FRASER INSTITUTE

2021

WILL CUTTING INCOME TAX RATES CREATE JOBS FOR CANADIANS?

Ergete Ferede

2021 • Fraser Institute

Will Cutting Income Tax Rates Create Jobs for Canadians?

by Ergete Ferede

fraserinstitute.org

Contents

Executive Summary

Job creation is often considered one of the most critical public-policy goals that governments seek to achieve. The recent significant job losses that the country has experienced during the COVID-19 pandemic have brought employment to the forefront of meaningful policy discussions and, so, some commentators and analysts suggest that policy makers should embark on tax cuts to stimulate a higher employment rate in the economy. Nevertheless, the effects of tax policy on employment have been among the most contentious issues in academic and political circles. There is also a lack of empirical evidence on this crucial issue in the Canadian setting, and results from previous studies are generally inconclusive. What are the effects of federal income taxes on employment? Can the Canadian federal government encourage private-sector job creation through cuts in the income-tax rate?

When governments face budgetary challenges and budget deficits rise, they often raise the income-tax rate on high-income earners and corporations to generate revenue. In Canada, since half of the capital gains are currently subject to income tax, any increase in the personal income-tax (PIT) rate also raises the tax burden on capital gains. However, various studies indicate that such attempts to raise tax revenue have high economic costs. An increase in the top marginal statutory PIT rate can discourage entrepreneurship, which hurts private-sector's capacity to create jobs in an economy. A higher income-tax rate reduces the after-tax wage income that individuals receive, and this adversely affects their incentives to work. Similarly, an increase in PIT that causes a rise in the capital gains taxes reduces the after-tax return for entrepreneurship and investment, ultimately hurting the economy's capacity to create jobs.

The empirical analysis of this study shows that income taxes have significant adverse effects on private-sector employment. The rates of the capital gains tax and the corporate income tax have similar negative effects on employment. The results of the study suggest that a one percentage-point cut in the federal top PIT rate leads to an increase in the private employment rate by about 0.25% in the year following the tax rate cut. In other words, if the federal government cuts the top statutory marginal PIT rate from the current 33% to 29%—the rate prevailing before the 2016 tax-rate hike—, the private

sector will create about 110 thousand jobs in the year following the tax cut. This would provide a vital boost to the economy that has suffered significant job losses as a result of the pandemic. Thus, this study's important policy implication is that, if the Canadian federal government wishes to encourage private-sector job creation, cutting the top PIT rate (and the associated capital gains tax rate), is a crucial and promising policy choice to consider. Such a policy change will also help significantly to improve Canada's overall tax competitiveness in relation to other OECD countries.

1. Introduction

Job creation has been a recurrent theme in various policy debates. Consequently, raising the employment rate is often considered one of the most critical public-policy goals that governments seek to achieve. To this end, some commentators and analysts suggest that policy makers should embark on tax cuts to stimulate a higher employment rate in an economy. However, the effect of tax policy on job creation has been among the most contentious issues in academic and political circles. Empirical results from previous studies on the impact of tax cuts on employment are generally mixed. Moreover, there is a lack of empirical studies on this crucial issue in the Canadian setting. What are the effects of federal income taxes on employment? Can the Canadian federal government encourage private-sector job creation through cuts in the income-tax rate?

As governments face budgetary challenges and budget deficits rise, they often raise the income-tax rate on high-income earners and corporations. In Canada, since currently half of the capital gains are subject to the income-tax system, any increase in the income-tax rate also raises the tax burden on capital gains. However, various theoretical and empirical studies indicate that such attempts to raise tax revenue have high economic costs. An increase in the top marginal statutory personal income-tax (PIT) rate can discourage entrepreneurship, which hurts the capacity of the private-sector to create jobs in an economy for many reasons (OECD, 2011). Theoretically, a higher income-tax rate reduces the after-tax wage rate and adversely affects labour supply. While this effect may depend on individual characteristics, many previous empirical studies suggest that high-income individuals are more responsive to changes in the PIT rate than low- and middle-income individuals (Saez, Slemrod, and Giertz, 2012). Second, higher personal income taxes may encourage people to look for work in the informal sector, reducing the formal employment rate. Such effects are notably stronger for high-income earners. For instance, using Canadian data, Milligan and Smart (2015) find that the behavioural response of the top 1% of income earners to changes in the tax rate is much higher than other income groups. Similarly, capital gains taxes decrease the after-tax return of entrepreneurship and investment and ultimately reduce an economy's capacity to create jobs. Clemens, Lammam, and Lo (2014) provide an excellent discussion of the economic costs associated with capital gains taxes.

