

SOURCES OF DEBT ACCUMULATION IN RESOURCE-DEPENDENT PROVINCES

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SUMMARY

Governments in provinces relying on natural resource commodities for significant amounts of revenue face the distinct challenge of unpredictably fluctuating budget circumstances. As politicians routinely point out, much of that challenge is in the volatility of global commodity prices. But a big part of it is actually the policies of the governments themselves.

In fact, when effects of commodity prices, economic cycles and fiscal policy are separated from one another, one of the biggest impacts on government debt over the last 30 years in Canada's four resource-dependent provinces – Alberta, Saskatchewan, British Columbia and Newfoundland and Labrador – has been government policy. While years of booming economies have offset years of busts, virtually all the debt racked up by these provinces over more than three decades has been a combination of movements in commodity prices and political decisions.

In Alberta, over three periods since the early 1980s, totalling more than 15 years cumulatively, it was policy – not energy prices or economic factors – that had the biggest impact on government debt levels. From 1988–89 to 1993–94, Progressive Conservative policies were the biggest factor in raising Alberta's debt, and from 1995–96 to 1999–2000, the Klein government's policies were the biggest factor in reducing Alberta's debt. The policies of then premier Ralph Klein also played the biggest role in reducing debt from 2001–02 to 2003–04, while from 2006–07 to 2013–14, the policies of the Stelmach and Redford governments outweighed economic and commodity-price effects in ways that both reduced debt at times, and then raised it again. Over the entire period from 1982–84 to 2013–14, PC government policy increased Alberta's debt ratio by 9.5 percentage points of GDP, while the business cycle decreased it by only one percentage point, and the commodity-price cycle decreased it by only 1.9 points.

In Saskatchewan, the policy component raised the provincial debt ratio by 11.6 percentage points of provincial GDP from 1982–84 to 2013–14. The business cycle added 1.5 points and the commodity-price cycle decreased the debt ratio by 6.1 points. Ironically, given assumptions about party proclivities, it was Progressive Conservative government policies that added most of that debt, and NDP government policies that made the most progress in reducing it.

In Newfoundland and Labrador, where a reliance on resource revenue is a more recent phenomenon, the policies of both PC and Liberal governments were almost indistinguishable, together reducing the debt ratio by 9.8 percentage points of GDP from 1982–84 to 2013–14, while the effect of commodity prices reduced it by 16.9 percentage points. But in B.C., government policy was, as in the other western provinces, the biggest factor on the debt ratio: decreasing it by 12.5 percentage points of GDP, compared to the increase of two points caused by economic cycles, and the reduction of 4.9 percentage points caused by commodity prices.

Whatever the politicians in resource-dependent provinces say about their unpredictable budgeting challenges, clearly policy can have the biggest impact on debt accumulation. As it happens, that is also the one factor over which those politicians actually have total control.

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1. INTRODUCTION

Having access to the revenues generated by the exploitation of fossil fuels and other natural resources carries with it both positive and negative consequences for provincial government budgets. On the one hand, royalties, land sales and fees provide governments with sometimes very large revenues that can be used to finance the provision of health care, education and other vital public services without the need for usurious tax rates on personal or corporate incomes. On the other hand, these revenues are often volatile and unpredictable, making it a risky budgeting strategy to rely on them to fund critical programs in health, education and social welfare.

In Canada, four provinces — Newfoundland and Labrador, Alberta, Saskatchewan and British Columbia — enjoy the benefits and suffer the risks of substantial amounts of resource revenues. Alberta and Saskatchewan have a long history of collecting significant amounts of revenue from the exploitation of natural resources. Since 2000–01, Alberta and Saskatchewan have relied on natural resource revenues to account for an average of 29 and 23 per cent of total revenue respectively. British Columbia’s reliance on resource revenues has grown over time but the reliance is smaller than in Alberta and Saskatchewan. Since 2000–01, B.C. has relied on these revenues to account for 12 per cent of total revenues, but the provincial government has made clear its hopes of increasing the amount of revenue it collects from this source. Newfoundland and Labrador has long collected revenues from natural resources, but the amounts were very small prior to 1992 when significant amounts of revenue began to flow to provincial coffers as a result of the development of offshore oilfields. Since 2000–01, an average of 22 per cent of total revenue collected by the province has come from natural resource revenues.

This is the second of a series of reports on the public finances of Canadian provinces.¹ This report uses public accounts data for the period 1980–81 to 2013–14 to summarize, describe and analyze the finances of the governments of Alberta, Saskatchewan, British Columbia and Newfoundland and Labrador. Relying on the simple arithmetic of debt accumulation implied by the government budget constraint, the sources of debt accumulation are identified, and inform a discussion of how much of the change in provincial debt can be laid at the feet of policy choices as opposed to economic conditions.

Memories of the price Canadians paid in the past when their governments had accumulated too much debt are stoking recent concerns that these costs — such as slower economic growth, higher interest rates, higher tax rates and cuts to social programs — might need to be paid yet again. In the four provinces considered here, the concern is heightened by the fact the fiscal sustainability of health care, education and other key provincial programs hinges on swings in internationally determined commodity price fluctuations. Understanding the separate roles of these exogenous shocks, as opposed to policy-induced changes in debt, is therefore of particular interest to citizens in these provinces. It is also useful to compare and contrast the policy choices made by these four provinces in responding to changes in economic conditions as they all face somewhat similar challenges. Of additional interest is the fact these provinces have significantly different political histories since 1980.

This paper will also contribute to the broader literature examining provincial budgets by providing a data set describing the finances of Alberta, Saskatchewan, British Columbia and Newfoundland

¹ The first of the series examined the finances of Ontario and Quebec. See Ronald Kneebone and Margarita Wilkins, “Who, or What, is to Blame for the Accumulation of Debt in Ontario and Quebec (And What will it Take to Stop the Bleeding?),” University of Calgary School of Public Policy Research Paper 7, 17 (July 2014).

and Labrador for the period from 1980–81 to 2013–14. As we explain in Section 2, Statistics Canada has halted, with data for 2008–09, the publication of a data series describing details of provincial government finances. Unless or until this data series is continued, analysts have nothing with which to measure the influence on provincial government finances of the recession of 2008–09 and the halting recovery that has followed. By providing these data we hope to facilitate further work on important questions concerning provincial government finances.

2. THE DATA

A long time series of useful data on provincial government finances is difficult to obtain. Statistics Canada's Financial Management System (FMS) sources data contained in the public accounts published by each provincial government. The data reported in the FMS represent an attempt to impose a certain degree of uniformity on the public accounts data published by each province, an effort that Statistics Canada notes can never be complete.² Moreover, the advantage of using data that impose some degree of uniformity on public accounts data is offset by certain drawbacks to the accounting conventions FMS employs. In particular, the royalty revenue that provincial governments collect from the sale of natural resources is not reported separately in the FMS data. Rather, these revenues are included in the category of "investment income" and so cannot be distinguished from the income provincial governments earn from financial assets and other sorts of investments. This is problematic given the importance of royalty income for the finances of the provinces we are considering in this paper. The usefulness of FMS data is also severely limited by the fact that the information they provide on provincial finances ends in 2008–09.³ To understand and identify the effects of the recent recession and the period of recovery since 2008–09 therefore requires accessing a different data set.⁴

Information on provincial government finances is drawn from provincial public accounts.⁵ A challenge associated with using these data is that they employ accounting standards and approaches that differ across provinces and change over time. A distinct advantage is that the public accounts identify royalty and other income derived from the sale of natural resources as a revenue category

² For a discussion, see *Financial Management System (FMS)*, Statistics Canada, 2009, <http://www.statcan.gc.ca/pub/68f0023x/68f0023x2006001-eng.pdf>.

³ Statistics Canada is moving to a new approach to measuring government financial statistics and has indicated that it intends to soon begin publishing data based on its new accounting framework starting with fiscal year 2008-09. We are not aware of any statement suggesting that a revision to historical data will accompany the adoption of the new accounting framework.

⁴ As noted by Kneebone and Wilkins ("Who, or What?"), another source of information on provincial government finances is available from Statistics Canada's *Provincial Economic Accounts (PEA)*. These data differ from the FMS data by reporting on a calendar-year, rather than fiscal-year basis and by reporting on different aggregates of provincial finances. Thus, while the FMS data report provincial spending on functional categories such as health, education and social services, the PEA data report on the much broader category of "net current expenditures on goods and services." As part of the goal of this paper is to identify the implications of debt reduction on spending on items such as health and education, the PEA data are less useful. Like the FMS data, the PEA data set is also limited by having been terminated by Statistics Canada, with the last year of data provided being 2009.

⁵ The Appendix presents the data on provincial government revenues and expenditures used in this paper. Simply collecting these data proved challenging. Enthusiastic support is added to the complaint recently expressed by Colin Busby and William Robson over the lack of transparency and consistency in provincial government financial accounting. See "Credibility on the (Bottom) Line: The Fiscal Accountability of Canada's Senior Governments, 2013," Commentary No. 404 (C.D. Howe Institute, March 2014). Some provincial governments are themselves responding to the lack of transparency in their public accounts and the inability to make comparisons across provinces. See, for example: Canada. Saskatchewan. Provincial Auditor, *The Need to Change – Modernizing Government Budgeting and Financial Reporting in Saskatchewan*, 2013 Special Report (2013).

separate from investment income. In ways we describe below, this allows us to isolate the influence on provincial budgets of fluctuations in commodity prices that are largely determined outside of Canada.

This paper focuses on the period from 1981–82 to 2013–14.⁶ This enables the analysis to capture the effects on provincial finances of three major recessions (1981–82, 1990–91 and 2008–09), two periods of strong economic growth (in the late 1980s and again in the early 2000s), and the impact on provincial finances of the economic recovery since the end of the 2008–09 recession. The long time series also enables us to consider the potential influence on provincial finances of the politics of elected governments.

It is worth noting that the Fiscal Reference Tables (FRT) published by the federal Department of Finance also present data from provincial public accounts and largely adopt the practice of not trying to enforce uniformity in provincial accounting. The FRT, however, do not offer a breakdown of total spending and total revenue into sub-categories. Thus, to obtain data on revenue collected by provincial governments by type (personal and corporate income taxes, retail sales taxes, etc.), and to determine program spending by program (health, education, social services, etc.), one must go directly to the public accounts of individual provinces. Accessing this finer gradation of spending and revenue is important to understanding the sources of revenue and spending changes and is also important for identifying, as is done below, what portions of revenue and spending changes are due to the business cycle as opposed to policy choices.

3. THE OPERATING ACCOUNT AND THE ACCUMULATED DEFICIT

It is important to emphasize that the focus of this study is only on that portion of provincial budgets we will refer to as the government's *operating account*. The operating account is intended to measure the cost of ongoing programs and services and the amount of revenue collected for the purpose of financing those costs. It excludes capital expenses and revenues raised to finance capital expenditures. The deficit of the operating account defines the excess of spending on government goods and services intended for current consumption over current revenue. The accumulation of such deficits over time defines what is commonly referred to as the *accumulated deficit*.

The ratio of accumulated deficits to GDP is different from what governments report as their *net debt*. Net debt is a measure that includes in its calculation the implications of extraordinary additions to debt and debt incurred to finance capital expenditures.⁷ Net debt, then, represents a broader definition of the government's debt than the accumulated borrowing required to pay for current expenditures.

