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Does Political Competition affect Fiscal Structure?
What time series analysis says for Canada, 1870 - 2015[1]

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Abstract

This paper asks whether political competition has played a role in moderating the governance issues that arise in relation to Canada's fiscal structure. By fiscal structure we mean three distinct but interrelated fiscal dimensions of the state: financial stability, long run size and short run interventions into the private economy, particularly with respect to the business cycle. The distinctiveness of this paper is that it focuses on four different measures of the degree of political competition: the size of the seat majority of the governing party in the House; the distribution of the volatility adjusted winning margins of the governing party; the proportion of electorally marginal constituencies adjusted for asymmetry; and the Przeworski-Sprague measure of electoral competitiveness at the constituency level. The analysis accounts for the differing time series properties of the political and economic variables and the comingling of long and short term fiscal policies in the time series data while finding support for the hypotheses that greater political competition will enhance fiscal stability (maintain a non-accelerating debt to GDP ratio), that government size will converge from above on economic and structural fundamentals and that period deficits/surpluses will align better with the business cycle. The potential impact of greater political competition is analyzed by applying the deficit model to the period of fiscal instability that arose in the 1980's.

JEL classifications: H1, H3, H5
Key Words: political competition, fiscal stability, government size, ARDL models.

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1. Introduction

This paper is concerned with the role played by political competition in moderating the principal-agent problems that arise in relation to a country's fiscal structure. By fiscal structure we mean three distinct but interrelated fiscal dimensions of the state: its financial stability, its long run size and its short run interaction with the private economy in response to the business cycle. To model any or all of these elements in terms of the underlying preferences of voters in a democracy (given technology, endowments and the shocks that hit the economy) there must exist some significant degree of political competition, otherwise the governing party would simply pursue its own special interest at the expense of general welfare (Downs, 1957; Wittman, 1989; Coughlin, 1994; Chen, 2000). For this reason we look at political competition as the key ingredient that ties the output of the state to the wishes of the community. It does so by generating the appropriate incentives for politicians and governments when designing and implementing economic policy (Winer and Ferris, 2008). The analysis is then applied to Canada.

From an overall perspective, the long run survival of Canada's parliamentary system and the continued advancement of economic welfare in Canada suggest that the degree of political competition has been both substantial and beneficial. However, the view that political competition does in political markets the same thing that economic competition does in private markets - that is, drive tax-prices down to marginal cost while insuring the level of services demanded by voters - is not the only possibility.[2] In the same way that the absence of property rights in economic markets leads market competition among rivals to overproduce and so dissipate economic rents, political competition is sometimes argued to have become excessive, leading to excessive size and the corruption of public policy (in a welfare sense).[3] Hence to assess whether political competition in Canada has operated to enhance efficiency, we must find ways of measuring changes in its intensity and relate those changes to a set of predicted outcomes.[4] In this paper we do so by considering political competition to have a number of different measurable dimensions: the degree of electoral completion among the political parties within its constituencies, the ex ante degree of asymmetry in the distribution of safe/marginal seats among the major contending national parties, the ex post

[2] We are aware of the difficulties in drawing exact parallels between competition in private and public sectors, particularly because the existence of the collective choice process makes the meaning of what is ' demanded by voters' a complex issue once one departs from the simple median voter situation. This paper is consistent with the view that competition drives policy to cater to a weighted average of voter preferences, with weights determined by the inequalities of political influence. See Coughlin (1994) and Hinich and Munger (1994). We do not explore empirically the implications of shifts in the distribution of these weights over time.

[3] See, for example, Sato (2003), Cai and Treisman (2004), and Lizzeri and Persico (2005).

[4] This paper represents an extensive rewriting of an earlier unpublished paper "Political Competition and the extension of the franchise: Political influences on Canadian Fiscal Choices, 1870 – 2000". Recent papers that relate political competition to economic performance (rather than fiscal structure) include Besley, Persson and Sturm (2010), Padovano and Ricciuti (2009), and Sorenson (2014).

intensity of competition among the parties in the legislature between elections and the distribution of volatility adjusted winning margins across the constituencies won by the governing party. We consider the implication of changes in these dimensions for the evolution of the fiscal structure of the Government of Canada.

Because many of the structural elements to be discussed in this paper are implicitly long run equilibrium relationships, the ability to test these hypotheses requires both a long time series of data and the use of appropriate time series techniques. With a considerable amount of reliable long run data generated within a stable political environment, Canada--from its emergence as a modern state at Confederation (1867) to the present—more than satisfies this necessary condition.[5] The Canadian data used in this paper are annual and run for one hundred and forty five years from 1870 through 2015.

One noteworthy feature of fiscal data is that the observable outcomes of the different policies that comprise a country's fiscal structure are all embodied in the same time series. That is the long run empirical relationships that describe both Canada's history of financial stability and government size are part of the same data series that incorporate Canada's history of countercyclical fiscal response. This means that the long and short run hypotheses that explain fiscal policy choices need to be modeled and tested together and this aspect of the data motivates our use of cointegration and error correction analysis.

A final feature of the data that complicates our analysis is that a number of the metrics used have different time series characteristics. For example, some of our measures of political competition are stationary across time while others and most economic data are not. Hence special care must be taken with how the differing time series dimensions of the economic and political variables are combined. Here we use the autoregressive distributed lag (ARDL) procedure developed by Pesaran, Shin and Smith (2001) to combine variables with different degrees of integration and thus allow for the capturing of separate effects on the long and short run. A complete list of variables used, their descriptive statistics and time series properties is included in the Data Appendix of this paper. Time series of each measure can be found on the accompanying web site.

The paper continues in Section 2 by describing in detail how political competition is viewed as affecting fiscal stability and government size. There we describe the set of measures used to proxy the different elements of political competition and explain how changes in these metrics are expected to change fiscal structure. Section 3 begins the testing of these hypotheses by first examining the stability of Canada's fiscal structure under the assumption of a sufficient but invariant degree of political competition. Here stability implies that government spending and taxes

[5] Even so, availability remains an issue. Unemployment figures, for example, are available in Canada only from 1919 onwards so that for the long run, business cycles are measured in terms of variations in output growth rates. Similarly the ability to analyze the composition of government expenditures in detail is possible only from 1921 onwards.

converge over time so that accumulated deficits or government debt as a fraction of GDP does not accelerate. We then examine the extent to which fiscal stability has been influenced by changes in our measures of political competition. Using the finding of financial stability from Section 3 and its implication that the expenditure and revenue sizes of government cannot be independent over the long run, Section 4 uses a set of economic and demographic fundamentals to explain the long run expenditure and tax sizes of government before adding the measures of political competition. The greater flexibility of ARDL modeling then allows the separation of the long run equilibrium time path of government size from the short run (stationary) manifestation of countercyclical fiscal policy and the process of convergence back to the long run equilibrium path. In this way we can examine how the different dimensions of political competition affect long run size, convergence to the long run and counter-cyclical intervention. Section 5 focuses explicitly on how the political competition variables relate to the deficit and the business cycle while Section 6 applies the model to the period of rapid federal debt accumulation between the mid-1970 and early 1990s by considering the performance of political competition throughout the period and illustrating how even minor changes in level of political competition could have changed the overall outcome. Section 7 concludes the paper by summarizing the economic and policy significance of our results.

2. A principal-agent approach to fiscal structure

This analysis extends the micro-political foundation of political regimes (see Persson et al 2000, Besley et al 2010, and Winer et al 2013) by viewing political competition as a multidimensional constraint on the behaviour of government in a principal-agent model of a country's fiscal structure. The analysis is directed at single member, first-past-the-post Westminster style parliamentary democracy and tested against Canada.[6] In such an approach the governing party is viewed as the agent representing the public as its principal, much as the board of directors serves as the agent for a firm's shareholders. In the public choice literature, the agency problem is often posed as whether or not the individual members of the Congress vote differently from the wishes of their electorate (Higgs, 1989; Bender, 1994; Jung, Kenny and Lott; 1994). In parliamentary systems, however, the political party is the key actor. The party winning the election is the agent that monitors and enforces the behaviour of its representatives while setting the overall policy agenda for government and the long life of the governing political parties in Canada serves as the commitment mechanism furthers the internalization of intertemporal externalities. In parliamentary democracies, then, parties compete to win the right to govern by promising and delivering programs that better reflect the wishes of voters, much as Demsetz's potential managers compete for the right to become the sole operator of a natural monopoly (Demsetz, 1968; Palmer, 1995).[7] In the absence of information

[6] Using a country like Canada allows us to avoid the complications associated with political systems that embody checks and balances and so diffuse responsibility for policy action. In a Westminster parliamentary system the governing party determines policy subject to its ability to maintain the confidence of the house.

[7] Note that Demsetz gets efficiency by expanding the margins along which performance can be specified. In the political context, meaningful forcing contracts must permit effective enforcement of multi-dimensional campaign promises. See the more extended discussion in Ferris, Winer and Grofman (2016).

and other coordination costs, and with open entry into the political arena, competition among political parties would result in the government providing the low cost program mix that best reflects the wishes of its constituents.

In real world situations, however, coordination costs are never zero.[8] The ability to organize a viable political party requires the political party to win and maintain the loyalty of members who typically join a party for reasons that are not coincident with the program wishes of the public. The party must then provide partisans with special benefits, perhaps in the form of positions in the new government and/or programs that cater to their special interests. It follows that the incumbent governing party will normally provide a mixture of government services directed at the preferences of both the electorate and their own partisan members. This is described in the political science literature as governments having to provide a mixture of "public" goods and "private" benefits (Bueno de Mesquita, Smith, Siverson and Morrow, 2003). But while all political parties must provide for its members in one form or another, the ability of the party to cater to the special interests of its members at the expense of, or in addition to, the more general interests of the public will depend on how effective is the competition provided by opposition political parties. Here we focus on four particular types of political competition.

