Do departures from democratic accountability compromise the stability of public finances?

Keynesianism, central banking, and minority governments in the Canadian system of party government, 1867 – 2009

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Abstract

This paper is concerned with the effectiveness of parliamentary political institutions in ensuring the stability of a nation's public finances. Our starting point and major hypothesis is that the governance structure embodied in Canada's parliamentary system has contributed importantly to the maintenance of fiscal stability over the history of the modern state. The fact that the Government of Canada, like the central government of many other modern democracies, has survived for over a century without default on its public debt means that in some meaningful sense, long run responsibility with respect to the nation's finances has in fact been achieved (and we show that this is in fact the case.) Hence a more meaningful test of our main hypothesis requires the designation of specific sub-periods when the ideological background for political policy making changed and/or when the institutions and organizations for operationalizing policy varied in ways that either improved or discouraged responsible fiscal performance. We consider ideational and institutional factors that are predicted to either enhance or detract from accountability and fiscal stability, including central banking, the adoption of Keynesianism, inflation targeting and minority government, and test for their effects on long run stability of the debt to GDP ratio using data for almost the entire history of the modern state from 1867 to 2008.

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1. Introduction

This paper is concerned with the effectiveness of parliamentary political institutions in ensuring the stability of a nation's public finances. Our starting point and major hypothesis is that the governance structure embodied in Canada's parliamentary system has contributed importantly to the maintenance of fiscal stability over the history of the modern state.

Fiscal stability both arises and is maintained, we argue, because the pure Westminster style of parliamentary democracy in Canada vests control over policy-making uniquely in the Prime Minister and his or her cabinet. To be in effective control, only a simple parliamentary majority is needed and, because of this, responsibility for fiscal choices can be attributed by voters directly to the appropriate decision-maker. Hence the ambiguity that can arise in institutions that divide fiscal powers and responsibilities, and thus frustrate decisive decision-making in response to national problems, is avoided. In addition, the abuse of such effective control has been minimized by effective political competition. The need to maintain a constant parliamentary majority on fiscal (and other significant) issues exposes the prime minister to the daily competition of other political parties in the House, and the necessity of holding periodic elections in single-seat constituencies under a first-past-the-post plurality rule gives the electorate the ability to directly reward or punish the ruling political party for the consequences of their behaviour. Moreover, the election-spanning longevity of the political party allows for the creation and enforcement of reputation, which in turn permits political promises to become credible and meaningful. And while the political party becomes the mechanism by which the inter-temporal externalities resulting from the overly-short time horizon of incumbent politicians can be overcome, the prime minister's need to rely on party discipline and the on-going competition of other political parties defeats the tendency for the incumbent Prime-Minister to engage in intergenerational redistribution by running up public debt.

The fact that the Government of Canada, like the central government of many other modern democracies, has survived for over a century without default on its public debt means that in some meaningful sense, long run responsibility with respect to the nation's finances has in fact been achieved. In statistical terms, this implies that we should observe the long run cointegrating relationship required for fiscal responsibility and long run debt to hold in Canada. (Below we show that this is in fact the case.) Hence a more meaningful test of our hypothesis - that the alignment of decision-making and responsibility within the Canadian parliamentary system has been appropriate for the achievement of fiscal stability - requires the designation of specific sub-periods when the ideological background for political policy making changed and/or when the institutions and organizations for operationalizing policy varied in ways that either improved or discouraged responsible fiscal performance.

Thus we look for evidence of loss of fiscal stability in periods when it has been argued that potentially destabilizing ideational factors (such as Keynesianism) were adopted, when innovations in economic institutions, such as the adoption of central banking and the more contemporary adoption of inflation targeting either confounded or enhanced responsible policy choices, and when periods of minority government potentially interfered with normal governance structures. By arguing that each of these episodes either detracted from or contributed to the accountability of the governing party or its ability to make the appropriate fiscal choices, we can derive and test for

predicted deviational responses that bear importantly on the main hypothesis, using the history of public policy in general and of fiscal policy in particular since the founding of the modern state in 1867**.**

Canada is a particularly useful country in which to study fiscal responsibility and the stability of national debt because the fundamental political institutions embodied in its Westminster style parliamentary democracy have remained largely unchanged for the roughly 140 years since Confederation in 1867. In addition, there is good data for most of that time period. Hence in Canada we find a time series long enough to make equilibrium analysis meaningful while providing enough natural variation in ideational and institutional factors to allow a test of a number of hypotheses that suggest reasons for divergence from the long run.

The natural breaks we consider include: the founding of the Bank of Canada in 1935; modifications to the responsibility of the governor of that bank to political authorities in 1961 following the firing of the governor James Coyne; the adoption of Keynesian policy ideas in Canada in the post-WW2 period); and the advent of inflation targeting in 1991. Finally, we consider the effect on financial stability of minority governments -there have been 14 minority governments among the 40 parliaments since the founding of the modern state in Canada in 1867.

The organization of the paper is as follows. In Section 2 of the paper we consider a number of potential factors, categorized according to the broad rubrics of *ideas* and *institutions*, that might have been expected to have affected budget stability. In Section 3 we provide graphically some basic statistical information about the nature of federal fiscal policy in Canada since 1870. Section 4 then presents our main empirical findings. The analysis builds on earlier work by Winer and Ferris (2008) who show that Keynesian ideas did, in fact, influence fiscal policy in Canada, and Ferris, Park and Winer (2008) who utilize long run cointegration analysis to study the size of government in Canada.

Our strongest result is that contrary to some public choice hypotheses and despite short run episodes of potential divergence, public expenditure and tax revenue of the Government of Canada appear to be in balance over the long run. This means that the adoption of Keynesianism by Canada following WW2, which may have led to the enlargement of government relative to GDP, did not impede the ability of the state to maintain fiscal responsibility and stable public finances. In addition, we find no clear evidence that the introduction of a central bank (or later changes in the nature of its accountability to political authorities) had any long run negative impact on fiscal responsibility. The introduction of inflation targeting following 1991, however, did improve policy making and financial stability. Finally we find that greater electoral competition, measured as periods of minority government, did impose greater restraints on spending and resulted in greater fiscal responsibility. This mirrors the earlier findings of findings of Ferris, Park and Winer (2008) for Canada and Winer et al (2008) for the U.S. that larger majorities and unified party control (independent of party affiliation) loosens fiscal restraints and increases government spending.

2. Ideational and Institutional Factors that Alter the Ability of National Governments to Maintain Long Term Budgetary Stability

The central empirical question for this paper is whether or not, over a roughly 140 year period, Canadian federal budgets have generated a stochastic pattern of deficits that are consistent with the long term stability of Canada's federal government debt as a fraction of GDP. It is important to emphasize three things about this central concern. First, although budget deficits and the resulting change in debt is a product of the divorce between spending and tax income in the short run, our focus is the long term level of debt relative to Canada's growing GDP and not the size of government itself (measured either in terms of taxes collected or monies spent). Second, we are interested in the existence or non-existence of a long run equilibrium and only coincidentally in shorter term patterns. We recognize, of course, that there can be periods of budget surplus or budget deficit, but it is not surpluses or deficits *per se* which are our primary concern. Rather our attention is focused on whether or not accumulated deficits grow as a share of GDP. It is a growing share of GDP that represents a time path that is not sustainable whereas growing deficits that are a fixed share of GDP could well be sustainable. Third, while we seek to answer whether or not there is long term equilibrium in debt level as a share of GDP in Canada, we are more interested in factors that might have impacted the ability of national governments to maintain long term budgetary stability by altering the accountability of government for its fiscal choices. We will characterize such factors as either *ideational* or *institutional*.

2.1 Ideational Factors

The key ideational factor whose importance we will assess is that of Keynesianism. The standard Public Choice view of the effects of Keynesian ideas, based largely we believe on evidence from the United States, is that Keynes has had a pernicious effect on how governments behave with respect to the economy (see, notably, Buchanan and Wagner, 1977). Here the central argument is less that Keynes was wrong in his macroeconomic theories, or that he was misunderstood by practitioners (though both those points have been made), but rather that Keynes provided the intellectual "cover" that gave legitimacy to the self-serving behaviour of politicians. The Keynesian view that governments have a broader economic mission than merely providing a rule of law to permit free men to organize free markets, along with the more specific Keynesian injunction requiring governments to adopt counter-cyclical intervention to "jump start" the economy, is said to have allowed politicians to "grow government", thus justifying higher spending and the taxes to feed that spending. The combination then provided a justification for deficits as an engine of economic growth that quickly became abused. In Buchanan and Wagner's words (1977: 99), the acceptance of Keynesian ideas introduced a bias toward "larger government" and an "inflationary bias":

> *The allocative bias stems from the proposition that, if individuals are allowed to finance publicly provided goods and services through borrowing rather than through taxation, they will tend to 'purchase' more publicly provided goods and services than standard efficiency criteria would dictate. The inflationary bias stems from the proposition that, for any given level of public goods and services, for any size of the budget, individuals will tend to borrow rather than to undergo current taxation. … The first bias entails the hypothesis that, because of government borrowing, government spending will be excess; the second bias entails the hypothesis that, regardless of spending levels, government borrowing will be excessive.*

It is important to emphasize that, even for Buchanan and Wagner (1977), Keynes's notion of counter-cyclical behaviour by governments would not, in and of itself, lead to higher debt in the long term. This is because government would undertake the opposing counter-cyclical actions in good times. Good times would bring about spending reductions and/or tax increases (leading to budget surpluses) in the same way that bad times would be met with higher spending/lower taxes and budget deficits. Thus if a government truly followed Keynesian counter-cyclical prescriptions, the long run would result in a pattern of surpluses and deficits that on average balanced.[1]

However unlike the "hyper-rational" Chicago School of economics, Public Choice theorists have always been sensitive to the foibles and cognitive limitations that affect the ability of voters to consistently discern and act in their own self-interest. In addition they emphasize the consequences of decisions made by self-interested politicians rather than simply exploring the consequences of a benevolent state maximizing an idealized social welfare function. To explain why Keynesianism has in their view proved so pernicious a factor in democratic politics, Buchanan and Wagner (1977: 93-94) emphasize a fundamental asymmetry in the motivations of self-interested politicians to follow the two sides of Lord Keynes's advice:

> *Elected politicians enjoy spending public monies on projects that yield some demonstrable benefits to their constituents. They do not enjoy imposing taxes on these same constituents. The pre-Keynesian norm of budget balance served to constrain spending proclivities so as to keep governmental outlays roughly within the revenue limits generated by taxes. The Keynesian destruction of this norm, without an adequate replacement, removed the constraint. Predictably, politicians responded by increasing spending more than tax revenues, by creating budget deficits as a normal course of events. They did not live up to the apparent Keynesian precepts; they did not match the deficits of recession with the surpluses of boom.*

Similarly to explain how politicians can run up unsustainable budget deficits without being punished at the polls by unhappy voters, Buchanan and Wagner (1977: 99-100) appeal to a fundamental asymmetry in how voters see budget deficits versus surpluses. To reduce a deficit requires either a tax increase or a cut in public spending. In either case, there will be losers: "If taxes are increased, some persons in the community will have their disposable incomes reduced. If public spending is reduced, some current beneficiaries of public services will be harmed." In contrast, the benefits of maintaining budget surpluses are much less direct and much more problematic. Thus Buchanan and Wagner (1977: 100) argue that even if the public is familiar with the Keynesian argument about the role of budget surpluses in reducing inflationary pressures, "[the] direct and indirect consequences impact quite differently … on the choice calculus of typical citizens. The benefit side of the surplus policy is never experienced, but rather must be *creatively imagined*, taking the form of hypothetical or imagined gains from avoiding what otherwise be an inflationary history." Buchanan and Wagner (1977: 101) add other arguments as to why budget surpluses are less likely in a political democracy than in "a social order controlled by 'wise men'." They point out interest groups that anticipate "making economic gains from inflation;" while others that may be particularly "vulnerable to downward shifts in aggregate demand". Both would be anxious to keep government spending high.