In provinces where the revenue collected from the exploitation of natural resources is large — as is the case for the four provinces considered here — an interesting question is whether those revenues ought to be considered part of any calculation of the operating balance. To the extent that resource

⁶ As described below, the approach involves ratios of debt to GDP. The choice of time span therefore reflects in part the availability of a consistent data series on provincial GDP. Calendar-year values of provincial GDP are available to 2013 (sources are provided below) and these are used to produce fiscal-year values for 1981–82 to 2012–13. Calendar-year data on provincial GDP for 2014 are not yet available and so the calendar value for 2013 is used to represent fiscal year 2013–14.

⁷ In Alberta, for example, we omit expenditures due to the province's capital plan. In 2012–13, for example, \$5.1 billion of spending on capital investments in Alberta is not considered part of that province's operating account. This spending would add to the provincial net debt but would not impact the accumulated deficit of the operating account.

revenues represent monetized physical capital, one might argue they are properly allocated to a capital account and so should be removed from our consideration of the operating account.

While this view would find favour among economists, it is not an approach Canadian provincial governments have typically taken. Only rarely have any of the four provinces being considered here budgeted in a way that would suggest they treat natural resource revenue as anything other than current income. Alberta established the Alberta Heritage Savings Trust Fund (AHSTF) in 1976, but the provincial government's commitment to depositing resource revenues into the fund has rarely survived revenue demands resulting from economic downturns and spending needs.⁸ After first reducing, in 1982, the commitment to deposit 30 per cent of natural resource revenues into the AHSTF to 15 per cent, the government halted all deposits between 1987–88 and 2004–05. After three straight years of additions to the AHSTF in an effort to maintain its real value, none has been made since 2007–08 when the effects of the most recent recession were first felt. British Columbia established a savings fund (the British Columbia Endowment Fund) in 1988–89, but this commitment to save lasted only until 1995. The government of Saskatchewan established the Saskatchewan Heritage Fund in 1978 to receive and invest natural resource revenues, but it was divested and eliminated in 1992.⁹ The government of Newfoundland and Labrador, a relatively recent recipient of significant amounts of resource revenue, has not had any public discussions of using resource revenues for anything other than current consumption. Given this revealed preference to treat resource revenue as current income, that revenue is included in the definition of the operating balance.¹⁰

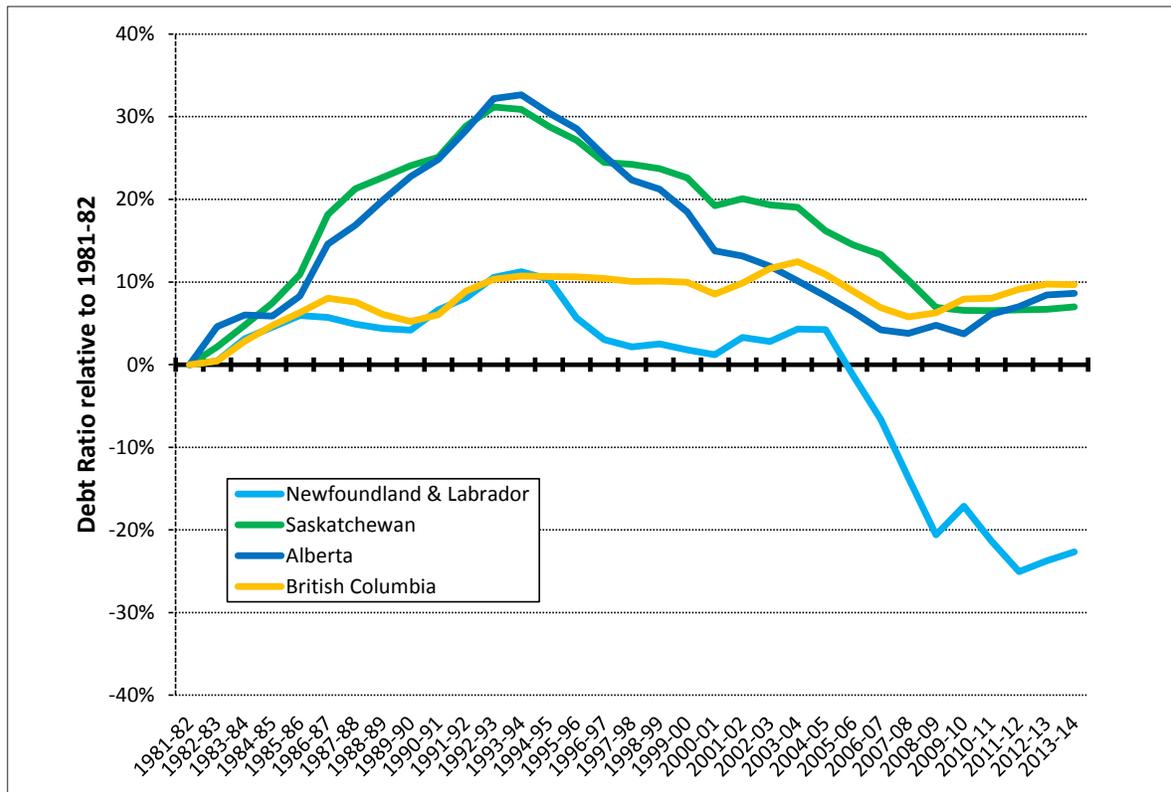
Figure 1 plots the change in the ratio of accumulated deficits on the operating account to GDP for each of the four provinces since 1981–82. After adding mountains of debt during the 1980s, Alberta and Saskatchewan followed a similar timetable for largely (though not completely) eliminating that newly accumulated debt. During the 1980s Newfoundland and Labrador accumulated less debt on its current account (relative to GDP) than did Alberta and Saskatchewan, and beginning in 2003–04 began to reduce its debt ratio relative to 1981–82 levels. British Columbia has more or less maintained a constant level of debt on its operating account relative to provincial GDP since the early 1990s. The purpose of the rest of this paper is to determine the sources of change in these debt ratios; were these changes the result of good fortune or good policy?

⁸ For a history of the government of Alberta's savings decisions, see Ronald Kneebone, "From Famine to Feast: The Evolution of Budgeting Rules in Alberta," *Canadian Tax Journal* 54, 3 (2006).

⁹ On March 19, 2014 the Saskatchewan government indicated its intention to use resource revenues to fund the creation of a Saskatchewan Futures Fund. Deposits into the fund will begin once the government's debt is retired, a future date that has been delayed by the recent fall in energy prices and resource revenues.

¹⁰ As noted in the Appendix, the natural resource revenue reported in Alberta's public accounts is reduced by the amounts transferred to the AHSTF to arrive at the amount of natural resource revenue entering the operating account. No similar adjustment is made for the amount of resource revenue that Alberta transferred to its Sustainability Fund beginning in 2003–04. These transfers were explicitly intended to fund operating account revenue shortfalls and not as permanent savings. For similar reasons, no adjustment has been made to account for what proved to be temporary deposits into the B.C. Endowment Fund or the Saskatchewan Heritage Fund.

FIGURE 1 ACCUMULATED OPERATING ACCOUNT DEFICITS SINCE 1981-82



4. THE SOURCES OF DEBT ACCUMULATION

Governments are constrained in their spending choices by their access to tax revenue and by what they are able to borrow. This fact has the important implication that the choices available to governments are constrained by the economic environment in which they operate; a government facing high interest rates for borrowing and slow growth in its tax base is more limited in its spending choices than it is when interest rates are low and income is growing rapidly. A government that fails to adjust its spending when interest rates rise and income growth shrinks soon finds itself in financial trouble. Understanding these basic accounting realities is behind the approach employed in this study to identify what portion of provincial government debt can be identified as due to policy choices as opposed to economic conditions.

The following equation defines a budget constraint for a government's operating account balance:

$$D_t - D_{t-1} = PDEF_t + r_t D_{t-1}$$

where we define

$PDEF_t$ = primary deficit (program spending less operating account revenue) in year t ¹¹;

D_{t-1} = accumulated deficit of the operating account at beginning of year t ;

¹¹ The primary deficit can take on a negative or a positive value. If program spending is less than tax revenue, the primary deficit has a negative value and may be referred to as a primary surplus. Program spending includes all government spending except debt service, which is represented here as $r_t D_{t-1}$. At the provincial level of government, the largest programs are health, education and social services.

D_t = accumulated deficit of the operating account at end of year t ;

r_t = average effective rate of interest on net debt in year t .

Some elements of the program spending and revenue in the operating account are sensitive to the state of the economy (the business cycle) and to movements in commodity prices. To separately account for these cyclical and commodity price influences it is useful to define

$$PDEF_t = G_t - T_t - NRR_t$$

where

G_t = provincial government spending on goods, services and transfers to individuals and firms in period t ;

T_t = provincial government revenues in the form of intergovernmental transfers and from taxation on all sources but natural resources in period t ;

NRR_t = provincial government revenue realized from the sale of natural resources in period t that enters the operating account.

We can now write

$$D_t - D_{t-1} = \left[(G_t - T_t) - (G_t^* - T_t^*) - (NRR_t - NRR_t^*) \right] + \{G_t^* - T_t^* - NRR_t^*\} + r_t D_{t-1} \quad (1)$$

where G_t^* and T_t^* define values of government spending and revenue that would be observed were the province at full employment output. These values are commonly referred to as *cyclically adjusted values*. We refer to the difference between them, $(G_t^* - T_t^*)$, as the *cyclically adjusted* portion of the primary deficit. The difference between what is observed in the data and the cyclically adjusted portion is the primary deficit that is due to movements in cyclical variables that affect provincial revenues and spending.

Unexpected changes in the revenue that governments realize from the sale of natural resources is largely determined by unexpected changes in commodity prices determined in international markets. Thus, we assume budget-makers in these provinces make a determination of what value of NRR_t they should expect to receive in year t based on what they forecast to be the price of commodity prices. NRR_t^* measures the revenue a budget-maker would expect to receive in period t given a forecast of international commodity prices and given an understanding of the impact of that price forecast on resource-based revenues. We refer to NRR_t^* as the *commodity price-adjusted* portion of the primary deficit. The difference between what is observed in the data and the commodity price-adjusted portion is that part of resource revenues that is an unexpected gain or loss by the budget-maker.

The sum of the terms in square brackets identifies the amount of the deficit that can be identified as arising due to the provincial economy being away from full employment — what we refer to as the *cyclical component* of the primary deficit — and the amount of the deficit arising from international commodity prices being different from what was expected by the budget-maker — what we refer to as the *commodity-price component* of the primary deficit.

The term in curved brackets in Equation (1) defines the size of the primary deficit that the budget-maker would expect to observe given his or her understanding of the commodity prices affecting resource revenues and assuming the provincial economy were operating at full employment. A

non-zero value of this term would reflect a set of policy choices in the form of tax and royalty rates and spending choices that produce a non-zero primary deficit. This will be referred to as the *policy component* of the primary deficit.