First, the ability of a political party once elected to cater to its own partisan interests will depend in part on how effective is the competition provided by other political parties in the House of Commons.[9] This will depend to an important degree on the proportion of the seats controlled by the winning party. The smaller is the opposition in the House, the less effective can competing parties be in monitoring the behavior of the party in power and hence the less costly it will be (in terms of losing political support) for the party in power to provide its members with specialized 'private' benefits. The prediction is then that a larger realized majority in the House (*LNSEATS*) will signal less intense political competition and thus provide less of an incentive to maintain fiscal discipline to restrain larger than normal levels of government expenditure. To the extent that payment for expenditures can be transferred through time to a succeeding government, it also implies a larger sized deficit.

While the size of the majority available to the governing party matters, the distribution of winning margins across the constituencies won by the governing party will be a measure of the party's ability to form a coherent national policy strategy. That is, the wider is the distribution of winning margins, given the size of the governing majority, the larger will be the proportion of constituency representatives who are subject to potential electoral loss and hence the larger the proportion who

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[8] Persson, Roland and Tabellini (2000) see the principal-agent problem of governance as arising out of three fundamental characteristics of political regimes: no direct democracy, no benevolent actors, and no outside enforcement. Our analysis focuses on ways by which commitment can be more effectively policed by competition among political parties in Westminster parliamentary democracies.

[9] Question period and the presence of a free and effective press are two important ways by which insider information is transmitted to voters allowing political competition to constrain parliamentary governments.

will rely on the assistance of a cohesive national party. In such cases the party will find it easier to design an overall direction for policy. Our measure of this dimension of party unity is the coefficient of variation of the volatility adjusted winning vote margins of the governing party, *CV_winning margin*. Higher values imply lower costs of achieving common agreement and in turn imply faster adjustment to the spending and taxation levels that are desired by the community and more of a concern with fiscal stability. The coefficient of variation is then interacted with *LNSEATS*, *INTER_LNSEATS*, to provide a counter-measure to the size of the governing party's majority.

In addition to the size and cohesiveness of the governing majority, the ability of the party to realize specialized benefits for its partisans will depend upon how close or contestable the election is expected to be. Here we define the degree of contestability as the proportion of constituencies that are not safe, where safe constituencies are ones that lie consistently in the upper tail of the distribution of winning vote margins. More formally, for each election at time t we first construct a volatility adjusted, winning vote margin for each candidate of incumbent party *p* (which won in constituency j at time t-1).[10] If this margin was more than one standard distribution above the mean of all such adjusted winning margins across all parties for the previous three elections, the constituency was then judged to be safe for that party.[11] The constituencies considered safe in the next election were constructed in the same way by adding the next election outcome and dropping the oldest to form the relevant test distribution. Applying this algorithm to all constituencies in each election, we find the proportion of all constituencies that are considered to be safe in each election, ψ_t, and compute the proportion of marginal constituencies (in the total to be elected) in each election as $MCons\_SD_t, = 1 - \psi_t$. Finally, we acknowledge the importance of how safe constituencies are distributed across the parties to the contestability of an election and adjust the proportion of marginal seats by the degree of their asymmetry among the parties by using a Euclidean measure of the deviation of the proportion of safe constituencies from a three party equal sharing, ϕ_t. A final allowance for redistricting then produces our measure of contestability at the national level, $Adj\_AMCons\_SD_t = 1 - \psi_t \phi_t$.

Lastly the ability of the governing party to maintain effective control over its elected members relative to the specific wishes of the constituency/candidate will depend in part on how intense is the level of competition at the constituency level.[12] A larger expected margin of victory means that the incumbent candidate will be less reliant on the help of the national party and so less likely to conform to the election platform adopted by the party. Greater competition in the constituency

[10] See the data appendix for greater detail on how this index was constructed.

[11] Because the definition of volatility requires margin measures from three consecutive past election outcomes, the gradual addition of new ridings and constant redistricting create problems for consistency. Hence we used unchanging geographical areas to define 'super-constituencies' across which measures of volatility are defined. This is an important feature of many of our constructs and is discussed more fully in the data appendix.

[12] Candidates with larger winning margins are less capable of being coerced into supporting party projects at the expense of personal/constituency plans making it harder for the party to engage in restrictive spending measures that are beneficial to the country as a whole (versus more expansive spending programs that provide constituency specific benefits).

then forces a broadening of the candidate's political base and makes the individual member to more willingly to bear the short run cost of such policies as financial stringency and spending discipline that require individual constituency interests to give way to the national interest. This in turn allows the party to better serve the broader general public by moderating the strength of the common pool problem that arises in an electoral system based on geographically defined constituencies (where it is always in the narrow self-interest of elected members to deliver benefits to his or her constituents with taxes levied on taxpayers in the country as a whole).[13]

Our measure of electoral competition among the candidates/ parties at the constituency level is the Przeworski/Sprague Index (1971, hereafter *PS*). This index is constructed on the premise that the primary objective of each candidate is to overcome the vote gap it faces relative to the incumbent. The constituency based index is constructed as one over the vote weighted sum of the volatility adjusted vote gaps of each candidate and a national index is constructed as the sum of each constituency's *PS* weighted by its vote share of the national total. The result is a metric where *PS* = 1 indicates a fully competitive constituency election (no vote gap to overcome) whereas a *PS* = 0 indicates one that was completely uncompetitive.[14]

--insert Figure 1 around here --

The statistical properties of our four measures of political competition—the size of the majority party in the house (*LNSEATS*), the interaction of the coefficient of variation of their volatility adjusted winning margins with *LNSEATS* (*INTER_LNSEATS*), the Przeworski/Sprague index of electoral competition at the constituency level (*PS_Adapt_Cons*) and the degree of party contestability (*Adj_AMCons_SD*)—are included with the other economic variables in Table A1 of the Data Appendix of the paper. What is important to note is that on the basis of the critical values of the adjusted Dickey-Fuller statistic, most of the economic variables are found to be nonstationary and most of the political variables are found to be nonstationary. *INTER_LNSEATS* is the political variable exception being nonstationary while *LNDEFICIT* and *FCOST* (to be defined shortly) are the only two economic variables found to be stationary. None are I(2). Table A2 of the Data Appendix shows the partial correlations arising among our political competition variables over our time period and reveals them to be positively correlated but not highly so. The partial correlations run from a low of .071 between *LNSEATS* and *Adj_AMCons_SD* to a high of .407 arising between *PS_Adapt_Cons* and *Adj_AMCons_SD*. The other four combinations range between .227 and .291.

It is because the ARDL model is designed to assess whether or not a long run cointegration (equilibrium) relationship exists among a group of variables when the orders of integration are

[13] On the common pool problem in majoritarian electoral systems, see Tullock (1959) and Buchanan and Tullock (1963).

[14] Many of the early constituency elections in Canada featured a winner by acclamation and thus were given a constituency PS = 0. For more detail on the complexity of the construction of the volatility and PS indexes see the Data appendix and associated web site.

ambiguous and the sample size is small that the framework established in Pesaran, Shin and Smith (2001) is ideally suited to our problem. It is implemented using the ARDL module in Eviews 10.

3. Financial Stability

We begin our analysis of the effects of these four aspects of political competition on Canada's fiscal structure by examining their effect on fiscal stability. By fiscal stability we mean whether the state is financially sound in the sense that expenditures over the longer run are fully funded so that the long run fiscal objectives of government can be pursued without having to deal with the burden of ever escalating government debt. This need not mean that the annual budget is balanced period by period but that over the long run expected tax revenues are sufficient to cover all planned expenditures. Canada's history of federal government noninterest spending and tax revenue as a proportion of GDP is presented in Figure 1. Here the addition to outstanding federal government debt -- the primary deficit or surplus – appears as the difference between the solid and dashed lines.[15] As can be seen from the diagram, the difference is not one sided; debt as a proportion of GDP does not appear to be rising despite ever rising levels of expenditure and some extended periods of primary deficits. Perhaps the most noticeable characteristic is that payment for war-time expenditure is typically spread over time, both through the war years and the decade that follows. The diagram does capture the key characteristic that while federal government debt may have risen and fallen over time, fear that the rapid escalation in government debt would lead to insolvency has rarely been a concern in Canada's history.

--insert Figure 1 around here--

A more formal test for the long run stability of Canadian public finances begins from the definition that the level of debt in an economy is sustainable if the share of debt in aggregate income/output, d_t, does not grow through time (i.e., $if\ \ \frac{1}{d_t}.\frac{\partial d_t}{\partial t} \leq 0$).[16] Then, defining $d_t = \frac{D_t}{p_t y_t}$, where D_t is the nominal level of government debt, p_t is the price level, and y_t is the level of real income/output and taking its time derivative we find:

$$\frac{dd_t}{dt}\frac{1}{d_t} = \left(\frac{dD_t}{dt}\frac{1}{D_t}\right) - \left(\frac{dp_t}{dt}\frac{1}{p_t}\right) - \left(\frac{dy_t}{dt}\frac{1}{y_t}\right). \tag{1}$$

[15] This section extends work begun in Ferris, Winer and Grofman (2012). See that article for an extended discussion of institutional structure that was the focus of that work.

[16] Note that this is a sufficient rather than necessary condition, the necessary condition being that the present value of government debt goes to zero over time. The advantage of using this stronger sufficient condition is that it yields a more transparent testable hypothesis.