[1] As Buchanan and Wagner (1977: 94) express this idea:"[i]t might even be said that Keynesian economics did not destroy the principle of a balanced budget but merely lengthened the time period over which it applied."

To these arguments we add the point that with a budget surplus, politicians tend to believe that they can achieve greater success by "handing back" the money that government has "confiscated" from the people (rather than simply paying off outstanding debt). In support they tend to argue that "no one is a better judge of how to spend your money than you are."[2]

Politicians' supposed increased ability to borrow using the Keynesian justification of supporting growth in the economy, in combination with Keynes's views about a "wider" role for government, and the arguments about why voters are more sympathetic to tax cuts than spending cuts, all support the claim that the Keynes's influence should yield higher government spending financed by greater government borrowing. Or, to put it another way, since "budget deficits make it possible to spend without taxing" (Buchanan and Wagner, 1977: 102), the removal of the constraint imposed by the balanced budget generates an asymmetry in competitive democracies in a post-Keynesian world. "Deficits will be created, but to a greater extent than justified by Keynesian principles; surpluses will sometimes result, but they will result less frequently than required by the strict Keynesians prescriptions"(Buchanan and Wagner, 1977: 103). Thus, even while there were asymmetries in budgetary incentives based on voter and politician self-interest before Keynes, these asymmetries are expected to be exacerbated by the influence of Keynesian ideas. These observations lead us to formulate a simple public choice hypothesis.

Public Choice Hypothesis 1 (PCH1): The adoption and implementation of Keynesian ideas will lead to spending outstripping taxation, giving rise in the longer run to unsustainable budget deficits.

In Canada one of Keynes' early students, Robert Bryce, was instrumental in introducing *The General Theory* and Keynesianism to the Department of Finance as early as the mid-1930s. He subsequently served for three decades as a high ranking official in the Department, ending his career as Deputy Minister of Finance. More publicly, the federal government's *White Paper on Employment and Income* in 1945 signalled the formal acceptance of Keynesian ideas in senior Canadian policy circles (Government of Canada, 1945). Finally, Winer and Ferris (2008) tested whether the espousal of Keynesianism in the *White Paper* translated into policy action and found evidence of greater counter-fiscal activity in the data following WW2. Hence in the tests below we use a 1946 dummy (0 prior to 1945, 1 thereafter) along with other necessary controls to test for evidence of whether greater Keynesian counter-cyclicality in the size of Canadian budget deficits and surpluses led to a period of greater instability in the public debt.

The essence of PCH1 is that there is no effective institutional mechanism that imposes the costs of diverging from optimal long run behaviour back onto the appropriate decision maker. This is perhaps easiest to see in the case of the U.S. where political responsibility for the budget is shared among the executive and the two branches of the legislature with overlapping tenures while the day-to-day responsibility for implementing policy is shared between the Federal Reserve System and the Treasury. Together they imply that the voter and the party system become less effective in ensuring fiscal discipline. The alternative to PCH1 is that institutional incentives do exist so that the

[2] The inapplicability of this argument in general depends on the existence of public goods or merit goods, the coordination and free rider costs of which provide an efficiency role for government. Interstate highway systems, national defence and various forms of public health/education are examples.

future cost of short run behaviour is brought to bear on the appropriate decision maker effectively. In Canada, as argued earlier, parliamentary democracy and the political party structure are the institutions that can internalize these externalities and benefit from correcting asymmetries discussed earlier. More specifically, effective control over decision making is consolidated in the Prime Minister and Cabinet so that responsibility for the consequences of policy is unambiguous. Similarly political power is concentrated in the party where the election-spanning lifespan allows for the creation of reputation and credibility. Hence the counter-hypothesis we test in this paper is that the Canadian parliamentary system has overcome the coordination issues associated with long run budgetary processes such that long run debt has been stationary (the debt level was sustainable). In section (b) we expand further upon this theme in relation to minority governments.

(b) Institutions

The literature on the economic effects of institutions is immense and spreads over at least three disciplines: economics, law, and political science, with a nascent literature in sociology as well (see e.g., Coase, 1960; Weingast and Marshall, 1988; Komesar, 1994; Cukierman and Webb, 1995; King, 1997; Huber and Shipan, 2002, Crisp, Moreno and Shugart, 2011, for just a flavour of the diverse literatures in this area). There are a variety of common themes in the Public Choice literature on institutions including: (a) *transactions costs analysis* (Coase, 1960) of the efficiency of division between private bargaining/contracting and public dispute resolution processes, (b) issues of collective action in controlling *free rider problems* and providing accurate measures of *demand revelation*, (c) issues of *optimal delegation* –with a focus on *principal-agent relationships* (see e.g., Huber and Shipan, 2002) and a strong interest in the difficulties in making *credible commitments*,[3] (d) claims about the power of competition, whether it be political party competition or benchmark competition from similar jurisdictions, or U.S. states as "laboratories of experiment, " to improve the efficiency of outcomes; and (e) concern for the structural reasons for institutional choice and maintenance, with a central idea being John Ferejohn's classic formulation that "preferences for outcomes conditions preferences for institutions."[4] (For a discussion of the propensities for pork-barrel spending under different types of electoral rules see Grofman, 1999.)

[3] Cukierman, Webb and Neyapti (1992) begin their essay on the consequences of delegation of economic authority to central banks with an elegant parable about the difficulty of credible commitment.

> *"Willpower is trying hard* not *to do something that you really want to do," said Frog.*
> *"You mean like trying* not *to eat all these cookies," asked Toad.*
> *"Right," said Frog. He put the cookies in a box. "There, now we will not eat any more cookies."*
> *"But we can open the box," said Toad.*
> *"That is true," said Frog. He tied some string around the box. He got a ladder and put the box up on a high shelf. "There, now we will not eat any more cookies."*
> *"But we can climb the ladder . . . ."* (Lobel 1972)

[4] According to the recollection of one of the present authors (Grofman), Ferejohn said this roughly 40 years ago at an early conference on Public Choice. We are not aware, however, of anywhere where this aphorism is written down and John Ferejohn doesn't remember saying it. But if he didn't say it, he should have!

Here we will limit ourselves to a brief discussion of two topics in this vast literature that allow us to develop specific hypotheses about other factors that influence the stability of budget deficits. The first of these concerns the importance of having a central bank as an alternative to the government in providing a homeostatic control for the economy, checking both inflationary and deflationary tendencies. Here greater independence provides a two edged sword—allowing circumvention of asymmetric short run cyclical political influence while at the same time dividing responsibility for the cycle and thus freeing the government from full responsibility for eradicating the business cycle. The second is the debate whether a more concentrated, centralized political authority, like single ownership of a "common pool" resource, improves economic efficiency or results in greater rent dissipation and a weakening of fiscal disciple.

2.2 Central Banks

As a general rule, economists are supportive of independent central banks that are as free as possible from political influence (Cukierman, Webb and Neyapti, 1982; Cukierman and Webb, 1995). Isolating central bank managers from political pressure through the granting of long terms in office and delineating independent authority should allow managers of central banks to take a longer term perspective than would elected officials and thus make more responsible decisions involving credible commitment. Like the "wise men" earlier referenced by Buchanan and Wagner (1977), central bankers would be less prone to choosing the popular over the good and hence result in greater long run price stability.

On the other hand, greater independence also means that the coordination of monetary and fiscal policy action between independent bankers and political fiscal decision-makers may become more complicated and difficult. Because interest rate and money supply changes influence real output in the short run, central bank actions necessarily impact on the plans of fiscal authorities at the policy level. Moreover, because the money supply is increased primarily through central bank purchases of (federal) government debt, monetary and fiscal policy become intertwined operationally within the government budget constraint. It follows that when both monetary and fiscal authorities view themselves as having responsibility for the cycle, accountability for the resulting budget deficit and accompanying changes in public debt will become somewhat blurred.[5] With greater ambiguity and diminished accountability, recognized responsibility tends to be lost. In this sense, the creation of an independent central bank would be expected to have a weakening effect on fiscal discipline and this would be predicted to result in larger fiscal deficits and hence larger levels of government debt.

To understand the implications of the independence created by a central bank, we must, in our view, understand the reasons why political authorities might willingly surrender power to "technocrats" such as "bankers". Because institutions can fulfill roles that have little or nothing to do with the motivations that inspired their origins, and because the single most powerful forces

[5] There is now a large literature under the heading of fiscal theories of the price level that examine the constraints on monetary policy of a dominate fiscal policy (where monetary must compensate to keep the government budget constraint satisfied). See for example, Hamilton and Flavin (1986), Leeper (1991), Canzoneri, Cumby and Diba (2001) and Catao and Terrones (2005). Earlier writers explored the "unpleasant" consequences for fiscal policy (and government debt) of the dominance of monetary policy within the government budget constraint (Sargent and Wallace 1981).

accounting for institutional continuity are inertia and an asymmetry between the nature of the coalition needed to put an institution in place and that needed to overturn it once vested interests in its continued existence are created,[6] and because institutions normally serve fulfill multiple purposes, any institution can operate in ways that cannot be explained merely by looking to see what political forces supported its creation or support its continuation. Nonetheless, recognizing the multiple roles that an institution such as a central bank plays in the political process gives us additional reasons to be sceptical of the view that a strong central bank insulated from political authorities will necessarily lead to better deficit control.