Of interest is the identification of sources of change in the ratio of the accumulated deficit to GDP; referred to more simply as the debt ratio. It makes sense to compare debt to GDP as the latter defines the collective income of the province's citizens and so measures the capacity for managing debt. The goal, then, is to explain movements in

$$\frac{D_t}{Y_t} - \frac{D_{t-1}}{Y_{t-1}}$$

where Y is GDP. Using Equation (1) and noting that values of Y_t and Y_{t-1} are related by the rate of growth in GDP in the following way:

$$Y_t = (1 + (n_t - n_t^*) + n_t^*)Y_{t-1}$$

where

n = the rate of growth in Y ,

n^* = the rate of growth in potential output, Y^* ,

the change in the debt ratio can be written as

$$\frac{D_t}{Y_t} - \frac{D_{t-1}}{Y_{t-1}} = (\text{Cyclical Component}) + (\text{Commodity Price Component}) + (\text{Policy Component})$$

where

$$\text{Cyclical Component} = \left(\frac{G_t - T_t}{Y_t} - \frac{G_t^* - T_t^*}{Y_t} - \frac{(n_t - n_t^*)D_{t-1}}{Y_t} \right)$$

$$\text{Commodity-Price Component} = \left(\frac{NRR_t^*}{Y_t} - \frac{NRR_t}{Y_t} \right) \quad (2)$$

$$\text{Policy Component} = \left[\frac{G_t^* - T_t^* - NRR_t^*}{Y_t} + \frac{(r_t - n_t^*)D_{t-1}}{Y_t} \right].$$

Discussion

The definition of the cyclical component identifies the change in the ratio of debt to GDP resulting from an economic slowdown as being measured not only by the resulting change in the size of income-sensitive components of the primary deficit — changes that cause a gap between G and G^* and between T and T^* — but also influences GDP itself, and so causes a gap between the observed rate of growth in GDP, n , and the rate of growth in potential output, n^* .¹²

¹² It is worth emphasizing that no attempt is made to identify how the interest rate might vary with the business cycle. This reflects an assumption that the interest rate does not react automatically to, or in a predictable way with, the business cycle.

Accusing a government of fiscal irresponsibility when its debt ratio is made large by the effects of recession or when commodity prices are lower than might be reasonably expected is not a fair assessment of the budgetary consequences of a government's policy choices. The same comment is appropriate when the debt ratio is made small by the effects of a cyclical boom or an unexpected increase in commodity prices. Removing these influences — which leaves us with the policy component — is appropriate if the goal is to identify how much blame for government debt can be laid at the feet of policy-makers. To put it differently, identifying the amount of debt accumulated after removing the effects of the provincial economic cycle and international commodity price movements indicates to what extent a government over- or under-taxes its citizens relative to the level of public services provided.¹³

The measure of the policy component is motivated by the idea that fiscal policy choices are constrained by the level of debt inherited from previous governments, by the economic conditions determining the interest rate paid on outstanding debt, the rate of growth in the tax base and the levels of cyclically sensitive spending and revenues and, finally, by unexpected movements in commodity prices. Depending on economic circumstances — particularly those determining the relative values of the interest rate due on outstanding debt and the rate of growth in potential output — the same set of fiscal policy choices may or may not be labelled fiscally irresponsible.

To better appreciate this point, it is easy to see from the definitions of the cyclical, commodity price, and policy components of the change in the debt ratio, that if the levels and growth rates of actual and potential output are equal and if commodity prices are at levels expected by the budget-maker, then there is no tendency for the debt-to-output ratio to rise only if

$$G_t^* - T_t^* - NRR_t^* = (n_t^* - r_t) D_{t-1}. \quad (3)$$

The term on the right-hand side is the target for a fiscally responsible set of fiscal policy choices. The debt-to-output ratio will tend to increase as a consequence of fiscal policy choices when the balance between spending and all sources of revenue is above the target, and tend to decrease when below the target.

As noted by Ron Kneebone and John Leach,¹⁴ implicit in this argument is the idea that governments with outstanding debt cannot spend as if they were not responsible for paying the interest on the outstanding debt they have inherited. Their cyclically- and commodity-price-adjusted deficits can be positive when the interest rate is low and the rate of growth in potential output is high ($r < n^*$), but they should be negative when the interest rate is high and the rate of growth in potential output is low ($r > n^*$). Policy settings appropriate when interest rates are low relative to growth rates in full-employment output may not be appropriate in an economic environment when the opposite is true.

In what follows, the definitions of the cyclical, commodity price and policy components are applied to the data defining the government's operating account. The so-called "golden rule" of public finances is that operating accounts ought to be such that, in the normal course of events, they

¹³ Cyclical and commodity-price components are not wholly "policy free." Their magnitudes are affected by the extent to which governments make their revenues and spending obligations sensitive to changes in income, the extent to which they make resource revenues sensitive to commodity price movements, and by their decision over what fraction of resource revenue ought to be considered equivalent to current income. The cyclical component therefore shows the change in the debt ratio due to the business cycle impacting the government budget via the current set of tax rates and the current design of spending programs and so shows the operation of automatic stabilizers, the size of which is a matter of policy.

¹⁴ Ronald Kneebone and John Leach, "The Accumulation of Public Debt in Canada," *Canadian Public Policy* 27, 3 (September 2001).

balance spending with revenues. More precisely, the application of the golden rule is that, at full employment, the operating account should not be causing the debt ratio to increase. Applying the golden rule of public finance would require that our definition of the policy component be zero at full employment and that, over time, when economic downturns have been balanced by economic booms, the accumulated deficits of the government's operating account should be zero.

5. POTENTIAL OUTPUT, THE CYCLICALLY ADJUSTED PRIMARY DEFICIT AND COMMODITY PRICE FORECASTS

The accounting framework requires that one identify cyclically adjusted provincial revenue and spending and use these values to define the cyclically adjusted primary deficit. This in turn requires estimates of potential output, Y^* , and its rate of growth, n^* . We also require an estimate of what a reasonable budget-maker might expect to receive by way of natural resource revenues, NRK^* .

Full Employment Output

It is common practice to generate values of provincial potential GDP (Y^*) by applying the Hodrick-Prescott (HP) filter to observed values of GDP (Y). The HP filter is intended to decompose data on GDP into trend and cycle components.¹⁵ The attraction of the HP filter is that its application involves a minimum of judgment and requires a minimum of data. What's more, the resulting smooth but non-linear time series of potential output accords with most analysts' expectations of the evolution of that series.^{16,17}

¹⁵ The HP filter is applied to measures of provincial real GDP. Multiplying these measures by the GDP implicit price deflator yields an estimate of Y^* measured in nominal dollars. Data on provincial real and nominal GDP are from CANSIM Table 3840038. These data are calendar-year measures that span the period 1981–2012, inclusive. Since the data on provincial finances are measured on a fiscal-year basis (April 1 to March 31) a fiscal-year version of Y and Y^* is calculated using the formula $FY_t = 0.25CY_t + 0.75CY_{t-1}$.

¹⁶ The HP filter suffers from what is known as the *end-point problem*: the fact that the approach causes estimates of potential output at the beginning and at the end of the time series to be close to observed values of output. To deal with this issue, we follow an approach that involves extending the data series on output beyond the end, and prior to the beginning, of the study's sample period. Marianne Baxter and Robert King ("Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series," *Review of Economics and Statistics* 81 (1999)) recommend adding at least three years of data (when using annual data) to each end of the sample period. That advice is followed here. Three years of data on provincial nominal output prior to 1981 (for years 1978–1980, inclusive) are taken from CANSIM series v123650 (Newfoundland and Labrador), v123734 (Saskatchewan), v123746 (Alberta) and v508458 (British Columbia). In lieu of an implicit price deflator, we rely on provincial measures of the consumer price index from CANSIM series D44978 (Newfoundland and Labrador), D45125 (Saskatchewan), D45146 (Alberta) and D45167 (British Columbia) for those years. Forecasts of real and nominal provincial output for three years beyond the end of our sample (2014–2016) are taken from TD Economics, *Provincial Economic Forecast Update* (January 26, 2015).

¹⁷ An alternative approach to using the HP filter is to estimate an aggregate production function relating output to the inputs producing that output. The modelling requirements of this approach are significant as are the data requirements, with the latter issue particularly acute at the sub-national level. Using Canadian provincial data, Yvan Guillemette ("A Simulation Model of Federal, Provincial, and Territorial Government Accounts for the Analysis of Fiscal-Consolidation Strategies in Canada," OECD Economics Department Working Paper No. 800 (August 2010)) shows that the production-function approach yields similar estimates of provincial potential output to those produced by the HP filter.

Cyclically Adjusted Balances

To arrive at estimates of the cyclically adjusted primary deficit, we employ an approach utilized by the International Monetary Fund (IMF), the OECD and other research organizations.¹⁸ Cyclically sensitive components of the provincial budget are adjusted proportionately to the ratio of potential output to observed output, as determined by its elasticity with respect to the output gap. Thus,

$$T_{i,t}^* = T_{i,t} \left(Y_t^* / Y_t \right)^{\alpha_i} \quad \alpha_i > 0$$
$$G_{j,t}^* = G_{j,t} \left(Y_t^* / Y_t \right)^{\beta_j} \quad \beta_j < 0,$$

where $T_{i,t}$ = observed revenue from revenue type i in year t , $G_{j,t}$ = observed expenditure on program j in year t , starred variables are values that would be observed at potential output, and α_i , β_j are elasticities measuring the sensitivity to output of revenue category i and program expenditure j , respectively. Once values of $T_{i,t}^*$ and $G_{j,t}^*$ are calculated, the remaining (non-adjusted) categories are added in order to derive structural total revenues and expenditures.

The IMF suggests an elasticity value of 0.7 for personal income tax revenue, 1.5 for corporate income tax revenue, 1.0 for indirect tax revenue, 1.0 for other tax revenue, and -0.1 for program expenditures.¹⁹ With one exception, those are the elasticity values used here. The exception is the elasticity value for personal income tax revenue in Saskatchewan, which we set at a value of 1.4. This is based on work by Guillemette,²⁰ who provides province-specific elasticity measures and notes that personal income tax revenues in Saskatchewan are considerably more sensitive to income than in other provinces.

Applying data to Equation (2) also requires a value of the interest rate, r_t , observed in each year for each government. For this purpose, an effective rate of interest paid by these governments is calculated as the amount paid in debt charges in year t divided by the amount of net debt inherited from year $t-1$.

Expected Values of Natural Resource Revenues

We assume budget-makers in these provinces make a determination of what value of natural resource revenues they should expect to receive in a particular year (NRR_t^*) based on a forecast of international commodity prices and given an understanding of the impact of that price forecast

¹⁸ See, for example, Fabian Bornhorst et al., "When and How to Adjust Beyond the Business Cycle: A Guide to Structural Balances," IMF Fiscal Affairs Department, Technical Notes and Manuals (April 2011); Nathalie Girouard and Christophe Andre, "Measuring Cyclically-adjusted Budget Balances for OECD Countries," OECD Economics Department Working Paper No. 434 (2005); and Martin Larch and Alessandro Turrini, "The Cyclically-adjusted Budget Balance in EU Fiscal Policy Making: A Love at First Sight Turned into a Mature Relationship," Economic Papers 374 (European Commission, March 2009).

¹⁹ As reported in Bornhorst et al. ("When and How"), results are not terribly sensitive to alternative choices of these elasticity values. The values used are those suggested for Canada in the template accompanying that paper (<http://www.imf.org/external/np/fad/strfiscbal/index.htm>).