Because the change in nominal government debt through time, $\frac{dD_t}{dt}$, equals the difference between total government spending and current tax revenues T_t, where total spending depends upon both program spending G_t and interest on outstanding government debt $i_t D_t$, (1) can be written as,

$$\frac{dd_t}{dt}\frac{1}{d_t} = \left(\frac{G_t - T_t + i_t D_t}{D_t}\right) - \pi_t - \left(\frac{dy_t}{dt}\frac{1}{y_t}\right) = \left(\frac{G_t - T_t}{D_t}\right) + r_t - \left(\frac{dy_t}{dt}\frac{1}{y_t}\right). \quad (2)$$

where $\left(\frac{G_t - T_t}{D_t}\right)$ is the operating or primary deficit as a fraction of total debt and r_t and π_t represent, respectively, the real rate of interest and the inflation rate. For the share of government debt in GDP to be both positive and not increasing in the long run, d_t must be a constant, $\bar{d}$, and hence the growth rate of d_t must be zero, i.e., $\frac{1}{d_t}.\frac{dd_t}{dt} = 0$. Setting (2) equal to zero, imposing the constancy of d_t and dividing the top and bottom of the right hand side by nominal income, $Y_t = p_t y_t$, we find:

$$\left(\frac{G_t}{Y_t}\right) = \left(\frac{T_t}{Y_t}\right) + \left(\frac{dy_t}{dt}\frac{1}{y_t} - r_t\right)\bar{d}. \quad (3)$$

This relationship asserts that for the share of government debt in GDP to be remain constant in the long run there must exist a particular long run relationship among three variables, *GSIZE* = G_t / Y_t, *TSIZE* = T_t / Y_t, and the fiscal cost of long run debt, *FCOST*$_t$ = $\left(\frac{dy_t}{dt}\frac{1}{y_t} - r_t\right)$. Intuitively, a positive primary deficit *(GSIZE – TSIZE)* can be sustained in the long run without increasing the debt to GDP ratio only if the average rate of growth of real output exceeds the long run real cost of holding outstanding debt.

In Canada's case, *FCOST* has been stationary or I(0) over time. This implies that because both GSIZE and TSIZE are nonstationary or I(1), long run fiscal stability requires *GSIZE = TSIZE*. The sustainability of government debt in the long run can be then be tested for through the form and coefficients of the following regression:

$$Ln\left(\frac{G_t}{Y_t}\right) = c_0 + c_1 Ln\left(\frac{T_t}{Y_t}\right) + c_2 FCOST_t + \varepsilon_t. \quad (4)$$

The sufficient condition for long run fiscal sustainability, that the debt to income ratio not grow over time, requires the regression residuals in (4) to be stationary and $c_1 = 1$. With *FCOST* stationary, $c_0 = 0$ is consistent with d_t remaining a long run constant.[17]

[Table 1 here]

[17] The stationarity of FCOST means that variations in its level produce transitory effects on the relationship between government expenditure and tax size, but have no permanent or long run effect. Hence the effect of FCOST, if any, should show up in the short run or error correction level of analysis. See Table 1 below.

An ARDL model of equation (4) was estimated using the Schwarz criterion to select optimal lag length for each of the model's variables (up to a maximum of 4 lags per variable) and the optimal ARDL model is presented as Table 1. The full ARDL model estimated on this basis is presented in column (1), with the implied long run cointegrating relation and the short run error correction process appearing as columns (2) and (3). Using period dummies to offset a number of period outliers, the ARDL equation passes two stability tests: the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares (CUSUM of Squares). In each case the recursive sums remain within the 5 percent bounds. The value found for the Bounds test (8.81), presented in the bottom line of the second column, implies that the long run equation is consistent with cointegration arising among the I(1) variables and thus with the existence of a long run equilibrium relationship. The short run process about the long run is presented in column (3) together with the error correction term. The latter is significantly negative but small in size, confirming convergence to the long run while indicating that the speed of convergence to that long run will be relatively slow.

The coefficient estimates of the long run cointegrating equation in column (2) meet the sufficient conditions for long run fiscal sustainability in Canada. The coefficient estimate on LNTSIZE is 1.002, insignificantly different from 1, with the coefficient estimate on FCOST and the regression constant both insignificantly different from zero. Together these imply the existence of fiscal stability in Canada in the sense that federal government deficits are stationary such that debt as a fraction of GDP has not accelerated over the entire post-Confederation time period.[18]

The short run is also informative. In particular while FCOST has had no long run effect on the growth rate of government debt, it is highly significant in the short run. That is transitory increases in the real rate of growth relative to the real rate of interest are associated with transitory surpluses as revenues tied to income grow faster than spending. As is the case at present in Canada, growth rates are often relied upon to resolve deficits arising from countercyclical spending and tax activity. Finally the short run also points to 1920, WW1, 1942 and 1946 as years producing exceptionally strong positive and negative shocks to federal government debt.

Given the stationary behaviour of federal deficits/surpluses, it might be thought that there would be little room for variations in political competition to have played much of a role with respect to fiscal stability. To test this hypothesis we reran the ARDL model adding the political competition variables as potential explanatory variables. Doing so revealed that the relatively high degree of correlation between *PS_Adapt_Cons* and *Adj_AMCons_SD* resulted in an underestimate of the

[18] While the emphasis this paper is on the election process and its effects on political competition, Ferris, Winer and Grofman (2012) consider the effect of a set of organizational/institutional changes in the alignment of decision-making incentives and responsibility within the Canadian governance system for fiscal stability. Two episodes of institutional reorganization are found to have altered the chain of responsibility for economic policy that first weaken and then strengthen financial stability: the founding of the Bank of Canada in 1935 that led to the division of fiscal responsibility between the Department of Finance (fiscal policy) and the Bank (monetary policy); whereas the adoption of inflation targeting in 1991 targeted the central bank with responsibility for inflation control (rather than real output or unemployment).

significance of either individual contribution leading us to drop, *Adj_AMCons_SD,* as an independent indicator of the degree of electoral competition. The estimation results using the remaining three political competition indicators are presented as columns (4) through (6) in Table 1.

Inspection of the full ARDL equation in column (4) suggests that aside from indicating somewhat more persistence through time, the introduction of the political competition variables has not altered any of the previous findings. The value of the Bounds test for cointegration (5.04), found at the bottom of column (4), is again consistent with the existence of a cointegrating relationship arising among the I(1) variables which in turn allows us to interpret the linear relationship described in column (5) as a long run equilibrium relationship. The coefficient on *LNTSIZE* is now estimated as somewhat smaller (0.919) but still insignificantly different from 1, and the *FCOST* coefficient and regression constant remain insignificantly different from zero. The error correction coefficient and short run adjustment path shown in column (6) again imply convergence back to the equilibrium time path with a speed of adjustment that is unchanged from that estimated earlier. Finally, the ARDL equation passes the CUSUM and CUSUM of squares test for stability with the equation residuals remaining within the 5% bounds.

The significance of the three political competition measures in the long run relationship of column (5) mean that variations in the degree of political competition have had a significant effect on fiscal stability over time. That is, to the extent that decreases in the proportion of seats held by the governing party, *LNSEATS*, and increases in the degree of electoral competition with constituencies, *PS_Adapt_Cons*, mean increased political competition, the signs of the coefficient estimates are all consistent with greater political competition decreasing the gap between government spending and taxes over the long run and hence improving fiscal stability. Note, however, that because these metrics are both stationary, there has been no trend, so that significance implies a reduction in the scale of the residual about the cointegrating equation. Periods in which the size of the governing majority has been smaller than average and the degree of competition within constituencies has been higher than average are then consistently associated with smaller levels of government spending and/or higher levels of taxation. While the sign of the coefficient estimate on our third political variable, the interaction of *LNSEATS* with *CV_winning margin*, is consistent with the hypothesis that a wider distribution of winning margins increases the responsiveness of the party to the voting public, the coefficient estimate is also insignificantly different from zero.

To summarize the primary results of this section, the data provides strong evidence of fiscal stability in the post Confederation period for Canada. Primary fiscal deficits are stationary and the indicated response to the appearance of a deficit is consistent with net spending changes to affect its removal and thus produce convergence to a stable long run debt to GDP ratio. The enhanced ARDL model provides evidence that at least two of our four measures of political competition are consistent with greater competition enhancing the fiscal responsibility of Canada's federal governments. Governing terms that are characterized by smaller seat majorities are associated with less fiscal

spending and smaller sized deficits while periods of greater electoral competition within the constituency have served to enhance fiscal stability.

4. Political Competitiveness and Government Expenditure and Tax Size

4.1. Modelling a Fiscal Policy Instruments under Financial Stability

When fiscal policy instruments are discussed, attention is most often focused on three interrelated policy decisions: government spending, taxation and deficits. Hence we describe the movement of the fiscal variables in our analysis as a structural simultaneous equation model of the long and short run dimensions of our three fiscal instruments—government expenditure size, $LNGSIZE_t = \log(G_t/Y_t)$, tax size, $LNTSIZE_t = \log(T_t/Y_t)$, and the deficit, $\Delta b_t = LNGSIZE_t - LNTSIZE_t$. We keep the form of the autoregressive distributive lag model as general as possible to allow for all possible influences on, and all potential determinants of, short and long run policy.[19] Hence we assume that at time t the government sector of the economy can be described by the following annual system of equations:

$$LNGSIZE_t = \alpha_0 + \alpha_1 LNGSIZE_{t-1} + \alpha_2 LNTSIZE_t + \alpha_3 LNTSIZE_{t-1} + \alpha_4 \Delta b_t + \alpha_5 \Delta b_{t-1} + \alpha_6 Z_t + \alpha_7 Z_{t-1} + \alpha_8 X_t + \alpha_9 X_{t-1} + e_t^g \quad (5)$$

$$LNTSIZE_t = \beta_0 + \beta_1 LNTSIZE_{t-1} + \beta_2 LNGSIZE_t + \beta_3 LNGSIZE_{t-1} + \beta_4 \Delta b_t + \beta_5 \Delta b_{t-1} + \beta_6 Z_t + \beta_7 Z_{t-1} + \beta_8 X_t + \beta_9 X_{t-1} + e_t^t \quad (6)$$

and $\Delta b_t \equiv LNGSIZE_t - LNTSIZE_t$ (7)

where Z_t is a vector of economic fundamentals and X_t is the vector of the political competition variables discussed above and where both are treated as co-determinants of $LNGSIZE_t$ and $LNTSIZE_t$. Here e_t^g and e_t^t are viewed as white noise random variables.