There are at least four reasons why politicians might cede power over the economy to non-elected officials. [7] First is the kind of logic alluded to by Cukierman, Webb and Neyapti (1982) in the quote above, namely a desire to send a credible signal of fiscal responsibility, by delegating responsibility to those who are better able to carry out the mission than politicians themselves. This reasoning suggests that politicians are well aware of the tactic used by Ulysses when faced with the lure of the sirens, namely stopping his ears and being bound to the mast (Elster, 1979). According to this line of argument, politicians cede authority for quite laudable reasons, to better serve the public interest. But rather different motivations may also apply. A second motivation is that politicians cede authority to a central bank from fear. Since the decision to tighten credit or allow inflation has a redistributive consequence for borrowers and lenders, politicians may "outsource" decisions such as these to agencies believed not to be accountable to them, to "pass the buck" in terms of perceived responsibility for politically unpopular choices. Third, given the secrecy given to central bank actions and the absence of a need to provide public reasons for their actions, politicians may well believe that they can influence central bank decisions in ways that escape public scrutiny, with central bank authorities sensitive to the desires of their politicians who appointed them (Abrams and Iossifov, 2006; Abrams, 2006; and Ferris, 2008). [8]

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[6] For example, after a strict "one person, one vote" regime was implemented in the U.S. in the years immediately following *Baker v. Carr* (1962), politicians reflecting rural interests advantaged by malapportionment sought a constitutional amendment to remove apportionment jurisdiction from the U.S. Supreme Court. Initially it appeared to be considerable bipartisan support for such an amendment, but once the U.S. House of Representatives came to contain members elected under the new OPOV regime, the pressure to reverse the Supreme Court's insistence on strict population standards for House districts essentially disappeared.

[7] The question of why political authorities cede power to central bank parallels in many ways the ongoing debate about what shaped the structure of U.S. Congressional committees in ways that appear to give committees power that is independent of the floor majority. The latter debate pits individual-level-benefit models of committees as designed to allow members of congress to engage in low cost implicit logrolls to pass legislation and claim credit in ways that enhance their re-election chances (Shepsle and Weingast, 1987) against models that focus on informational efficiencies in jurisdictional assignments that involve the accumulation of policy expertise (Gilligan and Krehbiel, 1990) against models that emphasize the ultimate majority party control of congress and the ways in which committee processes are actually structured to maintain that control (Cox and McCubbins, 1990). Still more recent models emphasize the contingent nature of party dominance (*conditional party governance*) as a function of the size of party majorities, ideological dispersion within parties, and ideological separation between parties (Rohde, 1991; Aldrich and Battista, 2002). Related debates about the implications of oversight delegation to judicial or administrative bodies take place in many other contexts, e.g., with respect to creating constitutional courts that have power of judicial review over the constitutionality of legislative acts (see e.g. Stone-Sweet, 2000).

[8] A Wuffle (personal communication, April 1, 2011) has suggested an analogy between answers to the question "Why political delegation of economic authority to a central bank?" and answers to the question "Why does the quarterback pass the ball? In U.S. football an obvious reason for the quarterback in U.S. football to pass the ball is

A fourth related argument why politicians might cede responsibility for control of inflation and deflation through monetary policy, offers a more Machiavellian story (see Acheson and Chant, 1973). By shifting part of the responsibility for economic matters to a central bank, politicians may see themselves as free to spend, in anticipation not just that that they will be spared from public blame, but that the central bankers will work to save them from their fiscal follies. In this case our previous discussion of the consequence of divided responsibility is restructured in terms of *moral hazard* sought through delegation.[9] This line of reasoning reinforces the argument given in PCH2, that is, however desirable is the passing monetary control from political authorities to central bankers, the consequences for fiscal responsibility will be perverse.

While institutions cannot prevent undesirable outcomes nor ensure desirable ones, the way that decision-making authority is allocated within the public sector will make some policy outcomes more probable than others. One such example concerns the assignment of authority between the central bank and the executive and legislative branches of government. Both economists and practitioners in the area of monetary policy believe that the central bank can affect primarily the expansion of money and credit and through them the price level and inflation rate. No competing organization can exercise similar control. Hence assigning primary responsibility for long run price stability to the central bank helps to ensure an institutional focus and accountability on a particular objective—inflation—and thus avoids the ambiguity that can arise from the pursuit of multiple potentially conflicting objectives. Institutionally, the Coasean prescription of assigning responsibility to the agent who can best affect the desired outcome increases the probability that lower inflation rates and more stable prices will be the realized solution.

Ultimately, the central bank's authority and scope of action depends on the government. The government passes laws and follows customs that grant their central banks more or less direction, authority and autonomy to pursue price stability. Narrowing the central bank's mandate to maintain price stability should result in more benefit to the economy and to the government itself. In its own terms, an increase in directed central bank independence better allows for the creation of reputation as one of the means by which a government can strengthen its commitment to price

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to increase the likelihood that his team will achieve its immediate goal by scoring a touchdown. Of course, the quarterback only wants to pass the ball to members of his own team, i.e., those who will take the ball in the desired direction. And the quarterback has to be persuaded that passing the ball increases the chance of a gain in yardage over his simply keeping the ball and running with it. The second argument is that the quarterback is afraid that if he keeps the ball he will be crushed by 300 pound linebackers -- who are only allowed to tackle him is he hasn't gotten rid of the ball. Here the linebackers are analogous to public opinion. (A third argument is that passing the ball , with the potential for visually compelling long broken field runs with the other team in hot pursuit, on the one hand, and the heightened suspense of risk of interception, on the other, increases the attractiveness of the sport to fans, and thus increases stadium and television revenues, but this argument does not seem to have any obvious parallel with delegation to central banks.)

[9] A rather different argument about undesirable aspects of delegation of final authority to experts have been put forward in the discussion of the merits of allowing judicial authorities to make ultimate determinations of constitutionality. For example, one argument by some early U.S. jurists was that allowing the Supreme Court this authority, however desirable from the standpoint of responsibility to the constitutional text, denied the public of the political education that comes from being allowed to make mistakes, having to live with their consequences and learning to correct them.

stability (Cukierman, Webb and Neyapti, 1982: 353-354). In addition, a narrowing of central bank focus on price stability requires less policy coordination with respect to longer run fiscal objectives. The result is a greater concentration of responsibility on the government for resulting surpluses and deficits. This, in turn, should lead to greater fiscal responsibility and hence better control over levels of outstanding debt.

Such reasoning leads to two testable public choice hypotheses:

Public Choice Hypothesis 2 (PCH2): The creation of an independent central bank weakens fiscal discipline and hence control over the level of government debt.

Public Choice Hypothesis 3 (PCH3): Fiscal responsibility and debt level stability will be enhanced by a concentration of central bank focus on price stability and strengthened by greater political independence.

In the rankings of central bank independence given by Cukierman, Webb and Neyapti (1982: Table 2, p. 362), Canada is coded as having one of the strongest degrees of independence among the 21 industrial democracies compared, with a score of .45--the sixth highest value, where the estimated values range from .17 (Belgium) to .69 (Germany).[10] In comparison, the score given to the U.S. Federal Reserve is .48. For all intents and purposes, then, there is not much difference in the degree of political independence given to U.S. and Canadian central banks. Hence the recent failure of budget discipline in the U.S. relative to Canada should make us somewhat sceptical whether it is only differences in political independence that explain the differential impact on deficits and debt over the longer run.

In the particular case of the Bank of Canada, while the original architects in 1935 designed the Bank as a private corporation with widely distributed shares and government participation restricted to the appearance of the Deputy Minister of Finance as a non-voting member of the Board of Governors, subsequent legislation quickly reversed this separation by making the government the exclusive owner of the Bank's shares (Thiessen, 2000: 3). Even so, the role that would be played by the government through the Minister of Finance in the setting of policy and daily operations of the Bank of Canada remained both controversial and ambiguous until the Coyne Affair of 1961. In that episode, the inability to reconcile inconsistent monetary and fiscal policies led the then Prime Minister, John Diefenbaker, to fire the Governor of the Bank of Canada, James Coyne. The refusal of the Senate to pass the legislation declaring the office of the Governor vacant precipitated a serious political crisis that resulted ultimately in the resignation of the Governor and the adoption of legislation enshrining the leadership of the Minister of Finance in matters of economy policy.[11]

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[10] We have only indicated comparisons of Canada to other industrial democracies; comparisons to the putative level of legal independence of central banks in the less developed world turn out to be essentially meaningless since the assumed legal insulation from political control is often only a "parchment barrier," which can be broached if their economic concerns appears grave enough to political authorities (see esp. Figure 1 in Cukierman, Webb and Neyapti , 1982).

[11] The relevant legislation reads "If, notwithstanding the consultations provided for in subsection (1), there should emerge a difference of opinion between the Minister and the Bank concerning the monetary policy to be followed, the Minister may, after consultation with the Governor and with the approval of the Governor in Council, give to

Nevertheless despite the undisputed ability of the Prime Minister through his Minister of Finance to dictate Bank policy by "writing a letter of direction" to the Governor, Canada's Central Bank and its Governor appear to enjoy a considerable degree of independence from partisan politics and the specific policy platform of the governing party.

The resolution of who had ultimate authority to set economic policy in Canada, however, did little to resolve the operational issues of overlapping responsibilities and multiple, often conflicting, policy objectives. The situation changed in 1991, however, when the Bank of Canada adopted inflation targeting jointly with the Government. This involved a formal commitment by the Bank to maintain price stability (as opposed to the competing objective of maintaining full employment) where price stability was now defined specifically in terms of a targeted range for inflation.

Hence in Canada our emphasis on directed responsibility and control would lead us to predict that the introduction of the Bank of Canada in 1935 would have reduced the degree of direct fiscal responsibility by government and thus generated less control over government debt. The formal resolution of the issue of ultimate political control over policy in 1961, on the other hand, would not have been expected to alter fundamentally the division of responsibilities for economic policy unlike the adoption of inflation targeting in 1991. Hence a dummy variable for 1961 (0 before 1961, 1 thereafter) would not be expected to generate a break in any cointegration relation whereas the adoption of inflation targeting in 1991 did better delineate policy actions and so would be expected to increase fiscal responsibility. Hence a dummy variable for the period of inflation targeting (0 prior to 1991, 1 thereafter) would be expected to indicate better control over government debt.

2.3 Cohesive single party governments

Breton (1996, chap 4) emphasizes that the Canadian Minister of Finance is given broad powers in the economic sphere and that Canada has a strong tradition of cabinet solidarity, i.e., the cabinet is collectively responsible to the Government (and thus to the Prime Minister) which prevents end-runs by spending departments around a Minister of Finance who says NO. Also, because budgetary affairs are handled internally by the cabinet and within the Ministry of Finance, there is a good deal of secrecy about budgetary decision-making and timing of announcements, thus adding to the relative bargaining power of the Minister of Finance, *provided he or she is backed up by the Prime Minister.*

Since it is usually single party governments controlling a majority of the seats in the Canadian parliament, "responsible government" in Canada is effectively "party government". The prime minister is <u>the</u> leader of the government, and as long as the prime minister commands the loyalty of his own party, this insures that the government largely speaks with a single voice on economic affairs. Indeed, dissenting ministers are expected to resign. Perhaps even more importantly, in Canada rather than taxation and spending being dealt with separately (as in the U.S.), they are considered as a package in every budget. In addition, the Prime Minister exercises a line-item veto if he wishes.