²⁰ Guillemette, "A Simulation Model."

on resource-based revenues. For this purpose, we assume they follow a simple approach of using as their forecast a three-year moving average of previously observed values of natural resource revenues.²¹

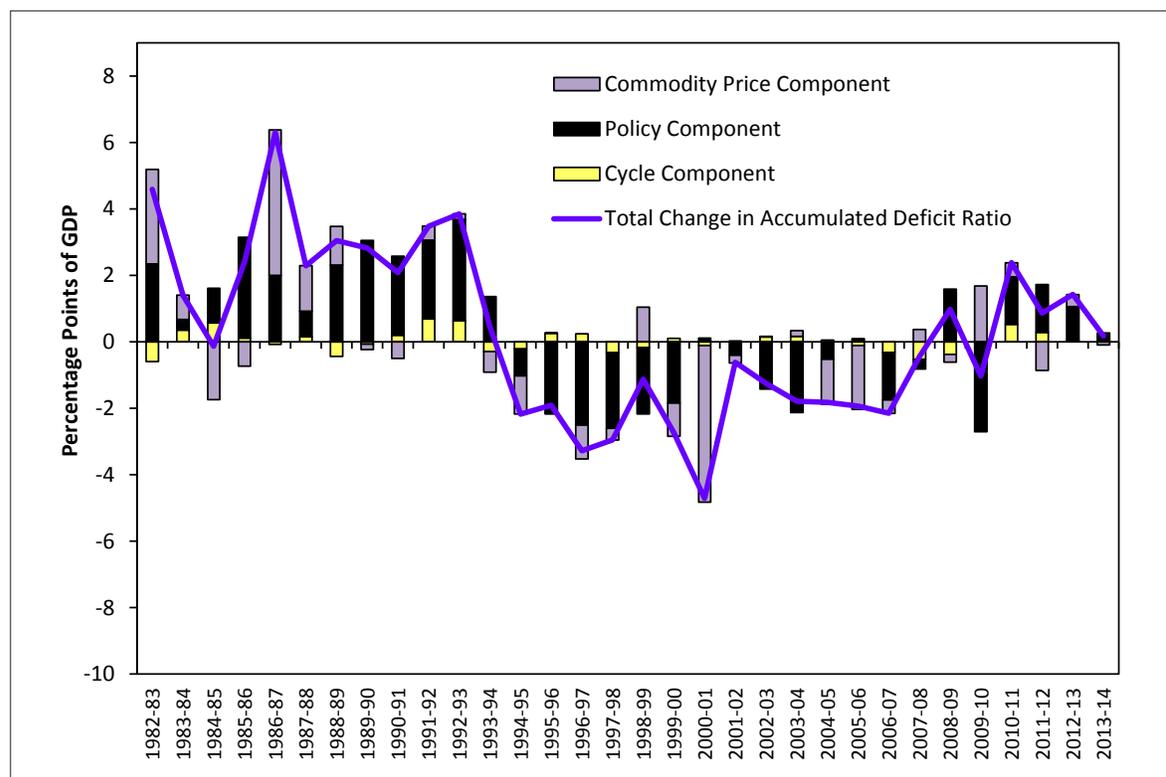
6. SOURCES OF DEBT ACCUMULATION

In this section, data describing the operating accounts of British Columbia, Alberta, Saskatchewan and Newfoundland and Labrador are applied to the accounting framework described by Equation (2). It is shown how this framework can be used to determine to what extent the fiscal policy choices of these governments can be held responsible for the accumulation of debt.

Alberta

Figure 2 shows the annual change in the ratio of accumulated deficits to GDP (the debt ratio) due to the influence of the business cycle (the cyclical component), international commodity price movements (the commodity-price component) and policy choices (the policy component).

FIGURE 2 ALBERTA



²¹ The length of the moving average reflects the level of tolerance the budget-maker has for volatility in the amount of revenue assumed for planning purposes. Were a government to choose to budget using a five-year moving average, this would imply it has less tolerance for volatility in the revenue assumed for planning purposes than if it were to choose a three-year moving average. Our results are not terribly sensitive to this assumption.

Each of the coloured bars identifies the change in the ratio of the accumulated deficit to GDP (the “debt ratio”), measured in percentage points of GDP, due to elements identified in Equation (2). Bars above the zero line indicate the influence is such to cause the debt ratio to increase; bars below the line indicate the influence is in the direction of reducing the debt ratio. The blue line identifies the vertical sum of the bars for any year and so measures the total observed change in the debt ratio for that year. For example, in 1993–94, one bar defines an influence pushing the debt ratio upward, while the other two bars define influences pulling the debt ratio downward. The latter two bars are of nearly equal size to the former, indicating that, as shown by the blue line, there was no overall change in the debt ratio in that year. Over the period 1982–83 to 2013–14, the ratio of accumulated deficits to GDP decreased by 8.6 percentage points of GDP.

The yellow bars identify the cyclical component. The cyclical component exhibits a wavy pattern of positive contributions to the debt ratio during periods of recession in the early 1980s, the early 1990s and with the most recent recession. Periods of strong economic growth — the mid-1980s and from the mid-1990s to mid-2000s — saw the debt ratio fall as cyclically sensitive revenues increased and cyclically sensitive expenditures fell. Over the period 1982–83 to 2013–14, the business cycle was responsible for increasing Alberta’s debt ratio by 1.0 percentage point of provincial GDP. The largest contributions to increasing the debt ratio came during the recession of the early 1990s.²²

A more important explanation for movements in Alberta’s debt ratio is due to the commodity-price component shown by the grey bars in Figure 1. Periods of unexpectedly low resource prices were responsible for significant increases in the debt ratio during the late 1980s, particularly following a sudden fall in oil prices in 1986. Unexpectedly high prices during the late 1990s and early 2000s were responsible for significant reductions in the debt ratio. Over the entire period from 1982–83 to 2013–14, the commodity-price cycle was responsible for decreasing Alberta’s debt ratio by 1.9 percentage points of GDP.

The black bars identify the change in the debt ratio due to the policy component. The policy component shows the effect on the debt ratio of discretionary changes in revenues and spending and changes in the government’s expectation about commodity prices. A positive value for the policy component indicates that, given the economic environment, provincial fiscal policy choices will result in the accumulation of debt even when at full employment levels and growth rates of output, and commodity prices are at expected levels. As the discussion in the previous section suggests, such a value for the policy component reflects a failure of government to respond to trends in its economic environment in a way that guarantees fiscal sustainability over the long term.

Over the entire period from 1982–83 to 2013–14, the policy component was responsible for increasing Alberta’s debt ratio by 9.5 percentage points of provincial GDP. The largest contribution in this regard came during the period 1982–83 to 1992–93 when the government accumulated an amount of debt on its operating account equal to 23 percentage points of provincial GDP. This was

²² The cyclical component is influenced by two considerations: by the deviation of output, Y , from potential output, Y^* (which causes the observed primary deficit, $G - T$, to deviate from its value at potential output, $G^* - T^*$), and by the deviation of the observed growth rate of output, n , from the growth rate of potential output, n^* . Calculating that portion of the cyclical component due only to n being different from n^* provides an estimate of what would have happened to the debt ratio had governments continually adjusted tax rates and continually adjusted spending programs to always keep $(G - T) = (G^* - T^*)$. In other words, one would be showing the result of governments intentionally short-circuiting automatic stabilizers. This exercise shows that, in Alberta, had governments behaved in this fashion over the entire period of our sample, the debt ratio would have increased by 6.5 percentage points of GDP rather than 8.6 percentage points. The implication is that automatic stabilizers, over the 32 years of our sample, added 2.1 percentage points of GDP to the debt ratio.

followed by the period from 1993–94 to 2006–07 when the governments of then premier Ralph Klein reduced the debt ratio by a total of 16 percentage points of GDP.^{23, 24}

Saskatchewan

Figure 3 presents the same information as Figure 2, but does so using data describing the finances of the government of Saskatchewan. The same vertical scale on the two figures is used to enable an easier comparison of the results for the two provinces. Over the entire period from 1982–83 to 2013–14, the debt ratio in Saskatchewan increased by 7.0 percentage points of provincial GDP.

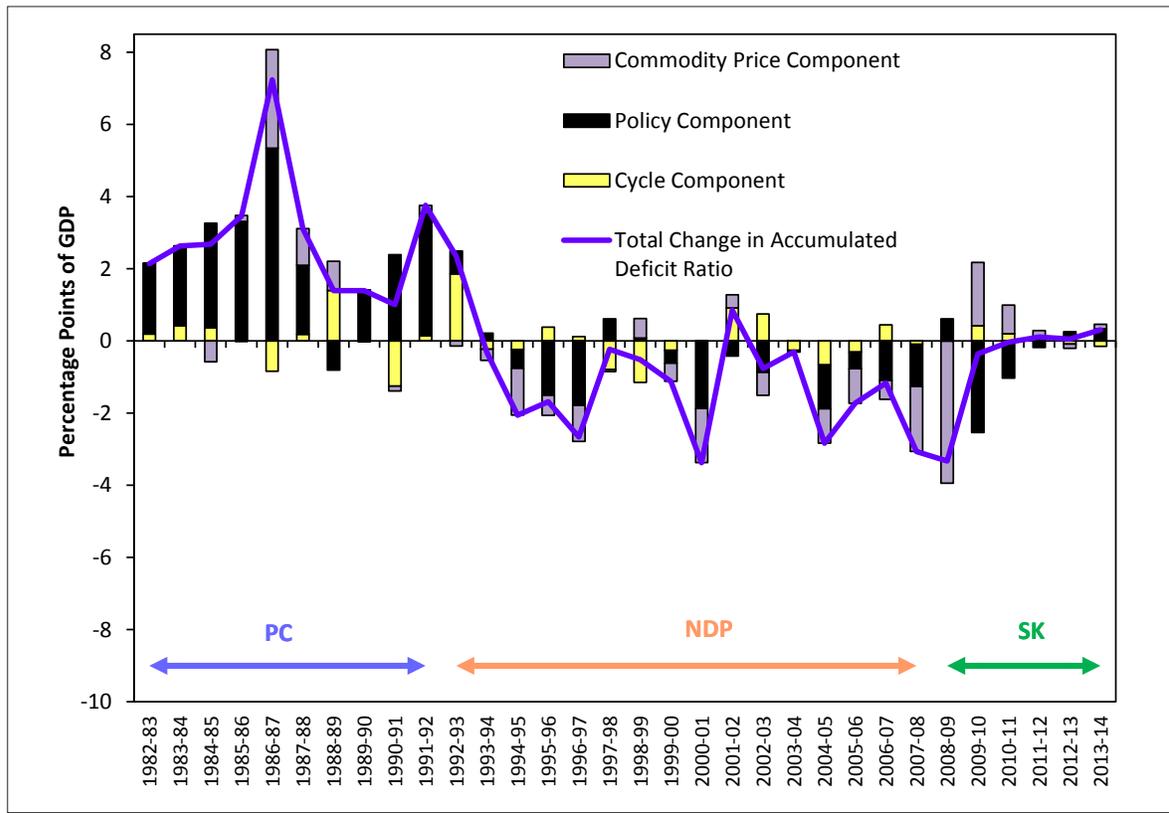
Cyclical influences have been generally larger in Saskatchewan than in Alberta, possibly due to the former being a less economically diversified economy. Over the period 1982–83 to 2013–14, the business cycle was responsible for adding 1.5 percentage points of GDP to Saskatchewan's debt ratio.²⁵

²³ Observing a positive (negative) value for the policy component in a year of economic contraction (expansion) might be interpreted as indicative of a discretionary counter-cyclical policy. This was observed in Alberta during half the years of our sample. One might judge these observations as a sign of a desirable policy intervention. That interpretation requires believing that discretionary provincial fiscal policies — particularly those stemming from changes in the government's operating account — have a favourable influence on output and/or the Bank of Canada's interest rate policies. If a provincial government recognizes that its fiscal policies can have no significant effect on output or market interest rates, then the effects of a positive policy component is negligible in the short term and, to the extent it results in an increase in the risk premium on its debt, negative in the long term. A provincial government wishing to stimulate a contracting economy is generally advised to rely on its capital budget for this purpose; the idea being that investments in public infrastructure that are complementary to private production will have maximum stimulative and long-term benefits on the economy. This advice has the added benefit of steering governments away from using their operating account — where spending is dominated by health care, education and social services — to fund temporary expansions and contractions in their budgets.