What is immediately apparent is that since $\Delta b_t \equiv LNGSIZE_t - LNTSIZE_t \ \forall\, t$, the three equations cannot be linearly independent even in the short run. By substituting (7) back into the two earlier equations we can reduce the system to two equations that can be independent (at least in the short run). Unfortunately the resulting two equation system solves for $LNGSIZE_t$ and $LNTSIZE_t$ simultaneously and this implies that the regression estimates on the contemporaneous terms of each separate equation will be inconsistent and likely biased. This issue is overcome by the substitution of one equation into the other and solving for the reduced form where each fiscal variable is a function only of the lagged values of all the political and economic variables and themselves. Representing the composite terms with a new set of coefficients and by adding and subtracting lagged variables, the two equation system can be written in terms of lagged variables and first differences and then rearranged to represent the short and long run versions of the system in error correction form. That is, after rearranging, an error correction form can be written as,

[19] Later ARDL estimation will allow for up to four lags of all covariates.

$$\Delta LNGSIZE_t = (a_1 - 1)\left[LNGSIZE_{t-1} - \frac{a_0}{(1-a_1)} - \frac{(a_4+a_3)}{(1-a_1)}Z_{t-1} - \frac{(a_6+a_5)}{(1-a_1)}X_{t-1} - \frac{a_2}{(1-a_1)}LNTSIZE_{t-1}\right]$$

$$+ (a_1 - 1)\Delta LNGSIZE_{t-1} + a_2\Delta LNTSIZE_{t-1} + a_3\Delta Z_t + (a_4+a_3)\Delta Z_{t-1} + a_5\Delta X_t + (a_6+a_5)\Delta X_{t-1} + v_t^g, \quad (8)$$

$$\Delta LNTSIZE_t = (b_1 - 1)\left[LNTSIZE_{t-1} - \frac{b_0}{(1-b_1)} - \frac{(b_4+b_3)}{(1-b_1)}Z_{t-1} - \frac{(b_6+b_5)}{(1-b_1)}X_{t-1} - \frac{b_2}{(1-b_1)}LNGSIZE_{t-1}\right]$$

$$+ (b_1 - 1)\Delta LNTSIZE_{t-1} + b_2\Delta LNGSIZE_{t-1} + b_3\Delta Z_t + (b_4+b_3)Z_{t-1} + b_5\Delta X_t + (b_6+b_5)X_{t-1} + v_t^t\,. \quad (9)$$

If the model is stable, in the long run the two terms in squared brackets must disappear (the deviation from the long run equilibrium path becomes zero) and, as we have seen, the Canadian fiscal structure is consistent with long run fiscal stability. In this case $\Delta b_t^* = 0$ or $LNGSIZE_t^* = LNTSIZE_t^*$. Imposing this condition on (8) and (9) we find the long run solutions:

$$LNGSIZE_t^* = \frac{a_0}{(1-a_1)} + \frac{(a_4+a_3)}{(1-a_1)}Z_t^* + \frac{(a_6+a_5)}{(1-a_1)}X_t^* \quad (10)$$

$$LNTSIZE_t^* = \frac{b_0}{(1-b_1)} + \frac{(b_4+b_3)}{(1-b_1)}Z_t^* + \frac{(b_6+b_5)}{(1-b_1)}X_t^* \quad (11)$$

with $\Delta b_t^* = 0$. (12)

In the empirical section below we follow Pesaran, Shin and Smith (2001) and estimate an ARDL model that allows for the separation of the long run equilibrium time path from the short run adjustment and error correction processes.

4.2 Economic Fundamentals as control variables

The role of political competition in relation to both the long run size of government and short run countercyclical fiscal intervention is analyzed within a model where long run size is based on economic fundamentals and its short run variation is based on adjustments to changing economic fundamentals and random shocks (see also Ferris, Park and Winer, 2008). Below we present the variables used to proxy these fundamentals. Despite the widespread availability of data for Canada, the variables that can be used to proxy economic fundamentals are limited by their need to span the entire one hundred and forty-five year period following Confederation. Subject to this restriction, the variables chosen reflect those often discussed in the growth of government literature and hence are widely used in the study of government size in (developed) democratic states.[20]

The traditional starting point in explaining government size is Wagner's Law, the hypothesis that the size and scope of government increases more than in proportion with society's growth in scale and complexity. This is interpreted as implying an elasticity of real per capita income (*RGDPPC*) with respect to size that is positive. To capture other structural features that may have promoted more

[20] For a more detailed discussion see Winer and Ferris (2008). Other papers using similar variables include: Borcherding (1985); Mueller (1986); Payne and Ewing (1996); and Borcherding, Ferris and Garzoni (2004).

(or less) government involvement in the Canadian economy, we use the immigration rate (*IMRATIO*) and the openness of the economy through the relative size of foreign trade in GDP (*OPEN*). Immigration has played a major role throughout Canadian history, especially before WWI and in the decade following WWII. The use of *OPEN* in relation to government size tests Rodrik's (1998) hypothesis that greater openness leads to more government as a form of insurance against external shocks relative to the competing view that openness restrains government size by imposing more external constraints on feasible levels of taxation (Borcherding et al 2004, Ferris et al 2008).[21]

Urbanization is a structural feature suggested by Kau and Rubin (1981) as a constraint on the ability of the government to tax effectively. Because urbanization is unavailable for our entire time period, we utilize its inverse - the percentage of the population in agriculture (*AGRIC*) and hence predict a negative relationship with size. Many studies of the long run size of government also find that the age structure of the population matters and use for this purpose the proportion of the population that is sixty-five or older (Cukierman and Meltzer, 1989; Ferris and West, 1996). For Canada, from 1870 onward, we have available only the proportion of the population that is less than 16 years old or younger (*YOUNG*). This we expect to exert upward pressure on government size through increased demand for government provided health and public schooling.[22] Finally another look at Figure 1 indicates clearly that the two world wars have had a dramatic effect on government spending. Hence dummy variables for WW1 (1914-1918) and WW2 (1939-1945) were developed and used.

With the exception of the world war and year dummies, all of the economic variables are used in log form, indicated as such in the tables by the addition of the prefix LN to the variable names.[23] The descriptive statistics for these variables are presented in the Data Appendix where it is noted that together with *LNGSIZE* and *LNTSIZE*, the explanatory variables used in the long run model of government size are typically nonstationary in levels and stationary in first differences.

4.3. Political Competition and Long Run Government Size

In columns (1) through (4) of Table 2 we present the best fitting versions of the ARDL models of expenditure size while columns (5) through (8) present the corresponding versions for Canada's federal tax/revenue size. All equations work well explaining over ninety five percent of the variation in government size. In each set of size groupings, the equations in the first two columns use only economic and demographic fundamentals as determinants of size while the second set of two add the political competition variables to the fundamental controls. In all cases the Bounds

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[21] Population size is often included to test for economies of scale. As is common with much of the literature, we find no evidence of economies of scale in the provision of government services.

[22] Although health and education are a provincial responsibility in Canada, the federal government provides considerable funding for these services though intergovernmental transfers.

[23] *GSIZE, TSIZE, IMRATIO, AGRIC, YOUNG, OPEN* and *SEATS* are all fractions constrained to lie between zero and one. Hence transforming these variables into percentages and logarithms avoids restrictions on the domain of the error terms in our estimating equations.

test statistics (shown at the bottom of each long run column) are consistent with the existence of a cointegrating relationship arising among the I(1) covariates. The long run cointegrating equations implied by each ARDL model are then presented in odd columns, (1) through (7), followed by their corresponding short run adjustment and error correction processes in the even columns (2) through (8). The error correction coefficients (shaded and found at the bottom of the short run columns) are all significantly negative, implying convergence back to the estimated equilibrium time path. Hence both shocks and covariate changes that produce deviations from the equilibrium time path are transitory, reacted to in a way that brings government size converging back to its long run equilibrium. Both models are similar in pointing to WW2 as a period of extraordinary changes in expenditures and taxes change but differ in other years that appear as large outliers.[24] Accounting for the specificity of these short run effects results in a stable ARDL model where the equation residuals all remain within the bounds of the standard CUSUM and CUSUM squared tests.[25]

-- insert Table 2 about here --

In both long run models, the relationships found between the different variables used to proxy economic fundamentals and government size conform to expectation. The trending reduction in agriculture's share of production (corresponding to an increase in urbanization and industrialism) is associated with a larger government size, but only weakly so. On the other hand, increases in the share of the population that is young and increases in real GDP per capita, on the other hand are both associated significantly with increases in both the expenditure and tax measure of government size. Hence the evidence is strongly consistent with Wagner's Law holding for Canada while periods of baby boom (busts) are met with greater (less) than proportional expansions in both spending and taxes. Periods with larger immigration flows have a similarly signed negative effect on both expenditure and tax sizes of government but are found to be significant only on the tax side. Finally the data is inconsistent with Rodrik's (1998) hypothesis that greater trading openness promotes a larger sized government. In Canada's case, the data is more consistent with the competing hypothesis that greater openness has constrained government size by limiting the ability of governments to tax traded goods, workers and capital differentially in the presence of low cost mobility across adjacent borders.