As a result of the significant job losses that the country experienced as a result of COVID-19, many commentators and analysts argue that stimulating employment should be a principal objective of the Canadian federal government in the short to

medium term. A meta-analysis of over 200 previous studies by Card, Kluve, and Weber (2018) suggests that government policy interventions in the labour market generally tend to have more significant impacts during such periods of slow growth and high unemployment. Following this logic, in October 2020 the Canadian federal government pledged to spend $10 billion on infrastructure investment, predicting that this would create 60 thousand jobs (Connolly, 2020). An alternative policy to achieve such a grandiose objective would be to cut the top marginal income-tax rate. However, as discussed above, the empirical evidence on the effects of tax policy on employment is inconclusive and, furthermore, studies that focus on the relationship between tax policy and employment in the Canadian context are very scant. Consequently, the main objective of this study is to fill this gap in the literature and provide empirical evidence on the effect of income taxes on private-sector job creation. More specifically, we use aggregate Canadian data from 1973 to 2019 to investigate the impact of the top marginal personal income-tax rate and the corporate income-tax rate on private employment. The results of this study will help enhance public discussions and inform policy makers on the relevance of reductions in the income-tax rates for job creation in the country.

The empirical analysis of this study shows that income taxes have significant adverse effects on private-sector employment. The findings are consistent with those of previous studies and robust to various sensitivity checks. Our results suggest that a one-percentage point cut in the federal top PIT rate leads to an increase in the private employment rate by about 0.25% in the year following the cut in the tax rate. To put this in perspective, if the federal government cuts the top statutory marginal PIT rate from the current 33% to 29%—the rate prevailing before the 2016 increase in the tax rate—, about 110 thousand jobs will be created by the private sector in the year following the tax cut. Thus, an important policy implication of our results is that, if the Canadian federal government wishes to encourage private-sector job creation and reduce the economic cost of the top marginal PIT rate, which is also associated with higher capital gains tax, cutting the top marginal PIT rate looks very attractive. Such a policy change will also help significantly improve Canada's overall tax competitiveness in relation to other members of the Organisation for Economic Co-operation and Development (OECD) (Hill, Li, and Palacios, 2020).

The remainder of the publication is organized as follows. In section 2, we briefly review some of the relevant literature on tax policy and employment. We also discuss the theoretical basis for our empirical analysis and provide background information in section 3. Section 4 presents the empirical results and discussions. The final section concludes and highlights the policy implications of our findings.

2. Literature Review

This section provides a brief review of the literature on the relationship between tax policy and employment. Many previous theoretical and empirical studies investigate the effect of tax policies on employment. However, we limit our review to some of the studies that are directly related to our study.

Wasylenko and McGuire (1985) provide one of the earlier empirical studies on the effects of taxes on employment, using industry-based data from US states. Their results suggest that a higher personal income-tax rate and the general tax policy environment adversely affect employment growth. Dalenberg and Patridge (1995) also investigate the effects of taxes and government expenditure on total employment using panel data of metropolitan areas in the United States. They find that taxes have negative impacts on total employment. Similarly, Feld and Kirchgässner (2002) employ aggregate panel data from Swiss cantons to investigate the effect of corporate and personal income-tax rates on the location of firms and employment. Their empirical analysis suggests that higher corporate and personal income-tax rates discourage firms from locating in a jurisdiction, which ultimately affects employment adversely. According to this study, cantons with lower corporate and personal income-tax rates create more jobs. Using data from the United States, Mertens and Ravn (2013) also find evidence that a decrease in the average effective personal income-tax rate raises employment.