²⁴ As noted earlier, although treating resource revenues as current income is the practice of provincial governments, most economists emphasize that all, or at least some fraction of these revenues ought to be part of a capital budget and so removed from the operating account. If that advice were followed and some fraction of resource revenues removed from the operating account, this adjustment would change the size of the annual deficit in the operating account, the size of the accumulated deficit, D , and values of NRR and NRR^* . As a consequence, all three components of the change in the ratio of accumulated deficit to GDP are affected. If 30 per cent of resource revenues were removed from Alberta's operating account, the accumulated deficits of the operating account would have been equal to 47 percentage points of GDP since 1982–83 and policy choices would account for nearly all of that increase.

²⁵ As explained in footnote 24, reporting only that portion of the cyclical component resulting from n being different from n^* , one determines what role automatic stabilizers played in debt accumulation. The calculation for Saskatchewan suggests that, over the 32 years of the sample period, automatic stabilizers increased the debt ratio by 1.5 percentage points of provincial GDP.

FIGURE 3 SASKATCHEWAN



The commodity-price cycle that is relevant for Saskatchewan includes the price of potash and so is somewhat different than the prices (mainly oil and gas) that are relevant for Alberta. The broad pattern over our sample period, however, is quite similar. Unexpectedly low natural resource prices in the late 1980s added to the provincial debt while unexpectedly higher prices during the late 2000s had the opposite effect. Over the period 1982–83 to 2013–14, the commodity-price cycle was responsible for decreasing Saskatchewan’s debt ratio by 6.1 percentage points of provincial GDP.

Over the period 1982–83 to 2013–14, the policy component was responsible for increasing Saskatchewan’s debt ratio by 11.6 percentage points of provincial GDP. As in Alberta, this was the net result of a period of policy-induced debt accumulation during the 1980s and early 1990s followed by policy-induced debt reductions more or less since then. Much of Saskatchewan’s fiscal policy since the early 1990s can be fairly assessed as an effort to undo the effects on the provincial debt and credit rating of the previous lost decade of policy-induced debt accumulation.

An interesting interpretation of the pattern exhibited by the policy component is one associated with politics. For this purpose, party affiliations of the government in power are identified in Figure 3. Summing the increases in the debt ratio caused by the policy choices of the government in power allows one to identify what some might suggest is the proclivity of certain political parties to add or subtract government debt. The results of this exercise, reported below, turns on its head the usual stereotype of governments on the right of the political spectrum maintaining more fiscally conservative policies while those on the left choose to maintain a “looser” set of fiscal policies.

The contrast between the implications for the debt ratio of policies adopted by the Progressive Conservative and the New Democrats is startling.²⁶

POLITICAL BOX SCORE: SASKATCHEWAN

Governing Party	Progressive Conservative Party (PC)	New Democratic Party (NDP)	Saskatchewan Party (SK)
Years as government	10	16	6
Total debt accumulated as a result of policy choices (percentage points of GDP)	+23.8	-9.7	-2.5
Annual average amount of debt accumulated as a result of policy choices (percentage points of GDP)	+2.4	-0.6	-0.4

Comparing Alberta and Saskatchewan, one observes a broadly similar pattern whereby policy choices lead to a rapid accumulation of debt during the 1980s and early 1990s. The latter half of the 1990s and the 2000s were periods of policy-induced retrenchments. More recently, the provinces have moved in opposite directions with Alberta returning to policy-induced debt accumulation while Saskatchewan has, for the most part, continued to introduce policies that have had a minimal impact on its operating account deficit.

Newfoundland and Labrador

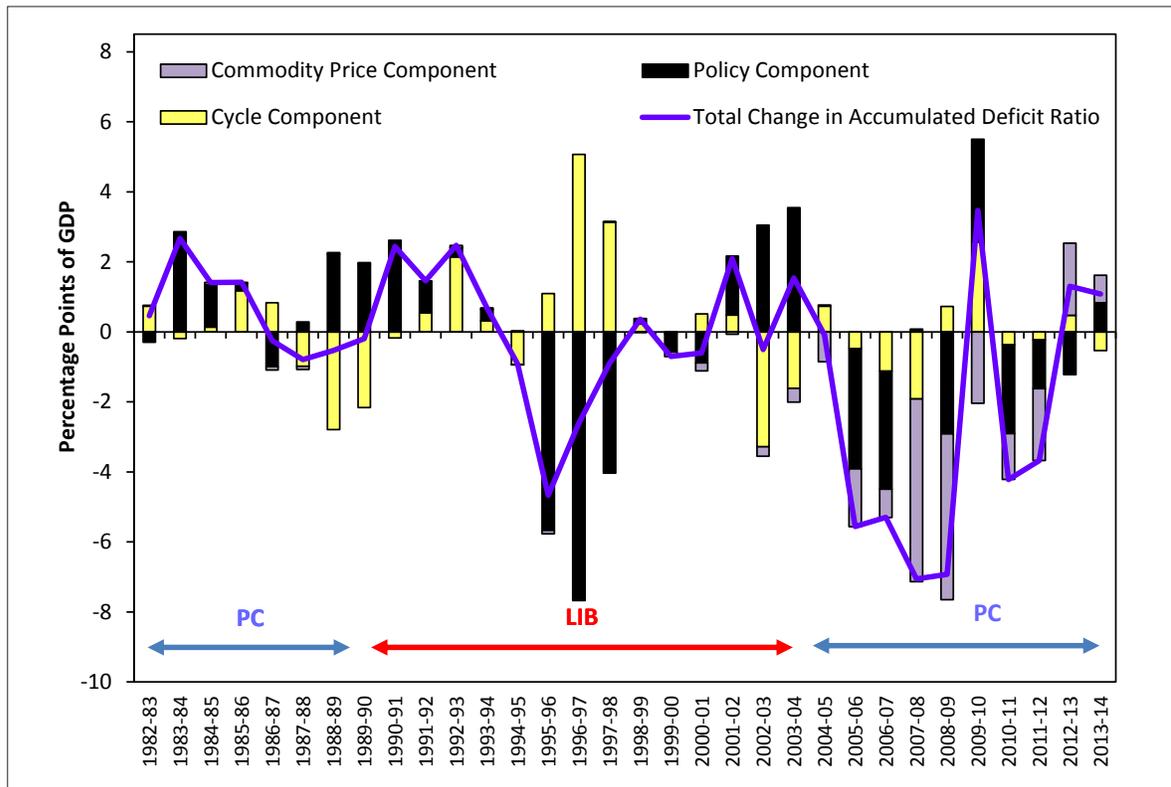
Figure 4 identifies for the government of Newfoundland and Labrador the contributions to the ratio of accumulated deficits to provincial GDP of the business cycle, the commodity-price cycle and government policy choices. Over the period 1982–83 to 2013–14, the operating account debt ratio in Newfoundland and Labrador decreased by over 25 percentage points of provincial GDP.

Cyclical influences have generally been much larger in Newfoundland and Labrador than in either Saskatchewan or Alberta (or, as we'll see, in British Columbia). The obvious explanation is that of the four provinces being considered, Newfoundland and Labrador is easily the least diversified and so the government budget is the most exposed to swings in business activity. However, over the period 1982–83 to 2013–14, the booms and busts of the business cycle have been largely offsetting so that it has been responsible for adding only 4.0 percentage points of GDP to Newfoundland and Labrador's debt ratio.²⁷

²⁶ Assuming the provincial government saved 30 per cent of resource revenues and so allowed only 70 per cent to be treated as current income produces an even bleaker picture of the fiscal policy choices of Progressive Conservative governments. With that assumption, the policy choices of PC governments were responsible for 34 percentage points of debt during their 10 years in power. During their years in power, the NDP and the Saskatchewan Party would now be identified as having reduced debt by 1.8 and 4.3 percentage points of GDP, respectively.

²⁷ Reporting only that portion of the cyclical component resulting from n being different from n^* , one determines what role automatic stabilizers played in debt accumulation. The calculation for Newfoundland and Labrador suggests that over the 32 years of the sample period, automatic stabilizers increased the debt ratio by 3.2 percentage points of provincial GDP.

FIGURE 4 NEWFOUNDLAND AND LABRADOR



The commodity-price cycle that is relevant for Newfoundland and Labrador is almost exclusively due to the price of offshore oil. Most important for the commodity-price component of the increase in the accumulated deficit is, however, the very emergence of the offshore oil industry beginning in the early 1990s and the beginning of significant inflows of oil royalties beginning in the early 2000s. Since 1982–83, the commodity-price component has been responsible for reducing the operating account debt ratio by 16.9 percentage points of GDP.

Over the period 1982–83 to 2013–14, the policy component was responsible for decreasing Newfoundland and Labrador’s debt ratio by 9.8 percentage points of provincial GDP. The province is remarkable in the size of swings in debt-induced policy choices; notably, the 17-percentage-point reduction in the debt ratio in the mid-1990s and the eight-percentage-point increase in the early 2000s.

The rapid reduction in the debt ratio in Newfoundland and Labrador since 2004–05 — a reduction equal to 27 percentage points of GDP — has been partly due to policy choices (contributing to a reduction of 11 percentage points of GDP) and partly due to a favourable commodity-price component (contributing to a reduction in debt equal to 15 percentage points of GDP).

POLITICAL BOX SCORE: NEWFOUNDLAND AND LABRADOR

Governing Party	Progressive Conservative Party	Liberal Party
Years as government	17	15
Total debt accumulated as a result of policy choices (percentage points of GDP)	-5.5	-4.3
Annual average amount of debt accumulated as a result of policy choices (percentage points of GDP)	-0.3	-0.3

The political box score suggests that, in Newfoundland and Labrador, the Liberal and Progressive Conservative parties have introduced very similar policies as regards their impact on the operating account deficit. As Figure 5 shows, Progressive Conservative and Liberal governments have both governed during periods when they have dramatically increased debt with their policy choices, as well as periods where the government has dramatically decreased debt. Thus, while each party has a similar record on debt reduction during their mandates, both have also introduced a good deal of volatility in the debt ratio with their policy choices.