The addition of the four political competition variables does improve significantly the fit of the equations and generate results that are consistent with political competition reducing political rents. The results are shown in columns (3-4) for expenditure size and (7-8) for tax size. A Wald test of the hypothesis that the four political competition variables have no effect on LNGSIZE can be rejected, with the probability that the political competition variables have no effect equal to 0.004. A similar Wald test on LNTSIZE finds the probability that the political competition variables have no effect is even smaller at 0.0001. Of the four different measures of political competitiveness, by far the metric that has the most significant long run effect on both measures of size is LNSEATS (an elasticity of 0.820 for its effect on expenditure and 0.538 for taxation). That is, the data indicates

[24] Note that 1920 was the year leading into the 14th general election which was the first federal election in which women could vote following the extension of the franchise in 1917, 1930 was the first year of the Great Depression in Canada and 1942 (1946) was the mid (end)-point in Canada's WW2 participation.
[25] To economize on space these graphs are not presented but are available upon request.

that the larger is the seat majority held by the winning political party in the House (independent of party type), the larger are both measures of government size. This is consistent with the hypothesis that because parties with larger governing majorities face less effective opposition in the legislature and hence have more opportunity to realize political rents by extending government expenditures. The data also indicate that the expansion in expenditure size has been financed not just by raising the level of current taxation but also by spreading tax increases over later generations through increased sized deficits. There is little suggestion, however, that a widening of the distribution of the governing party's winning margins (*INTER_LNSEATS)* has any long run constraining effect on government's expenditure or tax size. To the extent that a wider distribution of constituency winning margins indicates less party unity and a proportionally larger number of members interested in 'public' versus 'private' interests, the negative coefficient estimated for its effect is found to be insignificantly different from zero.

While greater competition in the house appears to be effective in constraining political rent seeking by restraining both measures of government size, the effect of greater electoral competition among the candidates within each constituencies (*PS_Adapt_Cons)* is somewhat different. That is greater electoral competition within the constituencies is associated with smaller government expenditures (-1.006) but with larger rather than smaller taxes (0.967). To the extent that greater inter-riding competition increases the candidates reliance on their party, the governing party appears better able to restrain constituency rent-seeking by restraining overall spending and enhancing fiscal stability by raising taxes.

Finally, our measure of the degree of contestability in the federal election (*Adj_AMCons*_SD) has had no significant effect on the expenditure size of Canada's federal government. It does, however, have a significant effect on the revenue/tax size of government (-0.524). Reductions in the number and/or greater asymmetry in how safe constituencies are distributed across competing parties is met with a decrease in the tax size of government. Put differently, increases in the number and or symmetry of marginal seats in a federal election that make the election more contestable among the competing major parties and are reflected in tax reductions rather than spending increases.

4.4 Short Run Variations in Government Size and Countercyclical Intervention

One advantage of ARDL modeling is that by separating the long run from the short run relationship arising in the same data series, ARDL outcomes can indicate which variables have power in the long versus short run and allow for same relationship to indicate a different role in the short run as opposed to the long run. One such example of the latter that stands out in our data is the relationship arising between the two measures of government size (*LNGsize* and *LNTsize*) and real income per capita (*LNRGDPPC*). For example, in columns (1) and (3), the data indicate that there is a strong positive long run relationship arising between the two measures. However, in columns (2) and (4) the data indicate that in the short run both measures of government size vary inversely with real income per capita, with dramatically different signs and relatively large elasticity values. Rather than being consistent with the long relationship implied by Wagner's Law or government size being complementary private output, the short run relationship appearing in the data is more consistent with government spending and public debt playing a countercyclical role in relation to the business

cycle. That is as real per capita income rises (falls), government spending decreases (increases) concurrently, with that decrease (increase) reversing as earlier as the following period. Government tax size, on the other hand, tends to be somewhat procyclical, increasing rather than falling relative to per capita income. Overall, however, short run fiscal policy is stimulating in its effect rather than contractionary, with transitory countercyclical changes in spending dominating smaller changes in taxes. Finally, the addition of the political variables appears to increase somewhat the stimulative effect of short run fiscal policy. The countercyclical response in government spending to a decrease in per capita income is larger (-.783 versus .708) while the procyclical response of taxation is smaller (-310 versus -.332).

A second feature of interest is that *INTER_LNSEAT,* the interaction of *LNSEATS* with *CV_gov_party,* is the only one of the political variables that is significant in the short run adjustment process. Because *INTER_LNSEATS* is insignificant over the long run and presents only offsetting significance across successive lags, the data suggest that a wider distribution of volatility adjusted winning margins across the constituencies won by the governing party does create temporary disruption to the plans of the governing party, but that these are transitory in nature, not surviving into the long run. Of the economic variables, only immigration flows, *IMRATIO,* are found to be significant. As was the case with *LNRGDPPC*, the sign of their effect is different in the short run from that found for the long run. In the case of immigration, the data suggest that in the short run larger immigration flows result in a larger tax sized government while over the long run both expenditure and tax sizes are significantly smaller.

Finally, while we have seen that the negative signs on the error correction term in all four sets of equations are consistent with convergence back to the cointegrating equation, it is important to note that the absolute size of the error correction coefficient estimates has increased with the introduction of the political competition variables. In the case of expenditure size, the error correction coefficient falls in size from -0.177 to -0.242, where the 0.065 difference is more than twice the standard error of 0.026. The result for convergence on the tax side is similar. The error correction coefficient falls in size from -0.108 to -0.180, with the 0.072 difference more than four times larger than the 0.015 standard error.

In summary the introduction of our set of political competition variables into these ARDL models of government size generates results that are consistent with the following hypotheses. Increases in political competition, as measured by changes in our four indices, are consistent with a) a reduction in the scale of political rents as measured by a reduction the gap between the actual expenditure and tax sizes of government and that implied by our set of economic fundamentals, b) improving the speed of convergence on the long run by increasing the rate at which short run departures return to the long run equilibrium path set by fundamentals, c) increasing the fiscal response to the business cycle and d) increasing financial stability by bringing closer together government spending and revenue plans and stabilizing government debt. It should also be noted that while all of our measures of political competition work in some way to support these hypotheses, each measure exhibits a slightly different focus. For example some metrics exhibit an effect on only one dimension of policy--*Adj_AMCons*_SD has a significant influence only the tax size of government while *INTER_LNSEATS* appears significant in the short run alone. On the other hand, the significant

appearance of *LNSEATS* throughout the analysis is supportive of a modified version of the hypothesis recently advance by Cox and Weingast (2017) that 'the health of the legislature' is at least as important as 'the health of the election'. Here the moderating 'at least as' comes from the equivalent significance of the degree of electoral competition among the candidates at the constituency level in all our measures of fiscal structure.

5. Political Competition, the Operating Deficit and the Business Cycle

While the response of the deficit to the political competition variables is implicit in the results of Tables 1 and 2, it is insightful to focus explicitly on how the operating deficit of the federal government itself responds to the business cycle and the political variables. Because the deficit is stationary, we relate the deficit to the set of stationary political variables, *LNSEATS, PS_Adapt_Cons and Adj_AMCons_SD* (together with the first difference of the nonstationary interactive political variable, *D(INTER_LNSEATS)*) and use the growth rate of real per capita output, *GROWTH_RGDPPC*, as our measure of the business cycle.[26] As was the case with the other Tables, we first present the relationship without political variables and then add the political variables to the model.

--Insert Table 3 about here–

As the OLS regression result in column (1) makes apparent, the deficit varies inversely with changes in the growth rate, consistent with the earlier observation that the net of government spending and tax changes responds countercyclically to the business cycle. The results also suggest that while the contemporaneous countercyclical response in the deficit is quickly offset as early as the following year, the persistence of deficits indicated in the regression means that any initial shock to the deficit size will initiate a prolonged change that will permit the level to return only slowly to its pre-shock level.[27]

The addition of the political variables in column (2) the previously estimates largely unchanged. The persistence of *LNDEFICIT* to shocks across time remains statistically unaltered as does the coefficient estimate describing the correlation arising between the size of the deficit and the growth rate.[28] On the other hand, the addition of the political variables does significantly increase the explanatory power of the regression.[29] Moreover, two of our four political variables have coefficient estimates that have their predicted sign and are significantly different from zero. The data is then consistent with the hypotheses that a small governing majority, interpreted as greater competition in the legislature, and a greater average degree of electoral competition across constituencies reduces the size of the federal deficit. The data also suggest that there is a weak

[26] The growth rate of GDP per capita is stationary about a constant growth rate of 2 percent over our time period.
[27] Causality is likely to run both ways in the relationship between government size and per capita output implying that the interpretation of the significant correlation found needs to be read with caution. However, because the effect of government size on output is expected to be positive, there is reason to believe that the size of the implied countercyclical response suggested above is understated rather than overstated. See Ferris and Voia (2017, forthcoming).
[28] Although the estimates of the two growth coefficients are both larger absolutely, the differences in estimated size are both insignificantly different from zero.
[29] A Wald test of the hypothesis that the set of four political variables has no explanatory power can be rejected at the five percent significance level.

constraining effect of an increase in the dispersion of electoral support across the ridings won by the governing party and a weak expansionary effect associated with greater symmetry in safeness of constituencies across the contending major parties, but neither of these latter effects is significantly different from zero at conventional levels of significance.

6. Does the level of political competition really matter? The Debt Crisis of the late 1980s

While the analysis thus far suggests that political competition has made a significant statistical impact on Canada's fiscal structure, one can still ask whether there is any evidence to suggest that this statistical significance translates into an economically meaningful contribution to Canada's fiscal performance? In this section, then, we ask what practical difference would an increase in electoral competition have made to the federal debt crisis that arose in Canada in the 1980s and early 1990s. Was political competition lacking during this period fiscal instability and, if so, would an increase in electoral competition have made an important difference to this fiscal outcome?