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the Governor a written directive concerning monetary policy, in specific terms and applicable for a specified period, and the Bank shall comply with that directive. This power has never been used.

Centralized control means that political leaders can effectively link aggregate spending and taxation, and single party government means that politicians can be more easily held to account by the electorate for fiscal performance. This is the basis for our belief that Canada will result not be susceptible to the Keynesian type influences suggested in PCH1 above. However, while the ability to exercise control is crucial to our argument, the size of the governing majority or the scale of its control is not. Moreover the extent to which the governing party is unchallengeable in its decision-making is more controversial. Here we distinguish between two competing hypotheses:

Public Choice Hypothesis 4 (PCH4): Single party majority party governments are more effective in dealing with budgeting issues than multiparty governments or ones with a minority government in power.

Here a larger majority is viewed as simply reinforcing the argument above. On the other hand, a larger majority means that the governing party faces less effective opposition, allowing it to ignore opposition and implement unimpeded more of its party platform. With less parliamentary opposition and a greater margin to waste, parties have fewer reasons to reject the expansionist plans of its supporters, both in relation to spending more and taxing its supporters less. Finally, by being able to running up deficits to finance public spending, the party in power might also be able to "buy" vote support, thus holding on to office longer, and leaving to the opposition party that eventually takes it place the unpalatable task of coping with a fiscal crisis whose solution has too long been postponed (probably also shortening the term in office of that opposition.) Winer et al. (2008) show that in the U.S., government, spending as a share of GDP is greatest when there is single party control over the institutions of government (the two chambers of the legislature and the presidency). Similarly, Ferris, Park and Winer (2008) show that larger parliamentary majorities in Canada led to increases in government spending and resulted in a larger sized government. This argument lead us to a countervailing hypothesis:

Public Choice Hypothesis 5 (PCH5): Minority governments represent instances when political competition is heightened. The centralization of policy control and responsibility in such circumstances results in a greater than normal degree of fiscal discipline and thus greater stability in public debt.

3. A Graphical History of the Canadian Fiscal System

Before getting started with the econometric analysis that encompasses the issues we have outlined, Figures 1 and 2 and present a graphical view of the history of the Canadian fiscal system almost from the beginning of the modern state in 1867. In the first figure we show the variables that will form the core of our cointegration estimating equations: the excess of real growth over the real rate of interest and, as a percent of GDP, federal tax revenues, federal program spending net of interest payments, and the federal net of interest deficit. Figure 2 shows federal debt interest paid to the private sector as a percent of GDP.

Figure 1: Federal Fiscal Size (percent of GDP) and Excess of Real Growth Over Real Interest Rate, Canada 1870 - 2009

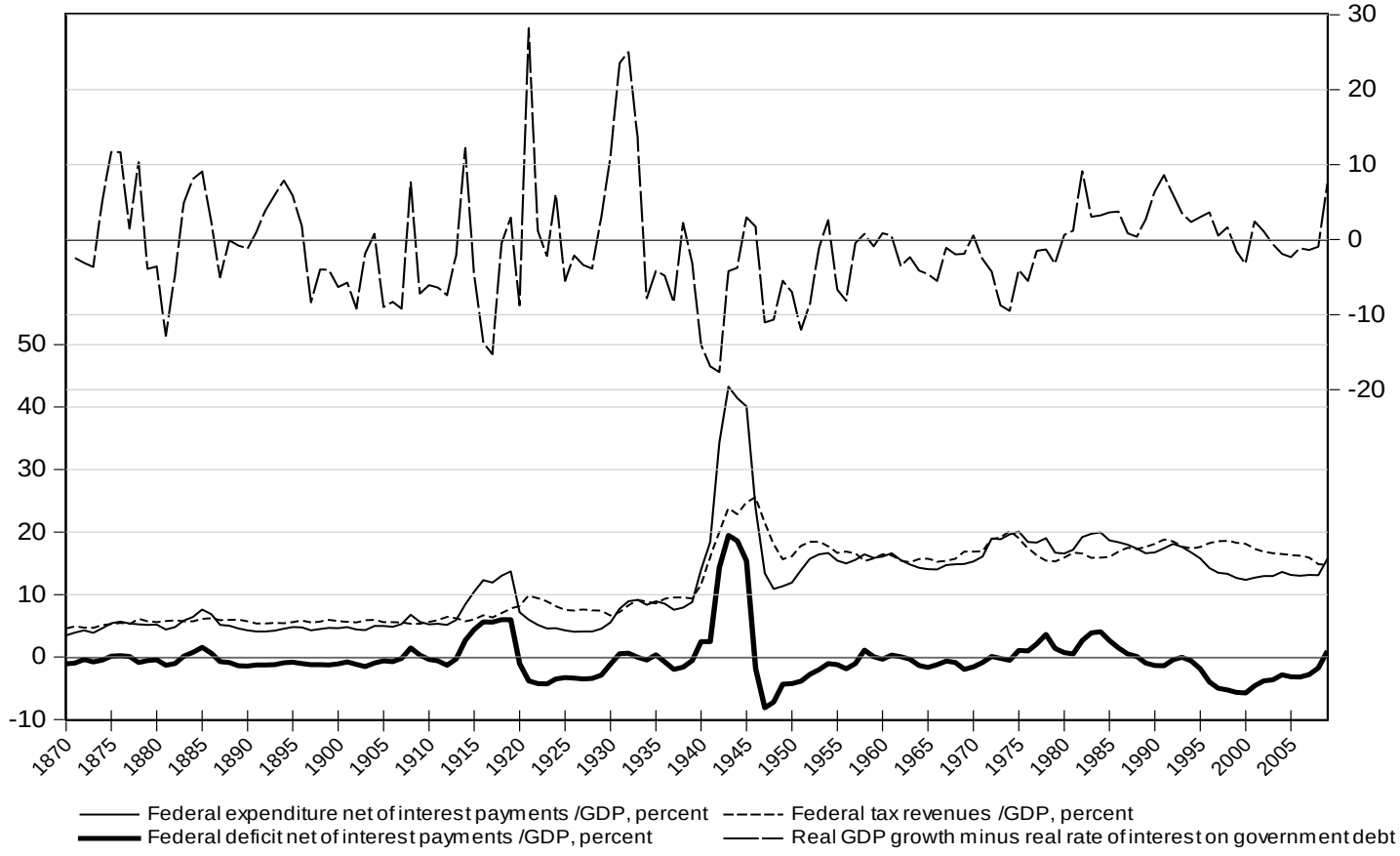

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Figure 2: Federal Debt Interest As Percent of GDP, 1870 - 2008

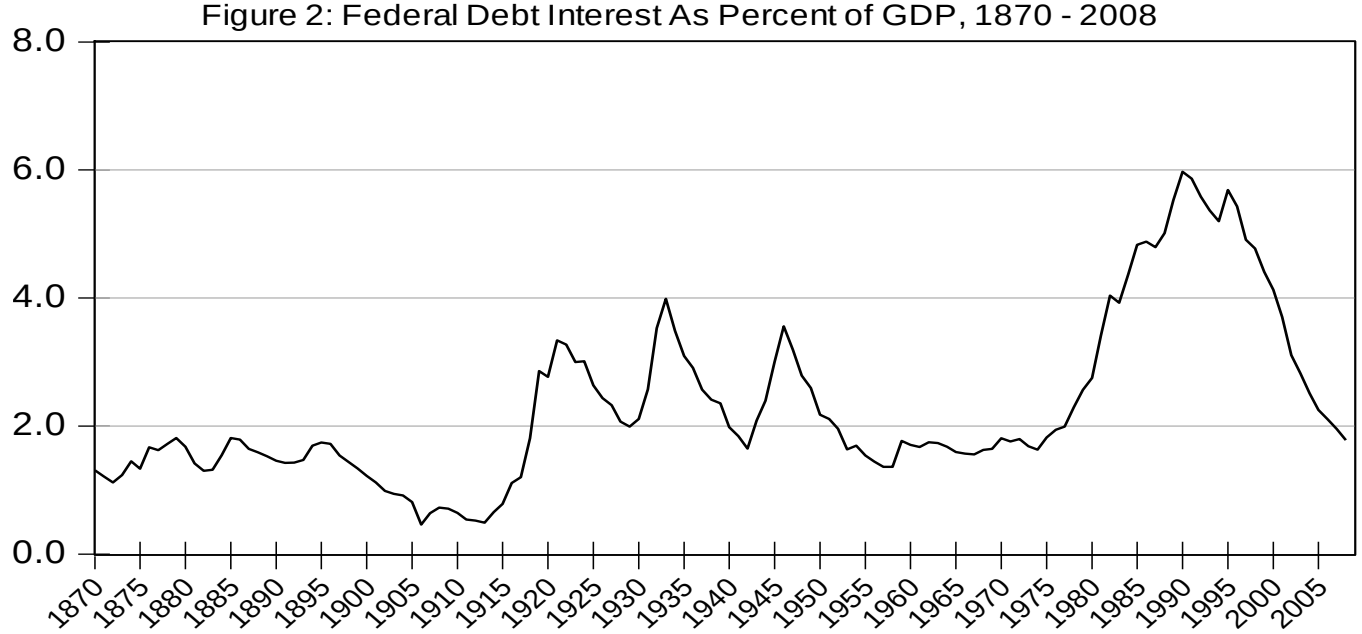

Table Accompanying Figures 1 and 2: Government of Canada, 1870 - 2009

Variable	Coefficient of Variation (and Mean)		
	1870-1913	**1920-1938**	**1950-2009**
Non-interest Spending/GDP	0.16 (0.06)	0.31 (0.08)	0.14 (0.16)
Tax Revenue/GDP	0.07	0.11	0.07
Deficit Net of Interest/GDP	-1.20	0.87	-2.31

We will investigate the time series properties of these data carefully in the following sections of the paper. Here we simply want to draw attention to one fact, confirmed by the coefficients of variation in the table following the figures: that except for the excess of the real rate of GDP growth over the real interest rate (in the top half of Figure 1), Canadian fiscal history is obviously more volatile after 1945 than it was in the 19th century. Whether this has something to do with Keynesianism, and whether or not this implies that the fiscal system is unstable, remains to be seen.

4. Empirics

In this section we test the hypothesis that Canadian parliamentary democracy has resulted in policy choices that are consistent with fiscal responsibility in the sense that spending and tax decisions led to a stationary share of government debt in GDP over the long run. We then examine whether or not the adoption of Keynesian counter-cyclical policies in Canada after 1945 has altered that degree of fiscal responsibility. The former test arises because the long run equilibrium condition needed to produce a sustainable level of government debt implies a cointegration relationship for government deficits. The latter test is based on the idea that if Keynesianism eroded fiscal responsibility, this should show up as a break in the long run cointegration relationship.