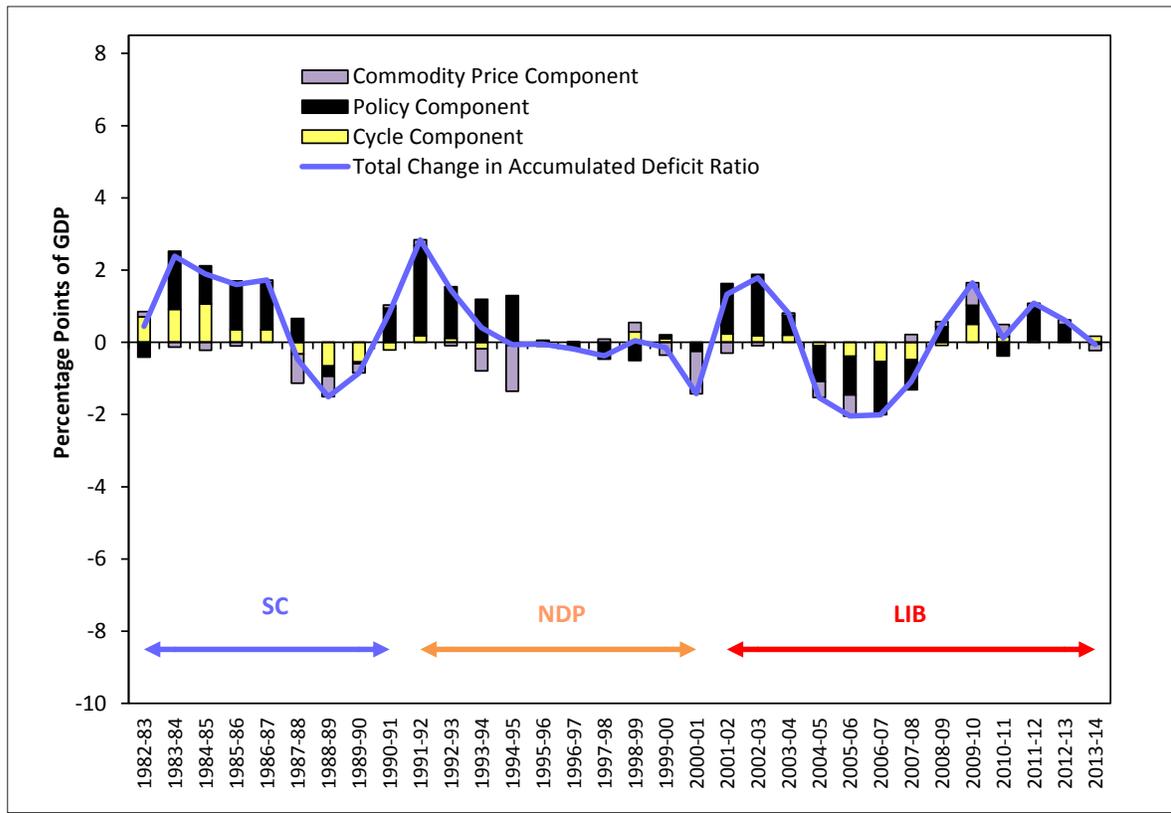
British Columbia

Figure 5 identifies for British Columbia the contributions to the ratio of accumulated deficits to provincial GDP of the business cycle, the commodity-price cycle and government policy choices. Over the period 1982–83 to 2013–14, the debt ratio in British Columbia increased by 9.7 percentage points of provincial GDP.

An obvious feature of the calculations for B.C. is that the three components of debt are all much smaller than in the other three provinces being considered here. The cyclical component was responsible for an increase in the debt ratio of 2.0 percentage points of GDP, while the commodity-price component explains a reduction of 4.9 percentage points. The policy component was the largest contributor to debt; over the sample period, provincial fiscal policy choices caused the debt ratio to decrease by 12.5 percentage points of GDP.²⁸

²⁸ Automatic stabilizers are calculated to have added 2.5 percentage points of provincial GDP to B.C.'s accumulated deficit ratio since 1982–83.

FIGURE 5 BRITISH COLUMBIA



Although B.C. is somewhat infamous for its polarizing provincial politics, its political box score suggests that, at least when it comes to the effect of their fiscal policy choices on debt, there is very little difference between the three parties.

POLITICAL BOX SCORE: BRITISH COLUMBIA

Governing Party	Social Credit Party	Liberal Party	New Democratic Party
Years as government	9	13	10
Total debt accumulated as a result of policy choices (percentage points of GDP)	+6.2	+1.2	+5.2
Annual average amount of debt accumulated as a result of policy choices (percentage points of GDP)	+0.7	+0.1	+0.5

7. DISCUSSION

As Figure 1 illustrates, from 1981–82 to 1992–93 the provinces of Alberta and Saskatchewan accumulated deficits on their operating accounts that added over 30 percentage points of GDP to their debt loads. Much of this accumulation of debt was the consequence of policy choices. In both provinces, policy choices made worse a problem also caused by unfavourable commodity prices shocks. After 1992–93, both provinces managed to eliminate most of this newly accumulated debt. Interestingly, since 1992–93 the sources of debt reduction have been almost identical: policy changes reduced the debt ratio by 13 percentage points while favourable commodity price shocks reduced debt by 10 percentage points. Saskatchewan benefited from a more favourable cyclical influence

than did Alberta over this period. In neither province did the business cycle result in a reduction in debt greater than an amount equal to one percentage point of provincial GDP

It is noteworthy that in Saskatchewan, the accumulation of debt was due almost wholly to the policy choices of Progressive Conservative governments during the 1980s, while the reduction of that debt occurred under the watch of NDP governments and was more or less consistently supported by policy choices. The current government, led by the Saskatchewan Party, has had to deal with negative commodity price shocks that the previous government rarely had to deal with. It has responded with policy choices that had offset these shocks and so maintained a more or less constant debt ratio. In Alberta, although all governments were Progressive Conservative, noticeable differences appear depending on leadership. Thus former premier Klein (1992-2006) introduced policy changes that had much different implications for the operating account debt than the policy choices of his predecessor, Don Getty (1985-1992). The election of Alison Redford as premier in 2011 saw the return of a series of policy-induced debt increases rarely seen in the province since the early 1990s.

In the mid 1990s, the government of Newfoundland and Labrador responded very aggressively to the accumulation of operating account debt with policy changes that, despite a downturn in the economy, contributed to reducing the debt ratio by 10 percentage points of GDP. In the mid-2000s the debt ratio fell by nearly 25 percentage points of GDP thanks to favourable commodity-price shocks but also a concerted effort to reduce debt with policy changes. As the political box score for the province indicates, there seems to be little difference between political parties when it comes to policy-induced debt changes.

Figure 1 highlights how the experience in British Columbia with respect to debt accumulation stands in contrast to the other three provinces. Outside of small declines in the debt ratio in the late 1980s under then Social Credit premier Bill Vander Zalm and during the mid-2000s under then Liberal premier Gordon Campbell, the operating account debt ratio has remained more or less constant relative to its level in 1981-82. In part, this is due to B.C. having a more diversified economic base than the other provinces. But it is also because, as shown in Figure 5, policy initiatives have been fairly small in their impact on debt, something that has been true regardless of the political party in power.

8. CONCLUSION

The purpose of this study was to gain an understanding of how policy choices, unexpected commodity price shocks and movements in the business cycle have each influenced the amount of debt accumulated in the four Canadian provinces most dependent upon the revenues earned on the sale of natural resources. An understanding of what drives the accumulation of government debt requires a time series describing government finances that is internally consistent insofar as the effect of spending and revenue choices on debt can be clearly identified. An important contribution of this paper was to construct a database of provincial government finances that allows this to be done. Those data are provided in the Appendix.

The second contribution of this study was to define an accounting framework that allows one to identify how much government debt has been accumulated as a consequence of policy choices as opposed to the effects of the business cycle and the effects of unexpected commodity price movements. This framework emphasizes that governments should be held accountable for paying

the interest on the debts they have inherited from previous governments and that to be labelled fiscally responsible requires that governments respond to changes in the economic environment.

The final contribution made by this paper was to show how this framework can be used to look backwards to evaluate the extent to which policy choices have contributed to changes in the debt ratio. Those calculations show that, while over certain periods the business cycle has played a role in debt accumulation, over the 30-plus years described by the data, the effects of economic booms and busts have been largely offsetting in their influence on government debt in the four resource dependent provinces. Virtually all of the debt incurred by these governments has therefore been the result of policy choices and what we identify as unexpected movements in commodity prices.

The data available for this study end with the 2013–14 fiscal year. The fiscal year that is about to end — 2014–15 — has been a momentous one for provinces reliant on resource revenues. The price of oil began to fall in the summer of 2014 and by the end of the calendar year had declined by 50 per cent. The economies of Newfoundland and Labrador, Alberta and Saskatchewan — in that order — are expected by forecasters to suffer the most from this change in commodity prices.²⁹ When 2014–15 data become available, an application of our analysis will identify a large commodity price and cyclical component, each contributing to a noticeable increase in provincial debt ratios. The size and direction of the policy component will be determined by provincial budgets to be released in the spring of 2015. “Belt-tightening” is the usual refrain from governments during times like these, suggesting a policy component in the direction of reducing the debt ratio. It is unlikely the debt-reducing policy response will — or even should — completely offset the increase in the debt ratio stemming from the fall in commodity prices and the downturn in the economic cycle. The governments of these four provinces, then, are likely in line for a new bout of debt accumulation on their operating accounts. As a consequence, taxpayers will once again be faced with the choice of whether to realign current spending and taxes to accommodate lower resource revenues or to maintain the status quo and hope for a recovery of those revenues.

²⁹ See, for example, TD Economics, *Provincial Economic Forecast Update*, January 26, 2015.

APPENDIX

The following four tables present the provincial budget data used in this study. These data comes from the public accounts of the four provinces and are measured in millions of nominal dollars.

As explained in the text, what we record as the accumulated deficit is the sum of annual deficits in the operating account since 1979–80. The accumulated deficit differs from measures of net debt as the latter includes the accumulated deficits from government funds other than the operating account.

Our analysis requires an initial value for the accumulated deficit. For this purpose we use the net debt for each province in 1979–80 as reported in the Fiscal Reference Tables (FRT) published by the federal Department of Finance, October 2002. Our calculations of the cycle, commodity and policy components rely on *changes* in the operating account debt ratio and so are not critically dependent on this initial value.

Similar data to ours are contained in the Fiscal Reference Tables (FRT) published by the federal Department of Finance. However, the data in the following tables go beyond what is found in the FRT by reporting not only total spending and total revenue but also revenues and expenditures by major categories.

Where our data and the FRT report data on the same categories, the two sets of data closely match what is reported for Alberta, Saskatchewan and Newfoundland and Labrador. As noted in the text, however, the data presented here remove from Alberta's resource revenues the amounts transferred to the AHSTF. These transfers occurred from 1980–81 to 1986–87 and from 2005–06 to 2007–08, inclusive. Recognizing these transfers means that data on Alberta's total revenue are also adjusted. An important difference between our data and that reported for Newfoundland and Labrador in the FRT is that the latter include the net income of government business enterprises when calculating the annual deficit, while we do not.