In Figure 2 we plot, as the solid upper line, the actual log deficit size (as a proportion of GDP) of the federal government's budget between the years 1975 and 1993.[30] Over that time period, multiple years of high fiscal deficits, in combination with loose monetary policy, resulted in high rates of inflation and ultra high interest rates (hitting 21% in August 1982). This in turn produced a vicious circle of federal borrowing, as high servicing costs required even higher levels of federal borrowing simply to maintain existing debt levels. Together these factors produced a rapid growth in the outstanding stock of federal government debt, rising from 20 percent of GDP in 1971 to almost 60 percent by the mid 1990s. While operating surpluses did begin earlier, it was only following the election of the Chrétien Liberal government in 1993 that an all-party consensus developed to tackle the federal debt issue allowing for a dramatic cut back in government hiring and the production of successive overall budget surpluses.

--insert Figure 2 about here--

From the perspective of this paper we can ask what was happening to political competition over this interval by examining the actual performance of our political competition variables. In Figure 3 we present the levels and movement of three of these variables relative to their means. As the diagram suggests, the two election variables—*PS_Adapt_Cons* and *Adj_AMS_SD* (scaled on the left axis)-- were well below their overall mean for large parts of this period, while the third variable, *LnSeats* (scaled on the right axis), began the period just below its mean before rising well above for the latter half of the 1980s. The similar time patterns exhibited by the two electoral competition measures imply that the degree of political competition within election constituencies and among competing national parties was well below normal from as early as 1976. Competition intensity remained below average through the mid 1980s before slowly rising back to the long run in the late 1980s. The seat majority held by the governing party, on the other hand, entered the period below its mean but, following the Mulroney election of 1984, rose well above its mean for the remainder of the 1980s before falling back to the mean by the early 1990s. This indication of a reduction in competition within the legislature arose at a time to counter the low but slowly rising level of

[30] Here LNDEFICIT = LNGSIZE – LNTSIZE where government spending does not include interest payments.

political competition in the elections. Thus while the two sets of measures differed in the specific time intervals in which a lack of competition was indicated, in combination they imply that overall the level of competition in federal elections and in the resulting legislatures was less than usual throughout. Political competition returned to normal for all our metrics only towards the end of our time period.

To give a measure of the potential importance of electoral competition, we can ask what would have been the effect of an increase in the degree of political competition as measured by our model. Would greater political competition have helped? Using the long run coefficient estimates from Table 3, but raising the Przeworski-Sprague and the asymmetrically adjusted marginal seat indexes, while reducing the size of the seat majority held by the governing party and the coefficient of variation of its winning margins by 2 percent, we can generate a prediction of what the long run deficits/surpluses would have arisen had these dimensions of political competition been marginally improved and all other factors remained unchanged. The different this two percent improvement in long run competitiveness would have made was then subtracted from actual LNDEFICITs. The newly predicted pattern of the log differences in deficits is shown as the dashed line on Figure 2.

--insert Figure 3 about here—

The story told by this counterfactual is quite striking. First it is important to recognize that a marginal increase in the average level of political competitiveness would not have changed the overall pattern of deficits arising over the period. Rather the marginal increase in average competitiveness would have worked to shift the time path of deficits downwards. As such the model suggests that greater competitiveness would not only have an important effect on the size of annual federal deficits but through this also alter favourably the growth rate of federal debt. The model's prediction suggests that federal government debt would have risen much more slowly, peaked at a much lower level, and began its decline from the peak size much earlier.

7. Conclusion

In this paper we have asked whether political competition, measured in four different ways, has played any significant role in explaining variations in four different dimensions of the Government of Canada's fiscal structure—its financial stability, its expenditure and tax sizes, and countercyclical policy. The short answer is that political competition so measured has played a significant role in relation to all of these fiscal measures, with significant correlations found arising between the two sets of measures consistent with the hypothesis that greater political competition reduces the scale of governance externalities so enhancing the efficiency of the federal government. The likelihood that these fiscal policies and political competition have a two-way relationship leaves open only the question of the strength of this causal connection.

The data are also interesting in their detail, suggesting that political competition may influence some dimensions of policy more than others and that different elements of political competition may work with some aspects of fiscal policy better than others, often in different ways. For example, the data are consistent with the effects of political competition being strongest with respect to government size. A fall in political competition as measured by an increase in the size of

the seat majority held by the governing party is associated with a significant increase in both the expenditure and tax sizes of government. Here the increase in expenditure exceeds that of taxes resulting in a net increase in the deficit. A similar reduction in the degree of electoral competition within Canada's federal election ridings is associated with a more unambiguous increase in deficit size, the significant increase in spending now matched by a significant reduction in taxes. The other two measures of political competition are supportive of these results but less strongly so. An increase in the proportion and/or asymmetry of safe seats, serving to weaken political competition, produces a significant increase in tax size alone while a decrease in the dispersion of volatility adjusted winning margins produces only a transitory increase in tax size. In addition to indicating the importance of greater political competition encouraging the governing party to bring long run size closer to that desired by its principals, the data also suggest that a more competitive political environment would be beneficial, decreasing persistence by increasing the speed at which departures in government size converge back onto the time path indicated by underlying fundamentals.

The tests for fiscal stability reveal that even without accounting for changes in our measures of political competition the data is consistent with long run financial stability. Government spending is essentially equal to government revenue over the long run. The introduction of three of the four measures of political competition does make it apparent, however, that variations in the degree of political competition have mattered. Our application of the model to the period of apparent federal debt instability in the 1980s illustrates how smaller seat majorities in the House and greater degrees of electoral competition in the ridings and between contenting parties could have played an important role in minimizing the likelihood of fiscal instability.

Finally, with respect to the business cycle, the data show that government spending is strongly pro-cyclical while government revenue is weakly counter-cyclical. Accounting for the effects of political competition suggests the size of both these effects is somewhat larger than otherwise. The former two effects are statistically significant, however, while the latter is not. When the net effect on the deficit is examined, the data is consistent with deficits being strongly pro-cyclical. Once again it is the size of the governing majority and the electoral competitiveness within ridings that are the two measures significantly associated with deficits, in this case both decreasing its average size. In this sense greater political competition appears to affect the business cycle primarily by increasing the scale of spending and taxation while effectively maintaining discipline over the tendency for recessions to promote an upward creep in federal debt as a proportion of GDP.

Data Appendix

The data for this study were collected over a long period of time from a wide variety of sources. The primary data together with a complete definition, description and sourcing of each variable are all available at the web site, http://www.carleton.ca/~winers. Here we present a short description of each variable followed by a table presenting the key statistical characteristics of each variable.

D(.) = first different operator; LN(.)= logarithm indicator.
LNGSIZE = log(GSIZE)=log[(noninterest federal government spending)/GDP], interest is on debt privately held.
LNTSIZE = log(federal government revenues/GDP)
VOLATILITY. Because the size of a winning vote margin is meaningful only in relation to the volatility of the constituency's vote margin, we needed a measure of vote volatility over time. Then to avoid the loss of information when new constituencies were added or reformed (and hence have no past), we constructed a number of regional super-constituencies - 80 in total - based on geographic regions that persist throughout Canada's election history for measures that required past election outcomes. These established regional specific vote volatilities for use in periods when a new constituency was created or an old one reshaped. To give one example, the area around Ottawa was used as the base for one of 29 Ontario super-constituencies. Electorally it consisted of one 1 riding in 1867 and had risen to include 7 ridings by 2011. A super-constituency volatility for each area and election was then computed as follows. First the average vote shares by party over the constituencies within a superconstituency were computed. Next the absolute value of the changes in these (party-specific) average vote shares across adjacent elections was computed, summed and divided by 2. Each of these super-constituency specific differences in vote shares were weighted by the relative number of constituencies inside each superconstituency and summed to derive an aggregate volatility number for each election. This volatility measure was then applied to vote margins whether a constituency was new or not.
LNSEATS = log(% of seats held by the governing party in Parliament)
AMCons = Asymmetric adjusted marginal constituencies = 1 - $\psi_t\phi_t$, where ψ_t is the proportion of safe constituencies in the previous election and ϕ_t is a Euclidean distance measure of asymmetry across the shares of safe seats. Safeness is defined using a three-year moving measure of volatility and a 1 standard deviation test. Lower values of $\psi_t\phi_t$ indicate either that more constituencies have become marginal or that the distribution of marginal constituencies across parties has become more symmetrical. In either case the election outcome has become less predictable ex ante. See also the Data Appendix in Ferris, Winer and Grofman (2016).
Adj_AMCons = AMCons adjusted for constituency redistributions. Because redistricting and the addition of new constituencies were frequent in Canada's electoral history, large numbers of constituencies will have no past history and hence no clear basis for assigning safeness. However, since some new constituencies will be formed out of constituencies that were previously safe, we defined the safeness of new constituencies (at the aggregate level) as the proportion of all current constituencies that would otherwise have been treated as safe. That is rather than simply treating all redistributed seats as marginal or as equivalent in safeness to the proportion of safe seats in the

ongoing constituencies that did have incumbents, the set of redistributed constituencies were treated as being between these two extremes.

$CV\_winmargin_t$ = the coefficient of variation of the volatility adjusted winning margins of the constituencies won by the political party that was governing following election t.