The alternative hypotheses are either that Keynesianism was effective in generating greater counter-cyclical activity (with perhaps a once and for all increase in the long run size of outstanding government debt (to GDP ratio)) or that Keynesianism has had no effect at all. Given that no evidence of a long run effect on debt's sustainability by Keynes can be found, we turn consider whether adding another institution besides for aggregate stability—the Bank of Canada—has had an impact on fiscal responsibility. The hypothesis here is that divided responsibility should lead to less fiscal discipline and that the resulting fiscal shirking produces a higher, less stable path for government debt.

4.1 Method

We begin from the observation 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., $iff\ \frac{1}{d_t}.\frac{\partial d_t}{\partial t} \leq 0$).[12] Then

[12] Note that this condition is a sufficient rather than necessary, the necessary condition being that the present value of government debt is zero. The advantage of using the weaker sufficient condition is that it yields a more transparent testable hypothesis.

since $d_t = \frac{D_t}{p_t y_t}$, 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, its time derivative becomes $\frac{dd_t}{dt} = \frac{1}{p_t y_t}\frac{dD_t}{dt} - \frac{D_t}{p_t^2 y_t}\frac{d_{p_t}}{dt} - \frac{D_t}{p_t y_t^2}\frac{dy_t}{dt}$. This in turn can be rearranged to be:

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

The change in nominal government debt through time, $\frac{dD_t}{dt}$, comes from the size of current government deficit, the difference between total government spending and taxes where total spending depends upon both program spending, G_t, and interest on outstanding government debt, $i_t D_t$. Government revenues come from taxation, T_t. Using this definition of $\frac{dD_t}{dt}$,

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

$$\frac{dd_t}{dt}\frac{1}{d_t} = \left(\frac{G_t - T_t}{D_t}\right) + i_t - \pi_t - \left(\frac{dy_t}{dt}\frac{1}{y_t}\right) = \left(\frac{G_t - T_t}{D_t}\right) + r_t - \left(\frac{dy_t}{dt}\frac{1}{y_t}\right) \quad (3)$$

where the first term on the right hand side, $\left(\frac{G_t - T_t}{D_t}\right)$, 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 to be positive and not increasing in the long run, the growth rate of d_t must be zero, i.e., $\frac{1}{d_t}.\frac{dd_t}{dt} = 0$. This in turn implies that $d_t = \bar{d}$ and that

$$\left(\frac{G_t - T_t}{D_t}\right) = \left(\frac{\partial y_t}{\partial t}\frac{1}{y_t}\right) - r_t. \quad (4)$$

Dividing the top and bottom of the left hand side by nominal income, $p_t y_t$, we find with rearrangement:

$$\left(G_t/p_t y_t\right) = \left(T_t/p_t y_t\right) + \bar{d}\left(\frac{dy_t}{dt}\frac{1}{y_t} - r_t\right). \quad (5)$$

This relationship asserts that for the share of government debt to be sustainable over time there must exist a particular long run relationship among three variables. Intuitively, a deficit can be sustained in the long run only if the rate of growth of real output exceeds the real cost of holding long run debt. For convenience, we call this last term the fiscal cost of long run debt, that is, FCOST = $\left(\frac{dy_t}{dt}\frac{1}{y_t} - r_t\right)$.

In statistical terms, the expenditure size, GSIZE, and the tax size, TSIZE, of government have both risen through time and are I(1). Hence a long run stable equilibrium relationship implies that a cointegrating relationship must arise between these two parts of the government's operating

deficit. On the other hand, FCOST is stationary or I(0). Hence FCOST can be combined with the operating deficit only if the residual from a linear regression between the two variables in the operating deficit are stationary. If this is the case then the parameter $\bar{d}$ can be inferred from the coefficient of FCOST in that extended linear regression.

Because Keynesianism is first and foremost a set of counter-cyclical policies, testing for a long run relationship between government spending and taxes is complicated by the fact that the data observed will also incorporate those short run policy measures designed to deal with short run variation in economic growth about its long run path. This could differ in degree and/or kind from the type of variation implied by long run policy. Hence testing for the existence of such a cointegration relationship to assess the long run hypothesis that Canada's parliamentary democracy has been consistent with fiscally responsibility should also account for the simultaneous appearance of short run counter-cyclical policy in the data. To do this we first estimate the long run cointegrating relationship as part of an error correction model of adjustment to the long run. In this case the condition that the residuals from the linear regression must be stationary is replaced by the condition that the error correction term must have a particular sign for stationarity. In our case convergence requires a reduction in spending when deficits rise and a rise in taxation.

4.2 Tests

A. Does Fiscal Policy in Canada exhibit stability over the Long Run?

The time series characteristics of and sources for the data used in our tests are presented in the Data Appendix found at the end of the paper. The important characteristic is that both the expenditure and tax shares of government in GDP are I(1) while FCOST is I(0).

The analysis above then suggests that the sustainability of government debt in the long run can be tested for by the form and coefficients of the following OLS regression:

$$\left(G_t/p_t y_t\right) = \; c_0 + c_1\left(T_t/p_t y_t\right) + \; c_2\left(\frac{dy_t}{dt}\frac{1}{y_t} - r_t\right) + \varepsilon_t. \qquad (6)$$

Fiscal sustainability requires the regression residuals, ε_t, to be stationary with $c_0 = 0$, $c_1 = 1$ and $c_2 = \bar{d}$. Perhaps as importantly, our analysis also suggests that this long run relationship should be imbedded within an error correction framework, where the error correction process allows for the incorporation of short run counter-cyclical fiscal policies that may incorporate more than just the types of variation in policies that underlie the long run. Since short run fiscal policy differs from considerations spanning the long run, we include the possibility of short run counter-cyclical policy in the error correction part of the model. Hence our test for fiscal responsibility implies running an error correction model where short run changes in government expenditure that respond both to the size of the "error' made incomplete adjustment to the long run and to variations in the growth rate (of GDP). In Table 1 below we then present the Johansen cointegration equation and error correction equations for the three potentially endogenous variables. Because WW2 generates abnormally large short run variations in spending, we exclude the 1940-1946 time period.

Table 1: Vector Error Correction Estimates, Canada: 1876 – 2009

(Standard errors in brackets)

Cointegrating Eq:	CointEq1		
GSIZE	1.000000		
TSIZE	-0.988196***		
	(0.08752)		
FCOST(-1)	0.964437***		
	(0.11276)		
C	0.012384		
Error Correction:	**D(GSIZE)**	**D(TSIZE)**	**D(FCOST)**
CointEq1	-0.055493***	0.021941**	-0.630447***
	(0.01936)	(0.01146)	(0.07728)
D(GSIZE(-1))	0.464038***	0.062583**	-0.142570
	(0.06177)	(0.03655)	(0.24652)
D(GSIZE(-2))	-0.085385	0.061778**	0.663875
	(0.06683)	(0.03954)	(0.26671)
D(GSIZE(-3))	0.071234	0.069948**	0.057774
	(0.06251)	(0.03698)	(0.24945)
D(GSIZE(-4))	-0.133985**	-0.087636**	-0.047893
	(0.05690)	(0.03367)	(0.22708)
D(TSIZE(-1))	0.067321	0.350726***	-0.013382
	(0.15371)	(0.09095)	(0.61342)
D(TSIZE(-2))	-0.240225	-0.294435***	-0.887089
	(0.15690)	(0.09284)	(0.62617)
D(TSIZE(-3))	0.351814**	0.040592	1.193730**
	(0.14965)	(0.08854)	(0.59721)
D(TSIZE(-4))	-0.243858*	-0.151073**	-0.318013
	(0.12911)	(0.07639)	(0.51526)
D(FCOST(-1))	0.008164	-0.029383***	-0.014948
	(0.01782)	(0.01054)	(0.07110)
D(FCOST(-2))	0.014470	-0.008898	-0.046340
	(0.01749)	(0.01035)	(0.06980)
D(FCOST(-3))	-0.000202	-0.024050***	-0.021689
	(0.01554)	(0.00919)	(0.06200)

D(FCOST(-4))	0.027702**	-0.003915	-0.012095
	(0.01351)	(0.00799)	(0.05391)
C	0.003119***	0.000764	0.038628***
	(0.00104)	(0.00062)	(0.00416)
GROWTHGDP	**-0.078768*** **	-0.026486**	-1.088821***
	(0.01815)	(0.01074)	(0.07245)
R-squared	0.626052	0.554854	0.779324
Adj. R-squared	0.579308	0.499211	0.751740
Sum sq. resids	0.009458	0.003311	0.150640
S.E. equation	0.009190	0.005437	0.036674
F-statistic	13.39334	9.971627	28.25226
Log likelihood	423.3648	490.0122	247.5975
Akaike AIC	-6.430941	-7.480507	-3.662952
Schwarz SC	-6.095013	-7.144580	-3.327024
Mean dependent	-0.000365	-0.000532	-0.000711
S.D. dependent	0.014168	0.007684	0.073605

Determinant resid covariance (dof adj.)	2.84E-12
Determinant resid covariance	1.94E-12
Log likelihood	1171.726
Akaike information criterion	-17.69648

(***) [**] {*} significantly different from zero at (1%), [5%], {10%}

The results in Table 1 indicate that for the period since Confederation, the cointegration equation (in the first section of the table) conforms well to requirements of debt stationarity.[13] First, the $c_1$coefficient estimate of tax size is .988, insignificantly different from its predicted value of 1 while the constant term, c_0 is insignificantly different from zero.[14] Hence the results do not allow us to reject the hypothesis that Canadian parliaments have been fiscally prudent in the sense that non-interest government spending and taxes have been approximately equal over the long run and the implied rate of growth of real government debt as a share of GDP has been approximately zero. Similarly, the set of error correction coefficients on the short run spending and taxation equations have their predicted signs for deficit convergence back towards zero (negative and positive) with government expenditures contracting significantly in the face of unexpected deficits.

The positive error correction term on the growth equation is not inconsistent with taxes being raised in the face of an unexpected deficit although the coefficient estimate is significantly different from zero only at the ten percent significance level. Overall, the results provide evidence of

[13] We must be careful not to read too much into the significance of the coefficient estimates because of the endogeneity that may exist amongst the variables. See below for the DOLS adjustments for correlations among the variables.

[14] If we allow only the two I(1) policy variables in the cointegrating equation, the tsize coefficient become .99. Note that Eviews does not report the standard error of the constant term in the cointegrating equation, but from later results we know this will be insignificantly different from zero. See the section on the long run below.

cointegration and deficit convergence and thus are consistent with the hypothesis of long run fiscal responsibility in the tax and spending choices made by Canada's parliament in the period following Confederation.

From the cointegrating equation we can also recover the implied values of the share of government debt in GDP. Because FCOST is negative on average over our time period (i.e., the long run real rate of interest has exceeded the rate of growth of real output) the data suggest that the stationary long run share of debt in GDP, c_2, is about 95%.