The data we report for British Columbia differ more noticeably from what is reported in the FRT. Our data represent the province's main operating account, known as the Consolidated Revenue Fund, and exclude the net balances of Crown corporations and agencies, the SUCH (schools, universities, colleges and health authorities) sector and other adjustments, such as the HST repayment to the federal government. Notes to the FRT for British Columbia indicate these budget amounts lying outside the CRF are included in the FRT tabulations.

ALBERTA

Fiscal Year	Revenue							Expenditure							Annual Operating Account Deficit	Accumulated Deficit since 1979-80
	Personal Income Tax	Corporate Income Tax	Retail Sales Tax	Federal Cash Transfers	Natural Resource Revenue	Other Own-Source Revenue	Total Revenue	Health	Social Services	Education	Other Program Expenditure	Total Program Expenditure	Debt Charges	Total Expenditure		
1980-81	941	588	0	740	3,211	1,997	7,477	1,577	506	1,398	4,015	7,496	22	7,518	41	-8,463
1981-82	1,323	581	0	1,145	3,314	3,074	9,437	1,875	703	1,969	4,100	8,647	91	8,738	-699	-9,162
1982-83	1,650	609	0	1,167	2,752	3,415	9,593	2,438	918	2,473	5,875	11,704	55	11,759	2,166	-6,996
1983-84	1,510	782	0	1,308	4,059	3,574	11,233	2,724	985	2,627	5,317	11,653	171	11,824	591	-6,405
1984-85	1,457	828	0	1,686	4,493	4,083	12,547	2,731	1,051	2,783	5,245	11,810	228	12,038	-509	-6,914
1985-86	1,521	780	0	1,788	4,247	4,273	12,609	3,003	1,156	2,961	6,753	13,873	182	14,055	1,446	-5,468
1986-87	1,768	396	0	1,689	1,675	3,872	9,400	3,244	1,270	3,114	5,725	13,353	297	13,650	4,250	-1,218
1987-88	2,236	595	0	1,912	2,626	4,536	11,905	3,114	1,329	3,118	5,137	12,698	572	13,270	1,365	147
1988-89	2,039	697	0	2,135	2,085	4,944	11,900	3,372	1,434	3,227	5,077	13,110	797	13,907	2,007	2,154
1989-90	2,536	700	0	1,943	2,240	5,420	12,839	3,631	1,502	3,379	5,328	13,840	1,115	14,955	2,116	4,270
1990-91	2,796	803	0	2,365	2,688	5,533	14,185	3,895	1,567	3,532	5,741	14,735	1,282	16,017	1,832	6,102
1991-92	3,057	731	0	2,150	2,022	5,777	13,737	4,129	1,746	3,676	5,501	15,052	1,314	16,366	2,629	8,731
1992-93	2,794	637	0	2,457	2,183	6,200	14,271	4,352	1,889	3,904	6,031	16,176	1,419	17,595	3,324	12,055
1993-94	2,877	854	0	2,090	2,817	6,768	15,406	4,194	1,721	4,036	5,172	15,123	1,654	16,777	1,371	13,426
1994-95	3,063	1,073	0	1,929	3,378	6,721	16,164	3,928	1,495	3,756	4,301	13,480	1,746	15,226	-938	12,488
1995-96	3,177	1,332	0	1,748	2,786	6,472	15,515	3,773	1,456	3,713	3,739	12,681	1,683	14,364	-1,151	11,337
1996-97	3,445	1,407	0	1,351	4,034	6,415	16,652	4,006	1,511	3,738	3,446	12,701	1,462	14,163	-2,489	8,848
1997-98	3,877	1,849	0	1,183	3,778	7,067	17,754	4,401	1,564	4,081	3,727	13,773	1,322	15,095	-2,659	6,189
1998-99	4,601	1,659	0	1,335	2,368	6,856	16,819	4,660	1,560	4,241	3,885	14,346	1,379	15,725	-1,094	5,095
1999-00	5,100	1,255	0	1,640	4,650	7,458	20,103	5,341	1,668	4,735	4,612	16,356	956	17,312	-2,791	2,304
2000-01	3,943	2,023	0	1,813	10,586	7,162	25,527	5,946	1,790	5,040	5,200	17,976	980	18,956	-6,571	-4,267
2001-02	4,183	2,229	0	2,264	6,227	7,023	21,926	6,846	1,942	6,099	5,184	20,071	774	20,845	-1,081	-5,348
2002-03	4,834	2,019	0	2,074	7,130	6,605	22,662	6,917	2,108	5,461	5,567	20,053	476	20,529	-2,133	-7,481
2003-04	4,613	1,696	0	2,926	7,676	8,976	25,887	7,646	2,272	5,854	5,708	21,480	271	21,751	-4,136	-11,617
2004-05	4,649	2,364	0	3,219	9,744	9,352	29,328	9,059	2,438	6,370	5,984	23,851	302	24,153	-5,175	-16,792
2005-06	4,677	2,917	0	3,392	12,597	10,209	33,792	9,709	2,707	6,900	7,427	26,743	248	26,991	-6,801	-23,593
2006-07	7,622	3,606	0	3,077	11,010	11,452	36,767	10,880	2,879	7,817	7,716	29,292	215	29,507	-7,260	-30,853
2007-08	8,271	4,695	0	3,048	10,106	11,131	37,251	12,286	3,117	8,886	9,085	33,374	214	33,588	-3,663	-34,516
2008-09	8,708	4,252	0	4,185	11,915	6,751	35,811	13,107	3,418	9,411	10,519	36,455	208	36,663	852	-33,664
2009-10	7,877	4,754	0	4,941	6,768	11,318	35,658	13,180	3,807	9,538	9,802	36,327	363	36,690	1,032	-32,632
2010-11	7,631	3,334	0	5,025	8,428	10,616	35,034	15,034	4,130	9,276	9,532	37,972	472	38,444	3,410	-29,222
2011-12	8,563	3,678	0	4,777	11,636	10,889	39,543	15,562	4,278	9,271	9,956	39,067	499	39,566	23	-29,199
2012-13	9,621	4,756	0	4,804	7,779	11,796	38,756	16,529	4,641	9,311	10,605	41,086	512	41,598	2,842	-26,357
2013-14	10,537	5,488	0	6,729	9,578	12,961	45,293	17,091	4,762	9,095	13,000	43,948	590	44,538	-755	-27,112

BRITISH COLUMBIA

Fiscal Year	Revenue							Expenditure							Annual Operating Account Deficit	Accumulated Deficit since 1979-80
	Personal Income Tax	Corporate Income Tax	Retail Sales Tax	Federal Cash Transfers	Natural Resource Revenue	Other Own-Source Revenue	Total Revenue	Health	Social Services	Education	Other Program Expenditure	Total Program Expenditure	Debt Charges	Total Expenditure		
1980-81	1,369	457	758	1,077	862	1,177	5,700	1,672	831	1,318	2,219	6,040	19	6,059	360	-1,440
1981-82	1,848	580	1,130	1,082	598	1,535	6,774	1,949	818	1,550	2,753	7,071	17	7,087	314	-1,127
1982-83	2,008	189	999	1,216	541	2,375	7,328	2,232	1,194	1,669	2,390	7,485	28	7,513	186	-941
1983-84	1,819	309	1,201	1,773	677	1,463	7,242	2,486	1,404	1,751	2,611	8,251	113	8,364	1,121	180
1984-85	1,853	366	1,332	1,825	721	2,710	8,807	2,963	1,266	2,379	2,763	9,371	430	9,801	994	1,174
1985-86	2,073	324	1,452	1,856	704	2,752	9,160	3,084	1,298	2,328	2,941	9,651	476	10,127	967	2,141
1986-87	2,248	281	1,551	2,025	658	2,701	9,463	3,368	1,298	2,353	2,957	9,976	648	10,624	1,161	3,302
1987-88	2,790	473	1,463	2,054	1,223	3,004	11,007	3,603	1,349	2,501	2,792	10,245	810	11,055	48	3,350
1988-89	2,995	600	1,718	2,149	1,271	3,836	12,570	3,924	1,440	2,686	2,893	10,943	891	11,834	-736	2,614
1989-90	3,577	666	1,990	2,121	1,249	4,053	13,656	4,405	1,496	2,962	3,478	12,341	859	13,200	-456	2,158
1990-91	3,901	608	2,010	2,096	1,171	4,451	14,236	4,920	1,669	3,812	3,682	14,083	927	15,010	774	2,932
1991-92	4,013	577	1,991	2,198	1,101	4,690	14,570	5,503	1,994	4,171	4,340	16,008	1,093	17,101	2,531	5,463
1992-93	4,212	545	2,101	2,416	1,260	5,638	16,172	5,884	2,366	4,399	3,914	16,563	1,295	17,858	1,686	7,149
1993-94	4,477	719	2,661	2,269	1,772	6,025	17,923	6,164	2,704	4,550	3,979	17,397	1,436	18,833	910	8,059
1994-95	4,707	998	2,893	2,462	2,699	5,747	19,506	6,432	2,890	4,783	4,261	18,366	1,587	19,953	447	8,506
1995-96	4,993	1,225	2,999	2,394	2,026	6,060	19,698	6,614	3,033	4,951	3,829	18,427	1,627	20,054	356	8,863
1996-97	5,290	1,347	3,076	1,955	2,186	6,272	20,126	6,864	2,969	5,122	3,582	18,537	1,704	20,241	115	8,978
1997-98	5,362	1,138	3,243	1,837	2,197	6,439	20,216	7,050	3,048	5,125	3,228	18,451	1,684	20,135	-81	8,897
1998-99	5,423	1,098	3,209	2,150	1,830	6,603	20,312	7,304	3,113	5,367	3,269	19,053	1,474	20,527	215	9,112
1999-00	5,824	939	3,338	2,687	2,517	6,531	21,836	7,888	3,093	5,469	4,199	20,649	1,508	22,157	321	9,433
2000-01	5,963	1,055	3,617	2,752	3,750	6,812	23,948	8,597	3,212	5,840	3,414	21,063	1,608	22,671	-1,277	8,156
2001-02	5,375	1,522	3,535	2,735	3,108	6,712	22,987	9,733	3,318	6,336	4,103	23,490	1,487	24,977	1,990	10,146
2002-03	4,154	613	3,770	3,276	3,255	7,137	22,205	10,258	3,019	6,370	4,075	23,722	1,442	25,164	2,959	13,105
2003-04	4,878	776	3,989	2,987	3,273	7,506	23,408	10,535	2,715	6,356	4,418	24,024	1,453	25,477	2,069	15,174
2004-05	5,051	1,256	4,099	4,562	3,938	8,657	27,562	10,685	2,570	6,447	5,190	24,892	1,414	26,306	-1,256	13,918
2005-06	5,838	1,428	4,326	5,018	4,527	8,574	29,711	11,583	2,670	6,710	4,893	25,855	1,319	27,174	-2,537	11,381
2006-07	6,908	1,540	4,673	5,383	3,941	9,060	31,506	12,329	2,862	7,010	4,986	27,188	1,318	28,506	-3,000	8,381
2007-08	6,959	2,253	5,086	4,950	3,699	9,370	32,317	13,513	2,976	7,510	5,391	29,390	1,175	30,565	-1,752	6,629
2008-09	6,309	3,394	4,979	4,931	3,760	7,607	30,981	14,131	3,344	7,585	5,803	30,863	1,206	32,069	1,089	7,718
2009-10	5,769	1,624	4,801	5,349	2,560	9,065	29,169	14,531	3,528	7,713	5,361	31,133	1,177	32,310	3,141	10,859
2010-11	5,806	2,026	5,521	6,210	2,623	10,667	32,852	15,263	3,734	7,864	5,556	32,417	1,244	33,661	809	11,667
2011-12	6,427	2,002	5,841	6,213	2,699	10,200	33,382	16,251	3,894	7,959	6,959	35,064	1,238	36,302	2,920	14,587
2012-13	6,977	2,204	5,975	5,592	2,348	10,267	33,363	16,580	3,917	8,001	5,425	33,923	1,197	35,120	1,757	16,344
2013-14	6,862	2,427	5,298	6,029	2,955	11,070	34,641	17,012	3,741	7,960	4,943	33,656	1,235	34,891	250	16,594