PS_Adapt_Cons = the Przeworski and Sprague measure of competitiveness at the constituency level and is the sum of a weighted measure of the volatility adjusted vote margin that each party must overcome at the constituency level relative to the incumbent winning party. To avoid the loss of data arising from acclamations and redistricting, the following conventions were adopted. Party candidates winning by acclamation were given a vote-share of 1 and were awarded the national constituency average number of votes to weigh their significance relative to other constituencies. This resulted in an larger adjusted national vote as the new base for the calculation of adjusted constituency vote shares. Redistributions were handled by creating pseudo-predecessor constituencies using the average vote shares of those parties of the constituencies (within the same super-constituency) that had been lost due to the redistricting. If the constituency was entirely new (no old constituencies were lost), the previous super-constituency average was used and if the super-constituency itself was new (as in the case of Newfoundland), the national average was used. The PS index runs between and 1 with higher values indicating a more competitive constituency. The PS version used in the text assumes adaptive expectations with an equal weight given to a one period historical past and contemporary outcomes. For greater detail see Przeworski and Sprague (1971) and the accompanying web site http://www.carleton.ca/~winers.

NOTE: When converting from an election to an annual basis, elections held in the first half of a calendar year were assigned to the previous year to allow for pre-election effects. The competition in the house variables--LNSEATS and CV_winmargin—were held constant between elections while AMS and PS_Adapt_Cons were treated as snapshot pictures of an evolving level of political competition and so interpolated between election years.

LNYOUNG = log(% of the population 17 and under).

LNAGRIC = log(% of the labour force employed in agriculture)

LNIMRATIO = log(immigrants as a percentage of the population)

LNOPEN = log[(Export+Imports)/GDP]

POP = population

LNRGDPPC = log(RGDPPC) where RDGPPC = (GDP/(GDPdeflator$*$POP))

LNDEFICIT $\equiv$ LNGSIZE – LNTSIZE

WW1 = 1 in the years 1914 – 1918, 0 otherwise.

WW2 = 1 in the years 1939 to 1945, 0 otherwise.

D1920(30)(42)(46)(74) = 1 in year 1920(1930)(1942)(1946)(19740); 0 otherwise

Table A1

Descriptive Statistics for Canada: 1870 - 2015

Variable	Mean	Maximum	Minimum	Standard deviation	ADF statistic Level-constant (Difference)
LNGSIZE	2.273	3.767	1.251	0.597	-1.836 (-7.58***)
LNTSIZE	2.357	3.242	1.524	0.517	-1.551 (-7.65***)
LNDEFICIT	-0.084	0.632	-0.663	0.252	-7.85***
FCOST	1.05	17.79	-27.55	7.15	-7.22***
LNSEATS	4.065	4.363	3.696	0.155	-4.967***
Adj_AMCons	0.847	1.00	0.594	0.151	-6.42***
INTER_LNSEATS	7.244	30.23	2.80	6.527	-1.97 (-10.53***)
PS_ADAPT_CONS	0.655	0.807	0.443	0.088	-3.74***
LNAGRIC	2.704	4.016	0.545	1.163	1.83 (-8.107*** trend)
LNIMRATIO	-0.300	1.659	-2.679	0.865	-2.54 (-10.07***)
LNOPEN	3.815	4.448	3.430	0.244	-1.949 (-9.08***)
LNRGDPPC	8.917	10.257	7.395	0.862	-0.704 (-9.030***)
GROWTH_RGDPPC	0.020	0.145	-0.134	0.049	-9.030

MacKinnon critical 1% value…-3.48; Probability of having a unit root….1% (5%)[10%, *** (**)[*]

Note that LNSEATS and CV_winmargin change discretely at each election interval, while Adj_AMS and PS_CANDIDATE are interpolated between elections to reflect the ever-changing intensity of their form of political competition between the snapshot pictures captured at the time of each election.

Table A2

Correlations among Political Competition Measures

	Adj_AMCons	LNSEATS	PS_Adapt_Cons	CV_winmargin (gov_party)
Adj_AMCons	1.000000	0.168486	0.601930	0.294855
LNSEATS	0.168486	1.000000	0.168486	0.054271
PS_Adapt_Cons	0.601930	0.288991	1.000000	0.230204
CV_winmargin	0.294855	0.054271	0.230204	1.000000

Figure 1
Expenditure and Revenue Measures of Government Size
Canada 1870 - 2015

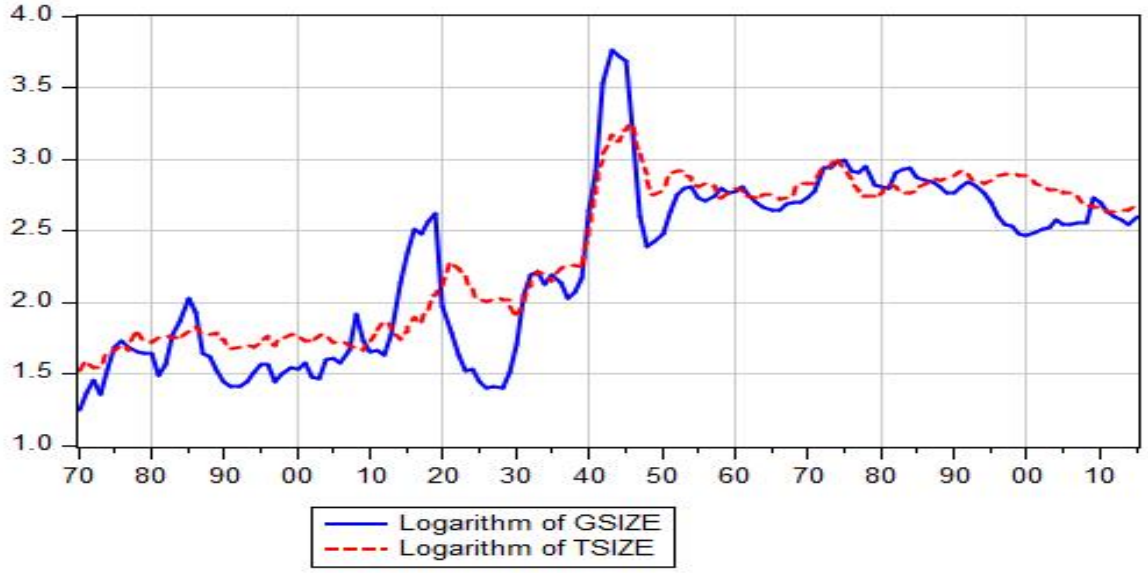


Table 1

ARDL Models of Fiscal Stability: Canada 1870 - 2015

(Newey West standard errors in brackets)

Equation Type	(1) ARDL Equation[t] (2,1,1)	(2) LONG RUN	(3) SHORT RUN and ERROR CORRECTION	(4) ARDL WITH COMPETITION[t] (2,0,1,0,0,0)	(5) LONG RUN WITH COMPETITION	(6) SHORT RUN WITH COMPETITION VARIABLES
Dependent Variable	LNGSIZE	LNGSIZE	D(LNGSIZE)	LNGSIZE	LNGSIZE	D(LNGSIZE)
LNGSIZE(-1)	1.328***			1.377***		
	(0.085)			(0.057)		
LNGSIZE(-2)	-0.513***			-0.665***		
	(0.068)			(0.078)		
LNGSIZE(-3)				0.193**		
				(0.077)		
LNGSIZE(-4)				-0.084*		
				(0.046)		
D(LNGSIZE(-1))			0.513***			0.557***
			(0.050)			(0.042)
D(LNGSIZE(-2))						-0.108**
						(0.048)
D(LNGSIZE(-3))						0.084*
						(0.044)
LNTSIZE[Z]	0.446**	1.00***		0.158***	0.919***	
	(0.203)	(0.060)		(0.044)	(0.090)	
LNTSIZE(-1)	-0.261					
	(0.182)					
D(LNTSIZE)			0.446***			
			(0.108)			
FCOST	-0.006***	-0.001		-0.008**	-0.005	
	(0.002)	(0.005)		(0.001)	(0.005)	
FCOST(-1)	0.006***			0.006***		
	(0.002)			(0.001)		
D(FCOST)			-0.006***			-0.008***
			(0.001)			(0.001)
LNSEATS				0.062*	0.360*	
				(0.033)	(0.208)	
INTER_LNSEATS				-0.001	-0.004	
				(0.001)	(0.006)	
PS_ADAPT_CONS				-0.170**	-1.013**	
				(0.072)	(0.410)	
WW1	0.154***		0.154***	0.133***		-0.136***
	(0.040)		(0.036)	(0.035)		(0.029)
D1920	-0.503***		-0.503***	-0.506***		-0.490***
	(0.031)		(0.076)	(0.026)		(0.063)
D1942	0.431***		-0.431***	0.516***		0.482***
	(0.044)		(0.077)	(0.027)		(0.062)
D1946	-0.411***		-0.411***	-0.373***		-0.389***
	(0.022)		(0.075)	(0.019)		(0.064)
CONSTANT	-0.017	-0.090		-0.114	-0.671	
	(0.028	(0.147)		(0.150)	(0.888)	
Error correction term			-0.185***			-0.180***
			(0.031)			(0.029)
Bounds Test		8.81***		5.04***		
Critical upper bound		I(1, 142) at 1% = 5.393		I(1,142) at 1% = 4.59		
No. of Obs	142			142		
ARDL AdjR^2	0.984			0.989		

* (**)[***] significantly different from zero at 10% (5%) [1%]. [Z] insignificantly different from 1 at 1%;

[t] the recursive residuals pass the CUSUM and CUSUM of Squares tests at 5%.