In the equations above, the short run error correction equations model allow for the possibility that short run fiscal policy could respond to the business cycle. The results suggest that government spending has responded pro-cyclically over the period as a whole with some tendency for taxation to respond in a similar manner. This suggests that short run counter-cyclical fiscal policy has always been used by Canadian governments to smooth the business cycle and such activities have not interfered with maintaining a stationary debt to GDP ratio. The short run error correction process also exhibits considerable persistence in both short run policy choices. A significant portion of both government spending and tax increases persist into the second year and call forth reinforcing changes in the other policy instrument.

B. Short run counter-cyclical policy and Keynes

Before proceeding to test whether Keynes had an influence on the long run sustainability of government debt in Canada, we first extend the error correction framework to convince ourselves that in fact Keynesianism policies were adopted in Canada. That is, because Keynesianism first and foremost implies counter-cyclical fiscal policy, our first approach to testing for Keynes' influence on Canadian fiscal policy is to ask whether the short run adjustment process described by the error correction model estimated above changes in any substantive way (on this see also Winer and Ferris, 2008). Formally we do this in the error correction setting by interacting a dummy variable for the 1946-2009 time period with real output growth. It follows that greater counter-cyclical intervention as proposed by Keynes would imply a negative coefficient in the interacted spending equation (greater spending when growth rates are falling) and a positive coefficient in that tax equation (reductions in taxation when growth is falling). The effect of incorporating Keynesianism in this way on the error correction model is shown in Table 2 below.

Table 2: Vector Error Correction Estimates, Canada: 1876 – 2009

(Standard errors in brackets)

Cointegrating Eq:	CointEq1		
GSIZE(-1)	1.000000		
TSIZE(-1)	-0.971532*** (0.18724)		
FCOST(-1)	1.575533*** (0.16809)		
C	0.010411		
Error Correction:	**D(GSIZE)**	**D(TSIZE)**	**D(FCOST)**
CointEq1	-0.041137*** (0.01426)	0.007384 (0.00764)	-0.417098*** (0.04417)
D(GSIZE(-1))	0.481064*** (0.11106)	-0.117692** (0.05947)	-1.306209*** (0.34395)
D(GSIZE(-2))	-0.264849** (0.13501)	0.137718* (0.07229)	-0.163463 (0.41811)
D(GSIZE(-3))	0.228370* (0.13307)	-0.009745 (0.07125)	0.016204 (0.41210)
D(GSIZE(-4))	-0.220844*** (0.08462)	-0.036342 (0.04531)	-0.000297 (0.26207)
D(TSIZE(-1))	-0.107887 (0.19738)	0.410084*** (0.10570)	-0.549387 (0.61130)
D(TSIZE(-2))	-0.066170 (0.21155)	-0.253332** (0.11328)	0.040345 (0.65516)
D(TSIZE(-3))	0.292730 (0.18995)	-0.048480 (0.10172)	0.834157 (0.58827)
D(TSIZE(-4))	-0.197915 (0.15402)	-0.037356 (0.08248)	-0.263545 (0.47700)
D(FCOST(-1))	0.008187 (0.02215)	-0.010558 (0.01186)	0.042100 (0.06859)
D(FCOST(-2))	0.042657** (0.02055)	0.000402 (0.01101)	0.019100 (0.06365)
D(FCOST(-3))	0.004125 (0.01887)	-0.011678 (0.01010)	0.033470 (0.05844)
D(FCOST(-4))	0.030309* (0.01550)	-0.001417 (0.00830)	0.004274 (0.04799)

C	0.003927	0.000785	0.037568
	(0.00128)	(0.00068)	(0.00395)
	[3.07770]	[1.14888]	[9.50745]
GROWTHGDP	**-0.050515****	-0.013518	-1.092989***
	(0.02147)	(0.01150)	(0.06650)
KEYNES*GROWTHGDP	**-0.082933****	-0.000732	0.077372
	(0.03884)	(0.02080)	(0.12029)
R-squared	0.301470	0.263154	0.836081
Adj. R-squared	0.205342	0.161753	0.813523
Sum sq. resids	0.011541	0.003309	0.110691
S.E. equation	0.010290	0.005510	0.031867
F-statistic	3.136127	2.595181	37.06409
Log likelihood	403.2684	481.3406	261.9653
Akaike AIC	-6.196295	-7.445450	-3.935445
Schwarz SC	-5.834270	-7.083426	-3.573421
Mean dependent	0.001037	0.000427	-0.001015
S.D. dependent	0.011543	0.006018	0.073796

Determinant resid covariance (dof adj.)	2.67E-12
Determinant resid covariance	1.77E-12
Log likelihood	1159.037
Akaike information criterion	-17.72860

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

The coefficient estimates in the last lines of column 1 suggest that fiscal spending has not only been counter-cyclical in the short run for the entire period since Confederation but that fiscal spending has become increasingly counter-cyclical in the time period following 1945. This is consistent with Keynesian prescripts and with evidence found elsewhere for Canada (Winer and Ferris, 2008). On the other hand, the coefficient signs on taxation continue to imply that taxation has been mildly pro-cyclical and that the period following Keynes has produced no further effect. From a broader perspective, the results in Table 2 suggest that the presence of Keynesianism in short run fiscal policy has had very little effect on the long run cointegration equation and hence on the sustainability of government debt in Canada. The coefficient on tax size, .972, is virtually unchanged and insignificantly different from one while the constant term remains zero. Similarly the error correction terms and their significance remain largely unaltered as does the pattern of persistence. The one suggestion that something may be arising in the longer run is that the estimated size of the steady state level of the debt to GDP ratio does rise.

We can then conclude our discussion of the effect of Keynesianism on short run policy by saying that that from the perspective of this error correction model (modified to include a counter-cyclical role for short run policy) there is evidence that Keynesianism did make fiscal expenditure policy more responsive to the business cycle but little evidence that Keynesian counter-cyclical policy has impacted negatively on the sustainability of government debt over the long run.

C. Did Keynes introduce debt instability into the long run?

While the short and long run fiscal policies adopted by Canada may have resulted in a stable debt to GDP ratio over the time period as a whole, there may well be sub-periods when policy choices were influenced by factors and/or ideologies that resulted in periods of temporary instability. Hence in this section we first examine whether the time period following Keynes represented a fundamental change in the long run relationship linking the expenditure and tax sizes of government. This in turn is interpreted as producing a break in the longer run cointegration relationship at or about the time Keynesian short run policies were adopted in Canada. We begin by first presenting a more robust test for cointegration across our time period that assumes there were no breaks in the time series relationship. To do so we use the dynamic OLS (DOLS) model of Stock and Watson (1993) over the entire 1870-2009 time period. This provides a correction for correlations that may exist among the equations covariates that can bias the standard errors. The result provides us with a benchmark against which we can assess whether Keynesianism has meant a break with previous policy practice with respect to government debt. The result is presented as column (1) in Table 3.

In column (1) of Table 3 the DOLS equation can be seen to produce coefficient estimates that are quite similar to the cointegration equations presented earlier in Tables 1 and 2. In particular, the coefficient estimate on TSIZE is still virtually identical to 1 (at 0.975) and the constant term remains insignificantly different from zero (indicating no tendency for the federal government debt to GDP ratio to grow or shrink in the long run). The DOLS correction, however, does make a difference to the estimate of the size of the long run debt to GDP ratio, suggesting a much smaller 10 percent level that is also insignificantly different from zero.[15]

In columns (2) and (3) we present re-estimates of the long run relationship under two sets of assumptions for the period time relevant to test for Keynesianism. Instability in the government debt ratio then appear as a break in the constant term of the cointegration equation, with a positive constant on Keynes, for example, implying a positive growth rate that would be unsustainable in the long run. Column (2) represents the case where the break point is determined endogenously as the initial point in the time interval that minimized the sum of the squared residuals in successive DOLS equations.[16] This procedure suggested 1946 as the appropriate break point. On the other hand, the choice of a post-war initial time means that Canadian government debt accumulated during WW2 would be excluded from time period attributed to Keynes such that the natural running down of war-time borrowing might bias the measure against finding any expansionary tendency present in Keynesianism. For this reason we redid the estimate using 1939 where the build-up of war-time debt would be contained within the Keynesian period.

Neither set of empirical results, however, suggest that a break is present. In column (2) the coefficient sign on Keynes is negative rather than positive (suggesting a tendency to reduce debt accumulated from deficits in pre-Keynesian times). In any case the coefficient estimate is

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[15] If we simply ran an OLS regression as our cointegration equation, we would find
GSIZE = -0.013 + 1.08 TSIZE – 0.016 FCOST with adj. R^2= 0.727 and ADF = -6.13 (1% MacKinnon criterion = -4.38).
(0.01) (0.025) (0.045)

[16] That is, we experimented with having the break point at 1945 through 1955 and chose the year at which the SSR was minimized.

insignificantly different from zero.[17] In column (3) the coefficient sign does become positive but remains both extremely small and insignificantly different from zero.

If the effect of Keynesianism in Canada was to reduce the growth rate of government debt, it would need to be reflected in a lower long run size of government debt as a fraction of GDP. Hence we re-estimate the equation to allow the size estimate, d, to vary across the time periods by including an interactive term on FCOST. This is presented in column (4). As that column indicates, allowing the estimate of the long run size of government debt as a fraction of GDP does suggest a smaller debt ratio consistent with the estimated negative effect of Keynes on the growth rate, but again both coefficient estimates are insignificantly different from zero.[18] It follows that if we define the post war time period as one of Keynesianism (using either break point to define its beginning), we find that the data give no support to the hypothesis that the adoption of Keynesianism introduced fiscal policies that increased the long run size of government debt.[19]

The hypothesis that Keynes' influence on deficits and long run debt has continued into the present has often been questioned for Canada. In particular, much has been made of the observation that the accumulation of public debt in Canada throughout the seventies and eighties precipitated a strong political reaction (the near elimination of the Progressive Conservative Party) leading to the election of the Chrétien governments (1993 – 2003) who dedicated their mandate to dramatically reducing government deficits and debt by reducing government spending. In terms of policy actions, the ending of Keynesian attitudes towards the deficit and debt may also have been signalled by the formal adoption of inflation targeting by the Bank of Canada in 1991. Alternatively it has been argued that that the instability of the Phillips curve in the early 1970's may have led policy makers to become more sceptical of the stimulative potential to debt financing. Hence in column (5) and (6) we present two different tests for the effect of Keynesianism now defined as the policy period between 1946 and 1991 (ending with inflation targeting) and between 1939 and 1975 (to include the war time build-up of government debt to end with the Phillip's curve debate). Somewhat surprising, the data is consistent with the hypothesis that government debt did exhibit instability over the longer 1946 to 1991 time period but not over the shorter 1939-1974 time interval.[20] This suggests that the period of debt instability is associated more with the 1974-1991

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[17] Using 1946 as our break point, we used the test proposed by Carrion-I-Silvestre and San$\acute{s}$o (2006) as our test of the null hypothesis of cointegration. Their test statistic is

$$SC^{+}_{An}(\lambda = \frac{T_b}{T}) = T^{-2}\hat{\omega}^{-2}\sum_{t=1}^{T}(S^{+}_{An,t})^2$$

where T_b is the time to the break, T is the length of the time interval, $\hat{\omega}^2$ is the long run variance of the residuals, $S^{+}_{An,t} = \sum_{j=1}^{t}\hat{e}_{An,t}$, and An reflects the fact that the estimating equation allows for a shift in the constant term at T_b. To interpret the outcome, we note that the Carrion-I-Silvestre and San$\acute{s}o$ test uses the upper tail of the distribution so that the null hypothesis of cointegration is rejected only when $S^{+}_{A,t}$ > critical value. In our case $S^{+}_{An,t}(.56)$ = 0.05867 which is strictly less than the critical value of 0.0840 (for k = 3, $\lambda = .5$).