Another strand of the literature focuses on the adverse impacts of the top marginal personal income-tax rate and capital gains tax on entrepreneurship and the harmful effects this can cause on employment. Poterba (1989) and Gentry (2010) argue that business start-ups' financial benefits are mainly captured when the business start-ups are sold. This implies that the capital gains tax is simply a tax on successful entrepreneurs. If the capital gains tax discourages business start-ups, it will adversely affect the private sector's job creation. Similarly, the empirical study of Carroll, Holtz-Eakin, Rinder, and Rosen (2000) suggests that high personal income-tax rates discourage entrepreneurs from hiring workers. The authors find that, when entrepreneurs' individual income-tax rate rises, it reduces their propensity to hire workers, ultimately affecting the overall employment rate. Using data from the United States, Moretti and Wilson (2017) also find that top income-earners such as scientists and entrepreneurs migrate to other jurisdictions in response to higher state personal and corporate income-tax rates. Houndonougbo and Murray (2017) investigate the impacts in

the United States of raising the income-tax rate on high-income earners. They found that increasing the income-tax rate on the rich has negative effects on employment growth in the long run.

A very limited number of previous Canadian studies focus on the impacts of the income tax on entrepreneurship and employment. Ferede (2013, 2019b) finds empirical evidence that the top marginal PIT rate has adverse effects on entrepreneurship. Using province-level aggregate data from Canada, Ferede (2013) examines the impact of personal income-tax progressivity (in the sense of a rising marginal personal income-tax rate) on self-employment. He finds that an increase in income-tax progressivity discourages self-employment. Ferede (2019b) also investigates the effects of the income-tax rate on entrepreneurship measured by business entry rate. He finds that a one percentage-point increase in the top statutory marginal PIT rate leads to a 0.41 percentage-point decline in the business entry rate in the long term. This long-term result also implies that an increase in the top marginal PIT rate by one percentage point leads to the creation of about 405 fewer new employer businesses. It is known that fewer businesses are often associated with lower job-creation capacities in the economy. Thus, the top marginal personal income-tax rate affects employment adversely.

The corporate income tax (CIT) is another tax policy that can negatively influence an economy's employment rate. Theoretically, the burden of CIT may be borne by workers, capital owners, and consumers. However, previous studies suggest that in a small open economy such as Canada, where capital is more mobile, more of the burden is likely to be borne by workers in the form of lower wages and reduced employment opportunities. Thus, one would expect the influence of CIT on employment may occur through various avenues. First, the CIT rate can indirectly affect the employment level in an economy through its effects on private investment. Many previous studies, such as Djankov, Ganser, McLiesh, Ramalho, and Sheleifer, 2010 and Ferede and Dahlby, 2012, show that a higher CIT rate reduces private investment. The fall in private investment causes a decline in the capital-to-labour ratio, and this reduces workers' productivity. The reduction in workers' productivity, in turn, influences the wage rate adversely.[1] The decrease in the wage rate associated with a higher CIT rate ultimately reduces the labour supply. Further, the increase in the cost of capital associated with a higher CIT reduces output and the demand for labour, and this ultimately causes a fall in the employment rate.

1. See for instance Hassett and Mathur (2015), who find evidence of an adverse effect of the CIT rate on wages using data from a cross section of countries. Ebrahimi and Vaillancourt (2016) and McKenzie and Ferede (2017) find similar results using Canadian data.

The US state of Georgia implemented job tax credits between 1993 and 1995 for eligible firms, which created new full-time jobs. Faulk (2002) employs a switching regression model to study the impacts of this program of job tax credits on employment in the state using firm-level data. She finds that firms that took the tax credit created more jobs than comparable firms that did not take the credits. Thus, her empirical results suggest that tax cuts play essential roles in job creation. Siegloch (2014) also finds empirical evidence that corporate taxation adversely affects employment using firm-level data from Germany. Similarly, Ljungqvist and Smolyansky (2014) employ state-level data from the United States to examine the impact of corporate income tax on employment and income. Their empirical results show that a higher corporate income-tax rate causes significant reductions in employment and income. According to their empirical estimates, a one percentage-point increase in the CIT rate is associated with a decrease of employment by between 0.3% and 0.5%. Giroud and Rauh (2018) use firm-level data from the United States to investigate the effects of various taxes on employment and the number of establishments. They find that the corporate income tax rate has negative impacts on employment. These findings are also consistent with a theoretical analysis of Chen, Qi, and Schlagenhauf (2018) that show lowering the corporate income-tax rate encourages the formation of corporations and raises employment opportunities. Similarly, for Canada, Chen and Mintz (2010) also show that a reduction of three percentage points in the federal CIT rate is associated with 233,000 jobs in the long term.

