-oriented policies. The Right should implement right-wing policies at the beginning of the legislative term, when the influence of the electoral constraint is less significant, while the Left should increase spending at the end of its mandate to take advantage of the proximity of the next election, while reducing expenditures earlier during its term if the fiscal constraint needs to be addressed (the model's implication are far less clear for centrist parties, however).

Our study is the first attempt to test the Frey and Schneider hypothesis at the subnational level. Does Canada constitute a unique case? At first sight, there seems to be no reason why this should be the case. Under democratic rules, it can be expected that politicians are driven by electoral and partisan motives. However, constitutional rules and the characteristics of political institutions may limit the politicians' margin of maneuver. For instance, in the case of Canada, our analysis has shown that factors linked to the capacity of provincial governments to raise revenues are important, particularly transfer payments received form the Federal government. Consequently, the willingness of the Canadian federal government to finance provincial programs is relevant. Can other characteristics be identified, for the case of Canadian provinces and for other subnational governments (e.g. American States, German Länder, Swiss Cantons, etc.)? We believe that this point should be further investigated.

Appendix: Variables Operationalization and Data Sources

$\Delta Spending$: Annual variation of total provincial public spending in percent ($\frac{Spending_t - Spending_{t-1}}{Spending_{t-1}} \times 100$). Annual variations measured in *percentage* are in order, since the size of the provincial budget can vary significantly from one province

to another one. For instance, the provincial budget of Saskatchewan is roughly ten times smaller than Ontario's. Total provincial public spending were measured in constant terms (1992 = 100) before been transformed in annual variations. Public expenditures in constant terms were computed by first disaggregating total provincial expenditures into several subcategories; secondly, measuring each subcategory in constant dollars with an appropriate price index; thirdly, adding all subcategories expressed in constants terms to obtain a measure of total expenditures in constants dollars. Once expenditures are expressed in current and in constant terms, a price index for the public sector can be computed. More details about this procedure are in Imbeau, Pétry, Crête, Tellier, and Clavet (2001). Public expenditures are measured on the basis of the fiscal year (from April 1st to March 31st of next year). Unless indicated otherwise, all explanatory variables used in this study were compiled on the same annual basis. Data from Statistics Canada, *Financial Management System, Public Sector Statistics*, catalogue n° 68–512, for provincial spending in current dollars and *Provincial Economic Accounts*, catalogue n° 13–213, for the price indexes.

$\Delta Revenue$: Annual variation of total provincial public revenue in percent, deflated with the provincial public sector price index (as indicated above). Data from Statistics Canada, *Financial Management System* and *Provincial Economic Accounts*.

Q: Dummy variable indicating whether the government faces a popularity surplus (when its popularity is higher than the popularity of its main opponent) or a popularity deficit (when its popularity is lower than the popularity of its main opponent). $Q = 1$ when there is a surplus of popularity and 0 otherwise.

Popularity: The difference between the popularity of the government and that of the main opposition party. Popularity measures provincial share (in percentage) of vote intentions of decided voters for each party as reported by opinion polls. Raw data are taken from three independent private survey firms conducting national surveys on a regular basis: Pollara, Environic and Ipsos-Reid. Answers to the following question were used: '*If provincial elections were held today, which one of the following parties would you vote for?*' Data were first collected on a quarterly basis to insure that observations measured public opinion all year long and then averaged over one year. The margin of error of annual measures is no more than ± 3.9 points of percentage 19 times out of 20 (and no more than ± 2.2 in the case of Quebec and Ontario, the two most populated Canadian provinces).

Election: Number of months since the last general provincial election, including months of the current year. If there is a minority government, then a provincial election might be called at any time without the consent of the government. To include this characteristic into the model, the variable *Election* takes the highest possible value (60) if there is a minority government

Data compiled with information provided by the *Canadian Parliamentary Guide*.

Left, *Center* and *Right*: Dummy variables indicating current government ideology. If an election occurs during a given year, the political party in power during more that half of the financial year is considered the ruling party. Therefore, if an election occurs before October 1st, the governing party is the new elected party; otherwise, the ruling party is the one in power before the election is held. Data compiled with information provided by the *Canadian Parliamentary Guide*.

Budgetary Balance: Ratio of provincial public deficit as a percentage of total provincial public spending ($\times 100$). Squared values were multiplied by -1 when a deficit occurred so a negative value indicates a deficit and a positive value a surplus. Data from Statistics Canada, *Financial Management System*.

Δ*Transfers*: Annual variation of total federal transfers to provincial governments in percent ($\times 100$), deflated with the provincial public sector price index (as indicated above). Data from Statistics Canada, *Financial Management System* and *Provincial Economic Accounts*.

Δ*Personal Income*: Annual variation of total provincial personal income in percent ($\times 100$), in constant dollars ($1992 = 100$). Squared values were multiplied by -1 when a decrease occurred so a negative value indicates a decline of personal income and a positive value an increase. The price index is the implicit price index for personal expenditure on consumer goods and services. The information required to compute this variable is only available on a civil year basis (January 1st to December 31st). Data from Statistics Canada, *Financial Management System* and *Provincial Economic Accounts*.

Notes

1. The federal government has unlimited taxation powers, but provincial authorities can only draw their revenue from direct taxation, which, however, encompass income, sales and property taxes.
2. The openness of the economy may also constitute another constraint (Frey & Schneider, 1978a; Schneider & Pommerehne, 1980). However, it seems inappropriate to take into account this constraint here since external trade is under exclusive federal jurisdiction in Canada.
3. It should be pointed out that the *exact* value of the critical level of popularity does not seem to matter. Frey and Schneider tested different critical values and found no significant empirical differences. Our own analyses confirmed this fact for Canadian provinces.
4. However, the use of a squared measure may be called into question. For that reason, we also tested the model without squaring the variable LEAD. The estimates were similar to the ones obtained for Eq. (1) although the coefficient of determination was smaller.
5. Missing observations prevented us to use time series that cover the whole period for all six provinces. Data are missing for 1983 and 1984 for Manitoba, Saskatchewan, Alberta and British Colombia, 1985 and 1986 for Manitoba and Saskatchewan, and 1995 for Ontario. Also, because the public expenditures data series used in this study have been interrupted

in 1995 (and replaced with a new series that is not strictly compatible with the former) it is not possible to extend our analysis after that year.

6. The statistical analysis was performed with the use of SHAZAM.

7. The robustness of our estimates was also tested by running six distinct TSCS regressions in which one province was in turn omitted. The estimates were quite stable from one regression to another and similar to the one obtained when the six provinces were used.

8. The Buse R^2 replaces the conventional R^2 when time series cross-section data are used. Generally, it can be used in the same manner as R^2, although the Buse R^2 is not guaranteed to be a non-decreasing function of the number of explanatory variables (Whistler, White, Wong, & Bates, 2004).

9. In order to avoid the dummy trap problem, the constant term was dropped from the equation.

10. Following the line of though presented by Frey and Schneider, the variable *Budgetary Balance* is squared to give more weight to higher values, because it is assumed that governments will react more strongly to higher deficits. A negative value indicates the presence of a public deficit and a positive value, a surplus. The same applies for Δ*Personal Income*. It should be noted that estimations without squared variables were undertaken and the results did not change the overall findings.

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