[18] Note that the mean value of FCOST is negative (i.e., r > growth rate) so that the predicted size of the debt share is positive not negative.

[19] In this case $S^{+}_{A,t}(.56)$ = 0.07034 which is less than the critical value of 0.0741 (for k = 3, $\lambda = .5\ at\ 97.5\%$).

[20] Having Keynesianism end with the election of the Chretien government in 1993 strengthens the significance of the Keynes effect. For the period as a whole, after allowing or the break between 1946 and 1991, $S^{+}_{An,t}(.56)$ = 0.0248247 which is strictly less than the critical value of 0.0840 (for k = 3, $\lambda = .5$). Hence government debt over the entire period is stable.

time interval than with any time period beginning near WW2, a time internal not well suited to fit into a Keynesian tail.

Table 3: DOLS equation estimates for Canada: 1876 – 2005

(HAC standard errors in brackets)

	(1) GSIZE	(2) GSIZE with break in 1946	(3) GSIZE with break in 1939	(4) GSIZE# 1946 break and interaction	(5) GSIZE Keynes 1946-1991	(6) GSIZE Keynes 1939-1975
Constant	-0.004	-0.0105	-0.003	-0.014	0.001	0.007
	(0.008)	(0.01)	(0.015)	(0.011)	(0.006)	(0.006)
TSIZE	0.975***	1.079***	0.957***	1.140***	0.881***	1.015***
	(0.069)	(0.137)	(0.271)	(0.176)	(0.061)	(0.056)
FCOST	-0.101	-0.090	-0.100	-0.170	-.066	-0.165*
	(0.091)	(0.07)	(0.093)	(0.107)	(0.071)	(0.088)
KEYNES(1946)		**-0.013**		**-0.019**		
		(0.016)		**(0.022)**		
KEYNES(1939)			**0.002**			
			(0.34)			
KEYNES(1946)*FCOST				**0.0175**		
				(0.110)		
KEYNES(1946-1991)					**0.017****	
					(0.007)	
KEYNES(1939-1975)						**-0.010**
						(0.008)
STATISTICS						
No. of obs.	130	130	130	130	130	130
Adj. R^2	.869	.868	.867	.870	.873	.869
SSR	0.07815	0.0777	0.0782	0.07567	0.0747	0.077
Log Likelihood	297.6	298.0	297.62	299.7	300.5	298.46

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

This table uses Stock and Watson's (1993) DOLS estimation to account for potential endogeneity among the explanatory variables by including the contemporaneous and four lagged and led values of the first differences of the right side variables (with the exception of the dummy variables). Only the coefficients of the level terms are presented.

The SSRs from 1945 through 1950 are, respectively: 0.07814, 0.07769*, 0.07808, 0.07809, 0.07805 and 0.07812 suggesting that the break point is at 1946. HAC standard errors use Bartlett kernel with Newey-West fixed bandwidths.

It follows that for the case of Canada, Keynesianism either had no effect on the long run evolution of government debt (the results in columns (2), (3), (4) and (6)) or, if it had a destabilizing effect (as in column (5)), it did so only for a short period before being countered by the political process through the electoral and party system. We can find no evidence that the more aggressive use of Keynesian counter-cyclical short run fiscal intervention (as suggested by the error correction process) has weakened the fiscally conservative approach that Canadians have typically taken towards paying for government services. This is not inconsistent with the hypothesis that Keynes may have played a possibly influential role in broadening the scope and hence the size of government in Canada. However even if that has been true, as has been argued elsewhere, our

evidence does not suggest that that larger scale of services by government has been funded by tax payments transferred implicitly to future generations.

D. Extensions

In this section we consider the two alternative tests of the hypothesis that under the parliamentary system of government, the concentration of fiscal responsibility in the Prime Minister and his/her political party effectively internalizes the fiscal externality associated with having governing terms of relatively short duration. The tests first examine the stationarity of the long run debt ratio in the face of a fracturing of responsibility for fiscal stability among more policy makers and second examine financial stability when governance process is constrained by having minority status in parliament.

In the first three cases, represented as the regression equations in columns (1), (2) and (3) of Table 4, we examine the hypothesis that the creation of a Central Bank divided responsibility for fiscal stability between the Department of Finance and the Bank of Canada and this would lead to less fiscal stability. Further, the attempt to focus the objective of the Bank on price stability through the adoption of inflation targeting should have led to greater stability. The first prediction, then, is that there would be less budgetary control following the introduction of the Bank of Canada so that the coefficient on the Bank of Canada dummy variable (1 following 1935, 0 before) should be positive. This is tested for in columns (1) through (3) where it is given weak support.

Table 4: DOLS equation estimates for Canada, 1876 – 2005

(HAC standard errors in brackets)

	(1) GSIZE DOLS(4)	(2) GSIZE DOLS(4)	(3) GSIZE DOLS(4)	(4) GSIZE DOLS(4)
Constant	-0.005	0.003	-0.003	-0.006
	(0.012)	(0.013)	(0.013)	(0.013)
TSIZE	0.957***	0.864***	0.957***	1.06***
	(0.192)	(0.202)	(0.192)	(0.219)
FCOST	-0.027	-0.091	-0.027	0.003
	(0.076)	(0.078)	(0.076)	(0.091)
KEYNES(1946)	-0.026	-0.037	-0.038**	-0.044
	(0.017)	(0.023)	(0.019)	(0.031)
Bank of Canada (1935)	0.041*	0.041*	0.038*	0.037
	(0.022)	(0.022)	(0.021)	(0.030)
Letter of Direction (1961)		0.007	0.012	0.008
		(0.010)	(0.009)	(0.015)
Inflation Targeting (1991)			-0.030***	-0.031**
			(0.009)	(0.015)
Minority governments				-0.020**
				(0.010)
STATISTICS				
No. of obs.	130	130	130	130
Adj. R^2	.871	.870	.881	.889
SSR	0.075	0.075	0.068	0.063

Log Likelihood	299.9	300.3	306.28	311.9

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

Ambiguity over which policy department would ultimately control aggregate economic policy in Canada came to a head in the Coyne Affair, where legislation was introduced defining the role of the Bank of Canada in relation to the Department of Finance. That legislation gave autonomy to the Bank in terms of the day-to-day operation of monetary policy while giving to the Department of Finance the authority to "direct" the operations of the Bank should its policy practices conflict with fiscal policy (under the Department of Finance). It is unclear whether the 1961 resolution did or did not increase Bank independence and thus make policy coordination more or less difficult. The hypothesis that the resolution of the Coyne Affair in 1961 did improve fiscal responsibility is tested in columns (2) and (3). Here the data is more consistent with the hypothesis that the establishment of the Bank weakened rather than strengthened fiscal discipline, but the 1961 Directive dummy generates a coefficient estimate that is insignificantly different from zero. Finally column (3) adds the hypothesis that the adoption of inflation targeting by the Bank of Canada in 1991 did represent a significant delineation of responsibilities between the Bank and the Department of Finance. This would be expected to produce a negative coefficient on the inflation targeting dummy. The result in the last line of column (3) in Table 3 is consistent with that expectation.

Finally, the second type of extension tests the hypothesis that fiscal disciple will be lost when political power is split across one or more political parties versus the hypothesis that a smaller governing mandate implies greater political competition that enforces greater fiscal discipline. This is tested by the response under minority governments. The result presented in column (4) suggests that at least for Canada the latter is more likely. Competition in the political system seems to focus more the attention of the electorate such that greater fiscal discipline is imposed as parties jockey for position in the upcoming election. This result however is somewhat weak and not robust to all equation specifications.

5. Conclusions

The Canadian case, with 140 years of good data, and virtually identical basic political institutions, provides us a long enough data set to model both short term effects and to search for long term equilibrium in budget deficits. Our first finding is indisputable: *despite recurring periods of recession and large deficits arising from world wars, there is simply no evidence of an unstable time path of deficit financing in Canada corresponding to any of the time periods suggested for instability.* Keynesianism, for example, which is considered by many Public Choice scholars to be an "enabler" (in the language of the clinical psychologists who study drug and alcohol dependency) of weak-willed politicians who find it easy to spend money but hard to raise taxes, and who can shelter their desire to buy votes needed for their re-election behind Keynesian arguments for countercyclical spending, seems to have had little impact in Canada -- at least on deficits and the debt to GDP ratio in the long run . Despite their embrace of Keynesianism and a strong role for the state in the post-WW2 period, Keynesian views do not seem to have sapped the will of Canadian politicians to balance budgets over the decades.

Students of public finance (especially those of a Public Choice persuasion) must come to terms with the Canadian experience. Is it a fluke (and if so why)? [21] Canada's success in dealing with budget deficits despite its Keynesian leanings poses a serious challenge to those who argue that Keynesianism is a source of evil. [22]

Our analysis also suggests that while the standard economic story that extols the virtue of independent central banks as providing one solution to the "Ulysses and the sirens" problem of the temptation to spend faced by politicians, the picture on the ground is much more complex. Yes, central banks often have the technocratic expertise lacked by government authorities, and are able to focus on a limited number of economic specifics rather than a multiplicity of policy concerns and thus are able to take a longer term view resistant to immediate political pressures that mitigates (if not fully solving) commitment problems. On the other hand we also need to understand the potential downside of delegation to central banks in terms of the *moral hazards* of delegation. By providing what seems to be a failsafe of last resort, the existence of an independent central bank may encourage politicians to vice, i.e., to bankrupting the public fisc, because they can expect to be bailed out of their follies by compensatory (and unpopular) actions taken by bankers who will be seen as operating out of the control of these self-same politicians. In addition, the greater independence of the central bank may reduce needed coordination in monetary and fiscal policy. When we examine the role of the Central bank in Canada, it may be that the positive and negative effects of Central Bank independence more or less cancel out, perhaps explaining our empirical finding of little or no impact on the stability of budget deficits attributable to the creation of the central bank or to changes in its powers.