NEWFOUNDLAND AND LABRADOR

Fiscal Year	Revenue							Expenditure							Annual Operating Account Deficit	Accumulated Deficit since 1979-80
	Personal Income Tax	Corporate Income Tax	Retail Sales Tax	Federal Cash Transfers	Natural Resource Revenue	Other Own-Source Revenue	Total Revenue	Health	Social Services	Education	Other Program Expenditure	Total Program Expenditure	Debt Charges	Total Expenditure		
1980-81	184	44	247	694	19	216	1,404	301	143	379	466	1,289	202	1,491	87	1,891
1981-82	213	45	257	782	26	229	1,552	353	160	433	520	1,466	234	1,700	148	2,039
1982-83	254	35	273	855	22	277	1,716	415	184	482	558	1,638	269	1,907	191	2,230
1983-84	247	34	328	914	21	285	1,829	457	206	593	596	1,852	303	2,155	326	2,556
1984-85	252	41	346	986	19	302	1,946	468	222	522	635	1,846	352	2,198	252	2,808
1985-86	265	60	373	1,062	19	358	2,137	492	248	545	698	1,983	407	2,390	253	3,061
1986-87	283	65	418	1,157	27	333	2,283	534	279	563	702	2,078	436	2,514	231	3,292
1987-88	336	73	468	1,218	29	421	2,546	620	263	632	771	2,286	457	2,743	197	3,490
1988-89	356	57	522	1,315	20	394	2,664	621	302	677	836	2,436	454	2,890	226	3,715
1989-90	407	57	565	1,426	22	455	2,931	663	331	703	950	2,647	459	3,106	175	3,890
1990-91	455	53	558	1,398	21	482	2,967	739	385	759	942	2,824	490	3,314	347	4,238
1991-92	468	49	562	1,427	20	582	3,108	748	418	760	962	2,888	496	3,384	276	4,514
1992-93	476	46	539	1,500	15	617	3,194	774	437	787	969	2,967	488	3,455	261	4,775
1993-94	506	39	539	1,462	15	597	3,158	786	449	799	830	2,864	500	3,364	205	4,980
1994-95	476	53	563	1,637	18	641	3,388	804	465	713	1,016	2,998	532	3,530	142	5,122
1995-96	554	63	565	1,451	26	829	3,487	913	366	717	571	2,567	545	3,112	-375	4,747
1996-97	618	63	556	1,499	22	663	3,420	904	367	693	567	2,531	544	3,075	-345	4,401
1997-98	543	78	433	2,019	21	904	4,000	1,034	380	708	1,009	3,131	865	3,996	-4	4,398
1998-99	545	83	438	1,834	26	870	3,795	1,280	293	761	798	3,131	1,008	4,139	344	4,742
1999-00	605	84	456	1,620	39	951	3,755	1,382	275	800	827	3,285	883	4,168	413	5,155
2000-01	625	75	498	1,757	60	885	3,901	1,477	280	788	885	3,430	951	4,382	481	5,636
2001-02	607	55	556	1,657	52	973	3,900	1,558	275	822	917	3,572	942	4,514	614	6,250
2002-03	671	109	590	1,589	97	893	3,950	1,659	273	837	996	3,765	979	4,744	795	7,045
2003-04	733	140	625	1,543	144	1,009	4,194	1,798	390	978	985	4,151	982	5,133	939	7,983
2004-05	767	172	595	1,513	271	995	4,312	1,825	371	906	931	4,032	940	4,972	660	8,644
2005-06	811	296	630	1,880	555	1,206	5,378	1,867	363	1,156	1,023	4,409	947	5,356	-21	8,622
2006-07	886	342	686	1,743	545	1,139	5,340	1,990	372	1,107	1,121	4,590	777	5,367	27	8,649
2007-08	804	484	686	1,788	2,031	1,150	6,942	2,137	382	1,188	1,262	4,969	751	5,720	-1,222	7,427
2008-09	900	520	758	2,558	2,455	1,236	8,427	2,347	414	1,304	1,472	5,537	745	6,282	-2,145	5,282
2009-10	817	595	704	1,545	2,206	1,238	7,106	2,620	530	1,452	1,837	6,439	890	7,329	224	5,506
2010-11	887	533	800	1,763	2,628	1,317	7,928	2,665	568	1,400	2,069	6,702	837	7,539	-388	5,118
2011-12	1,012	503	873	1,594	3,112	1,448	8,543	2,846	574	1,492	2,136	7,048	789	7,838	-706	4,412
2012-13	1,159	767	941	992	1,964	1,442	7,265	2,844	584	1,484	2,008	6,921	780	7,701	436	4,848
2013-14	1,222	358	907	1,020	2,286	1,316	7,109	2,869	572	1,514	2,070	7,025	851	7,876	767	5,615

SASKATCHEWAN

Fiscal Year	Revenue							Expenditure							Annual Operating Account Deficit	Accumulated Deficit since 1979-80
	Personal Income Tax	Corporate Income Tax	Retail Sales Tax	Federal Cash Transfers	Natural Resource Revenue	Other Own-Source Revenue	Total Revenue	Health	Social Services	Education	Other Program Expenditure	Total Program Expenditure	Debt Charges	Total Expenditure		
1980-81	393	128	300	426	788	21	2,056	540	239	447	800	2,026	22	2,048	-8	-1,193
1981-82	512	93	317	535	759	200	2,416	614	319	500	932	2,365	43	2,408	-8	-1,201
1982-83	683	87	312	417	776	248	2,524	729	444	589	1,018	2,780	42	2,822	298	-904
1983-84	565	132	340	558	758	252	2,605	961	302	645	1,019	2,927	57	2,983	378	-526
1984-85	554	121	345	598	866	309	2,793	1,012	328	636	1,151	3,128	102	3,230	437	-89
1985-86	628	129	374	652	769	395	2,947	1,067	341	677	1,297	3,382	190	3,572	625	536
1986-87	692	119	357	799	305	396	2,668	1,165	356	701	1,557	3,779	193	3,972	1,304	1,840
1987-88	769	124	455	923	458	442	3,171	1,184	378	780	1,172	3,514	282	3,796	625	2,465
1988-89	848	128	499	1,074	356	705	3,609	1,249	364	810	1,232	3,656	320	3,976	367	2,832
1989-90	899	108	502	1,231	352	948	4,040	1,401	363	848	1,361	3,973	523	4,496	455	3,287
1990-91	980	66	518	1,489	417	1,131	4,601	1,531	367	897	1,726	4,521	475	4,996	395	3,683
1991-92	1,023	75	578	1,260	325	788	4,049	1,581	390	908	1,510	4,389	502	4,892	842	4,525
1992-93	1,075	92	539	1,304	396	970	4,376	1,548	425	904	1,350	4,228	740	4,968	592	5,117
1993-94	1,068	146	666	1,248	452	1,100	4,680	1,464	552	864	1,198	4,078	873	4,952	272	5,389
1994-95	1,057	162	729	1,297	718	1,262	5,225	1,534	576	902	1,204	4,215	882	5,097	-128	5,261
1995-96	1,111	238	779	975	673	1,355	5,132	1,555	587	880	1,243	4,264	849	5,113	-18	5,242
1996-97	1,277	232	841	761	908	1,485	5,503	1,608	587	882	1,225	4,302	794	5,096	-407	4,835
1997-98	1,328	217	753	553	781	1,530	5,162	1,677	600	917	1,179	4,373	755	5,127	-35	4,800
1998-99	1,448	200	743	961	622	1,629	5,604	1,775	636	978	1,442	4,830	745	5,575	-29	4,771
1999-00	1,446	277	660	1,209	932	1,334	5,857	1,962	580	1,034	1,502	5,077	696	5,773	-84	4,687
2000-01	1,255	317	758	872	1,293	2,259	6,754	2,098	577	1,113	1,469	5,257	664	5,921	-833	3,854
2001-02	1,197	145	776	1,238	825	1,879	6,059	2,204	624	1,092	1,801	5,721	617	6,338	279	4,133
2002-03	1,430	178	814	801	1,244	1,990	6,457	2,343	681	1,069	1,670	5,762	611	6,374	-83	4,050
2003-04	1,246	311	854	1,033	1,141	1,974	6,558	2,516	681	1,228	1,741	6,166	603	6,768	210	4,260
2004-05	1,329	258	985	1,666	1,474	2,079	7,792	2,774	679	1,273	1,722	6,448	579	7,027	-765	3,495
2005-06	1,448	394	1,112	1,265	1,721	2,277	8,218	2,991	693	1,462	1,988	7,133	545	7,678	-539	2,956
2006-07	1,669	554	1,080	1,389	1,694	2,258	8,643	3,203	821	1,606	2,077	7,707	538	8,245	-398	2,558
2007-08	1,938	674	930	1,603	2,640	2,081	9,866	3,504	733	1,562	2,237	8,036	547	8,583	-1,283	1,275
2008-09	1,844	592	1,109	1,709	4,612	2,459	12,325	3,976	790	2,113	2,955	9,835	520	10,355	-1,970	-695
2009-10	1,891	881	1,084	1,604	1,911	2,896	10,266	3,934	860	2,095	2,730	9,619	480	10,099	-168	-862
2010-11	1,796	1,155	1,187	1,600	2,528	2,795	11,061	4,548	911	2,197	2,886	10,541	424	10,965	-95	-958
2011-12	1,897	794	1,322	1,726	2,822	2,559	11,120	4,400	902	2,330	3,021	10,654	412	11,066	-55	-1,012
2012-13	2,406	838	1,285	1,671	2,516	2,708	11,424	4,576	964	2,448	3,030	11,018	391	11,409	-16	-1,028
2013-14	2,470	1,017	1,326	1,617	2,521	2,491	11,442	4,835	961	2,572	2,963	11,331	328	11,659	217	-812

About the Author

Ron Kneebone is a Professor of Economics and Director of Economic & Social Policy in The School of Public Policy, both at the University of Calgary. His current research is examining the characteristics of Canadian federal, provincial and municipal fiscal policy choices, the problem of homelessness and income supports for persons with disabilities.

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