Table 2

ARDL Models of the Expenditure and Tax Size of Government: Canada 1870 - 2011

(Newey West standard errors in brackets)

Equation Type	(1) LONG RUN No PV's	(2) SHORT RUN No PV's	(3) LONG RUN With PV's	(4) SHORT RUN[Z] With PV's	(5) LONG RUN No PV's	(6) SHORT RUN No PV's	(7) LONG RUN With PV's	(8) SHORT RUN[Z] With PV's
Dependent Variable	LNGSIZE	D(LNGSIZE)	LNGSIZE	D(LNGSIZE)	LNTSIZE	D(LNTSIZE)	LNTSIZE	D(LNTSIZE)
D(LNGSIZE(-1))		0.393***		0.360***				
		(0.050)		(0.047)				
D(LNTSIZE(-1))						0.386***		0.437***
						(0.062)		(0.059)
D(LNTSIZE(-2))						-0.328***		-0.290***
						(0.063)		(0.058)
LNAGRIC	-0.061		-0.133		-0.022		-0.008	
	(0.242)		(0.188)		(0.137)		(0.079)	
LNYOUNG	1.829***		1.789***		1.700***		1.541***	
	(0.340)		(0.334)		(0.366)		(0.189)	
LNOPEN	0.088		0.062		0.367*		0.225*	
	(0.374)		(0.271)		(0.221)		(0.125)	
LNIMRATIO	-0.069		-0.092*		-0.149***		-0.136***	
	(0.056)		(0.047)		(0.043)		(0.023)	
D(LNIMRATIO)		-0.085***						0.011
		(0.021)						(0.010)
D(LNIMRATI0(-1))								-0.0005
								(0.010)
D(LNIMRATIO(-2))								0.034***
								(0.009)
LNRGDPPC	0.816***		0.692***		0.733***		0.806***	
	(0.293)		(0.241)		(0.170)		(0.117)	
D(LNRGDPPC)		-0.708***		-0.783***		-0.332***		-0.310***
		(0.144)		(0.127)		(0.073)		(0.064)
D(LNRGDPPC(-1))		0.533***				0.154*		-0.059
		(0.166)				(0.078)		(0.082)
D(LNRGDPPC(-2))						-0.280***		-0.297***
						(0.076)		(0.080)
LNSEATS			0.820***				0.538***	
			(0.264)				(0.142)	
INTER_LNSEATS			-0.005				-0.001	
			(0.007)				(0.003)	
D(INTER_LNSEATS)								-0.002**
								(0.001)
D(INTER_LNSEATS(-1)								0.003***
								(0.001)
PS_ADAPT_Cons			-1.006*				0.967***	
			(0.549)				(0.268)	
D(PS_ADAPT_Cons)								
Adj_AMCons_SD			0.060				-0.524**	
			(0.248)				(0.198)	
D1920		-0.527***		-0.597***				
		(0.080)		(0.074)				
D1930						-0.136***		-0.130***
						(0.042)		(0.034)
WW2		0.225***		0.307***		0.226***		0.220***

		(0.048)		(0.041)		(0.023)		(0.020)
D1942		0.426***		0.437***				
		(0.0.086)		(0.082)				
D1944						-0.178***		-0.189***
						(0.047)		(0.040)
D1974						0.099***		0.137***
						(0.042)		(0.035)
CONSTANT		-2.045	-12.70***		-11.40***		-13.34***	
		(4.584)	(3.11)		(2.705)		(1.57))	
Error correction term[z] (1%CV= 4.79)		-0.177***		-0.242***		-0.108***		-0.180***
		(6.779)		(11.42)		(6.975)		(9.100)
Bounds Test	7.372		10.96		6.637		6.91	
Critical upper bound	I(1,142) at 1% = 5.163		I(1,138)at 1% = 3.68		I(1,143) at 1%=4.587		I(1,136) at 1%=3.68	
No. of Obs	142		136		143		136	
AdjR²	0.982		0.983		0.993		0.995	

* (**)[***] significantly different from zero at 10% (5%) [1%].

[z] Error correction term presents absolute value of t-statistic to allow easier comparison with critical 1% value

[t] the recursive residuals pass the CUSUM and CUSUM of Squares tests at 5%.

Table 3
Federal Government Operating Deficits and Political Competition: Canada 1879 - 2015
(Newey-West standard errors in brackets)

Dependent Variable	(1) **LNDEFICIT^t**	(2) **LNDEFICIT^t**
LNDEFICIT(-1)	1.393***	1.352***
	(0.080)	(0.075)
LNDEFICIT(-2)	-0.662***	-0.645***
	(0.109)	(0.109)
LNDEFICIT(-3)	0.142**	0.130**
	(0.059)	(0.059)
GROWTH_RGDPPC	-0.709***	-0.712***
	(0.225)	(0.219)
GROWTH_RGDPPC(-1)	0.303*	0.321**
	(0.187)	(0.155)
LNSEATS		**0.093****
		(0.041)
D(INTER_LNSEATS)		**-0.001**
		(0.002))
PS_ADAPT_CONS		**-0.272****
		(0.115)
ADJ_AMCONS_SD		**0.073**
		(0.067)
D1920	-0.608***	-0.619***
	(0.028)	(0.026)
D1942	0.543***	0.549***
	(0.029)	(0.031)
D1946	-0.462***	-0.410***
	(0.023)	(0.022)
CONSTANT	0.001	-0.265
	(0.009)	(0.165)
No. of Obs.	138	137
AdjR^2	0.897	0.905
Wald[c(7)=c(8)=c(9)=c(10)=0]		F(4,124) =3.2
		Prob = 0.015

* (**)[***] significantly different from zero at 10% (5%) [1%]. ^{Z} insignificantly different from 1 at 1%;
^{t} the recursive residuals pass the CUSUM and CUSUM of Squares tests at 5%.

Figure 2
LNDEFICIT: Actual and adjusted for a 2 percent increase in long run political competitiveness
Canada: 1975 - 1993

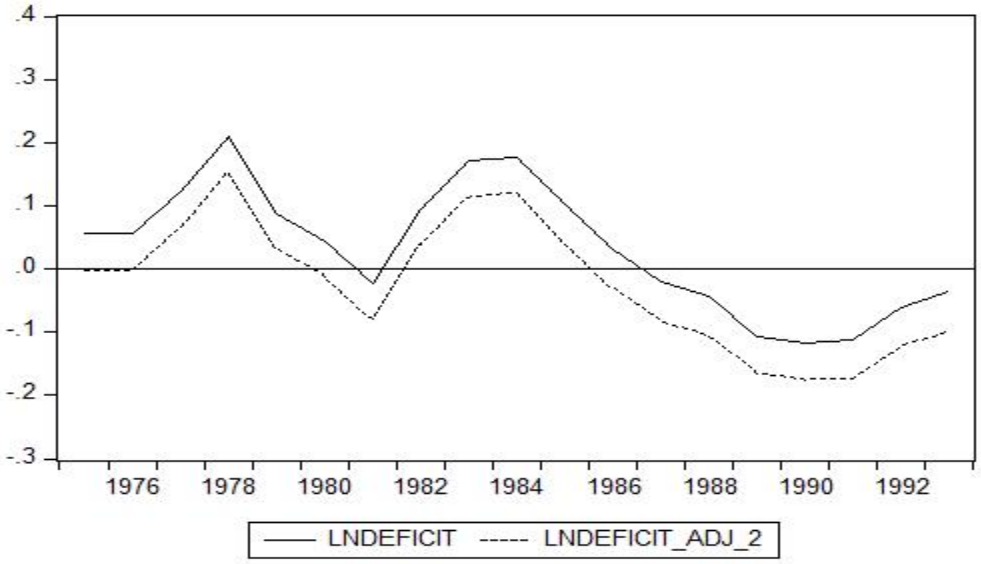
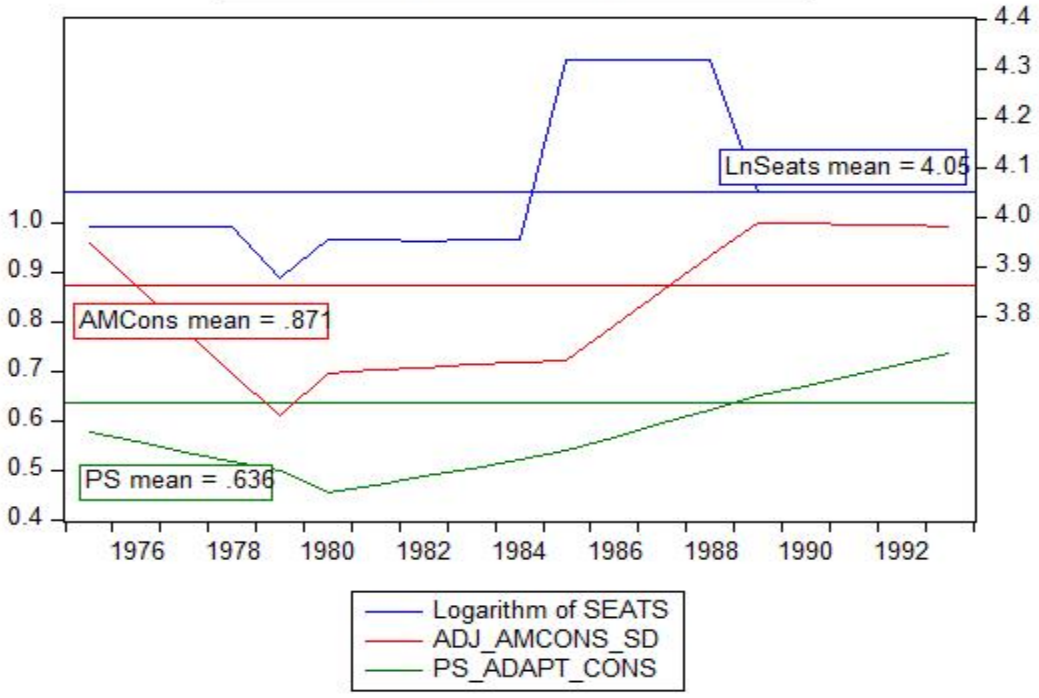


Figure 3
Political Competition Variables with long run means
Canada: 1975 - 1993



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