It is tempting to attribute Canada's success in developing long run economic stability to its (usual) centralization of both political and economic power in the hands of a Prime Minister and a Minister of Finance from a party with majority control of the legislature, and to the norm of "responsible party government," where by this we mean joint cabinet responsibility to the parliament which, in the case of single party control of the parliament means party responsibility in which the government speaks with a unified voice and dissenters are expected to resign from cabinet office. The argument, as we laid it out earlier, is quite simple. Centralized control means political leaders can link aggregate spending and taxation more easily, and they are also more easily held to account by the electorate for fiscal performance, thus structuring their re-election incentives in a sharp

[21] Here we note that there are other factors we have not explored in depth that are peculiar to Canada ranging from a more consensus–oriented political culture, to specific institutions such as the Auditor General's role in budgetary review, or the PM's ability to use a line-item veto, that might help us explain Canadian long run budgetary success.

[22] We repeat, however, a point made earlier, that the present paper's focus is on deficits. We can have stationarity in deficits even if there is long term growth in government size and taxation levels as long as the latter are in balance with each other (CF. Winer and Ferris, 2008). Moreover, our results do not speak to the influence of Keynesian ideas on the size of the welfare state or on industrial policy. Thus we do not wish to overstate our differences with Buchanan and Wagner (1977) and later authors who blame Keynes for providing an economic /intellectual underpinning for many features of the modern state that are repugnant to libertarians or who argue that Keynesian policies ultimately hinder economic growth.

fashion that would seem to incline them to fiscal prudence.[23] But here, too, as with the role of central banking, we must be careful. There is no guarantee that "responsible party government" in the very technical sense we defined it above, means "responsible" government in the more common sense meaning of that term vis-à-vis "sensible" budget outcomes.[24]

Therefore, rather than trying to do the impossible, that is arguing that data from a single country makes the general case for some particular factor or set of factors being central determinants of debt stability relative to GDP in all political regimes, we wish instead to conclude simply by pointing out that Canada is the white Keynesian swan that contradicts the claim that all Keynesian swans are black.

[23] By analogy, this argument suggests that concentrating power in the hands of a king (or having unified party control in a presidential system where the president served as the dominant party leader) would give us good budgetary outcomes –at least in the long run. But all we have to do is think about the U.S. under unified party rule (e.g., most of the George Bush II era from 1994 through 2006) to see that centralized control can also mean great irresponsibility as ideology requiring tax reduction as a matter of a quasi -religious faith (combined with the influence of special interests directly benefiting from the cuts) dominated Micawberian common sense. On the other hand, thinking about divided government in the U.S. under Obama since 2008 reminds us that political competition can also lead to irresponsibility as great or even greater as unchecked power of a dominant executive, as we see the Republican and Democratic parties engaging in a "blame game" for their failure to agree on ways of dealing with the current potentially cataclysmic budget crisis. (Of course, even with unified party control, we can still distinguish the U.S. from Canada in many ways, e.g., checks and balances disperse power and authority across the President, House, Senate and Supreme Court, and strong federalism allows for competing centers of power in the U.S. For a much more detailed discussion of U.S. - Canada institutional comparisons in the financial area see Breton, 1996, chapter 4; for a more general discussion of U.S.-Canada comparisons with respect to political and electoral arrangements see Blais, Bowler and Grofman, forthcoming.)

[24] As was said to Peter Parker (Spiderman), "with great power comes great responsibility." But this is a normative injunction, not a guarantee of good behaviour by the powerful. For example, If there is anticipated change in party control, politicians may seek to hold onto power as long as possible by avoiding spending cuts or tax increases, or perhaps by actually cutting taxes, bequeathing to the opposition the unpalatable choice of having to either raise taxes or cut spending (or do both) to deal with the deficit left them, or face a disaster in the credit markets -- in either case shortening the opposition's own subsequent tenure in office. Indeed, in the U.S., a good claim can be made that tax reductions under Bush I, and the deficits they generated, was in fact a diabolical plot by Republicans to "starve the beast," and prevent the Democrats when they eventually returned to power from having any ability to expand the size of government, rather than a mistaken belief in the "Laffer curve" idea that cutting taxes would actually raise government income by improving the incentives of taxpayers to work longer and harder

Data Appendix

1. Economic variables and data sources

The economic data come from several sources: Urquhart and Buckley (1965), Urquhart (1993) and Leacy et al. (1983) for the economic variables in the earliest time period (1870 through 1921); and *Cansim I* and *II*, the statistical databases maintained by Statistics Canada, for these variables in the later time period (1921- 2010). More precise definitions and their sources are given below.

Bank of Canada = 1 for 1935 onwards; 0 otherwise.
D1961 = Legislation authorizing the "letter of direction" concerning conflict between the Government of Canada and the Bank of Canada = 1 from 1961 onwards; 0 otherwise

GDP = gross domestic product in current dollars. 1870-1926: GNP from Urquhart (1993: 24-25) (in millions); 1927-1995: CANSIM I D11000; 1996-2009: CANSIM II V3800002 (aggregated from quarterly data). Note GNP and GDP data are not available before 1870 so that GDP numbers were calculated by assuming that the tax size of government remained constant between 1867 and 1869. Since data is available on federal government tax revenue, a value for GDP was implied.

Keynes = 1 for 1946 through 2009; 0 otherwise

P = GNP deflator before 1927 and GDP deflator after (1986 = 100). 1870-1926: Urquhart, (1993), 24-25; 1927-1995 (1986=100): Cansim data label D14476; 1996-2006 Cansim D140668. All indexes converted to 1986 = 100 basis.

RGDP = real GDP = GDP/P.

GrowthGDP = growth of GDP = LnRGDP – LnRGDP(-1).

GOV = total federal government expenditure net of interest payments.1870-1989: Gillespie (1991: 284-286); 1990-1996: Public Accounts of Canada 1996-97: 1997-2000: Federal Government Public Accounts, Table 3 Budgetary Revenues Department of Finance web site, September 2001. To this we add the return on government investment (ROI) originally subtracted by Gillespie for his own purposes. Expenditure is net of interest paid to the private sector. Data on ROI: 1870 to 1915: Public Accounts (1917: 64); 1915-1967: Dominion Government Revenue and Expenditure: Details of Adjustments 1915-1967 Table W-1; 1916-17 to 1966-67: Securing Economic Renewal - The Fiscal Plan, Feb 10, 1988, Table XI; 1987-88 to 1996-97: Public Accounts 1996, Table 2.2. Interest on the Debt (ID) was subtracted out (with adjustment for interest paid to the Bank of Canada (BCI) ultimately returned to the government). Data on ID: 1870-1926: Leacy et al. (1983: Series H19-34): Federal Government budgetary expenditures, classified by function, 1867-1975; 1926-1995: Cansim D11166. 1996-2000: Cansim D18445. Finally, data for BCI: copied by hand from the Annual Reports of The Bank of Canada, Statement of Income and Expense, Annually, 1935-2000. Net Income paid to the Receiver General (for the Consolidated Revenue Acct). Note: all government data are

converted from fiscal to calendar years, and allows for a change in the definition of the fiscal year in 1906/07, as described in Gillespie (1991: Appendix C).

GSIZE = non-interest federal government, direct public expenditure as a fraction of GDP = GOV/GDP.

TAXES = the sum of the fourteen different categories of taxes collected in Canada. The fourteen categories include: 1. Custom Duties - Customs Import Duties (in Public Accounts); 2. ExciseDuties- Excise Duties (in Public Accounts), included in ExciseTaxes after 1990; 3.Sales Tax - Sales Tax (in Public Accounts). GST replaces Sales Tax from 1991; 4. Excise Taxes -Other (in Public Accounts), includes Excise Duties after 1990; 5. Personal Income Tax - Income Tax, Personal (in Public Accounts); 6.Corporate Income Tax - Income Tax, Corporate (in Public Accounts); 7.Non Resident - Non-resident Income Tax (in Public Accounts), included in Other Income Tax Revenues after 1994; 8.Excess Profits - Energy Taxes (in Public Accounts); 9.Estates Taxes - 0 after 1977; 10.Post Office Revenues - 0 after 1983; 11.Misc. Revenues - Other Non-Tax Revenues (in Public Accounts); 12. Special Recipient and Other Credits - Refunds of previous year's expenditure, Services and service fees, Privileges, licences and permits, Proceeds from Sales, Bullion and coinage. Excludes premium and discount on exchange. This category listed as Misc. Revenues after 1989; 13. UIC Taxes - Unemployment Insurance Contribution, Government Contribution (in Public Accounts); 14. Old Age Security - 0 after 1977; Sources: 1868-1989: W. Irwin Gillespie, *Tax, Borrow and Spend: Financing Federal Spending in Canada, 1867 - 1990*, Carleton University Press, 1991, pp.284-286; 1996-97, Public Accounts of Canada; 1997-2000: Federal Government Public Accounts, Table 3 Budgetary Revenues Department of Finance web site, September 2001.

TSIZE = federal tax revenue as a fraction of GDP = TAXES/GDP

r = long term government bond rate as a fraction: 1870-1913: Rich (1988), Average Yield on Dominion Government Bonds - Table 7-4, p.201; 1914-1919. Homer (1973) Province of Ontario Bonds Annual Average, %, p. 484; 1920 - 1958: Homer (1973), Long Term Dominion of Canada Dollar Bonds Annual Average, % p. 484; 1959-1995: Gov't of Can. Bond Yield Ave 5-10 year, Cansim series B14030; 1995-2001: updated by hand as average of 12 months Cansim B14030. See: also Sidney Homer. (1977). *A History of Interest Rates*. Rutgers University Press.

realrate = real rate of interest on federal debt, as a fraction = r – (LnP – LnP(-1))

FCOST = GrowthGDP – realrate

2. Political variables and data sources

MINORITY = 1 if the governing party was part of a minority government; = 0 otherwise. There have been fourteen minority governments in Canada since 1867.

Sources:
Canadian Parliamentary guide, 1997, 2002; Thirty Seventh General Election 2000, Elections Canada 2001.
Beck, Murray, J., 1968, *Pendulum of Power* Prentice Hall of Canada, Scarborough.
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3. Descriptive Statistics of Variables Used in Estimation, 1870 – 2009

	MINORITY	GSIZE	TSIZE	FCOST	GROWTHGDP	REAL RATE
Mean	0.137	0.116	0.119	-0.008	3.61	2.76
Max	1.000	0.433	0.256	0.282	15.77	17.56
Min	0.000	0.035	0.046	-0.177	-11.80	11.14
Std. Dev.	0.345	0.073	0.058	0.072	4.92	4.43
ADF	-5.0***	-2.03	-1.94	-6.77***	-8.96***	-6.62***

***(**) significant at 1% (5%). ADF is adjusted Dickey-Fuller statistic for the null of no cointegration

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