Although a larger part of previous empirical evidence shows that income taxes on individuals and businesses have adverse effects on employment, a few earlier studies find results contrary to that. Mark, McGuire, and Papke (2000) investigate the impact of personal and business taxes on private employment using county-level data from the Washington, D.C metropolitan area. They find that the effect of the corporate income-tax rate on private employment growth is positive but statistically insignificant. The authors argue that the wrong sign for the corporate income-tax rate coefficient can be the result of the measurement error problem in their data. When the US state of New Jersey experienced substantial job growth after the government cut the personal income-tax rate from 1994 to 1996, Reed and Rogers (2004) used county-level data to investigate empirically whether the observed employment growth in the state was the result of the reduction in the personal income-tax rate. However, the authors' findings cast doubt on the tax cuts' importance on job creation in the state. A recent study by Zidar (2019) also uses individual-level data from the United States to examine the effect of a reduction in the PIT rate on employment growth. The author finds a positive association between employment growth and tax cuts but he shows that this positive effect of the PIT cut on employment was mainly the result of a tax cut for the lower-income groups rather than the high-income group.

In the literature, a common challenge for empirical analyses is to identify the exogenous variations in the tax rates and their impacts on economic activities. Recent studies have begun employing narrative measures (historical accounts of each piece of tax legislation and the policy makers' motivations behind each change in the rate) of changes in the tax rate that are considered exogenous to economic activities to circumvent such a problem. For example, the empirical analysis of Mertens and Olea (2018) uses the narrative measures of changes in the marginal tax rates to estimate taxable income elasticity for the United States. They find that high-income individuals' response to changes in the tax rate is much higher than that of other income groups. Further, their empirical results reveal that cuts in income-tax rate for the high-income groups cause a short-run increase in economic activities and reduce the unemployment rate. In fact, their analysis indicates that the economic benefit of cutting income-tax rates is not limited to the top income group. Reducing the income tax rates for other income groups also positively affects economic activity, although these effects occur with a longer delay. Thus, their analysis reveals that income-tax rates can affect unemployment and income in an economy.

3. Theoretical Framework, Data, and Specification

3.1 Theoretical framework

In this section, we briefly discuss the theoretical underpinning that serves as a basis for our empirical analysis. As detailed discussion of the relationship between taxes and employment are available in previous studies such as Carlton (1982), Feld and Kirchgässner (2002), Davis and Henerekson (2004), Ferede (2013), and McKenzie and Ferede (2017), among others, we focus only on the intuitive explanations of the various theoretical models.

The effects of tax policies upon the labour market are often analyzed by looking at the responses of labour demand and labour supply to changes in tax rates. Income taxes can affect the labour market through the labour demand, the labour supply, or both. Theoretically, in a simple labour-market model, the effect of changes in personal income-tax rates on the labour supply depends on the substitution effect and the income effect.[2] A reduction in the personal income-tax rate raises the after-tax wage income and this provides individuals with the incentive to work for more hours and take less leisure. This substitution toward more work and less leisure increases the labour supply. However, when the individuals' after-tax income rises as a result of tax rate cuts, the individuals tend to feel wealthier, which causes them to take more leisure and work for fewer hours. This income effect associated with the cut in the income-tax rate causes a reduction in labour supply. Thus, theoretically, the net result of reductions in the income-tax rate on labour supply is ambiguous as it depends on the relative strength of the income and substitution effects. However, a number of previous studies show that the substitution effect is generally stronger, and hence income-tax rate cuts are expected to raise the labour supply.

The personal income tax and capital gains tax can also affect employment through its effects on entrepreneurship. Theoretical studies of Gentry and Hubbard (2000, 2010) suggest that higher personal income tax and capital gains tax can discourage entrepreneurship. The reason is that entrepreneurship is a risky activity and entrepreneurs take a lot of risks. When they are successful, a higher part of their financial gain is subject to the income-tax system. That is, the government shares the gain but not the risk associated with entrepreneurship. From this point of view, income tax (including the capital

2. Similar arguments also hold for payroll taxes.

gain tax) can essentially be viewed as a "success tax". Thus, personal income and capital gains taxes can discourage entrepreneurship, and this adversely affects employment (see Ferede, 2013 for a detailed discussion).

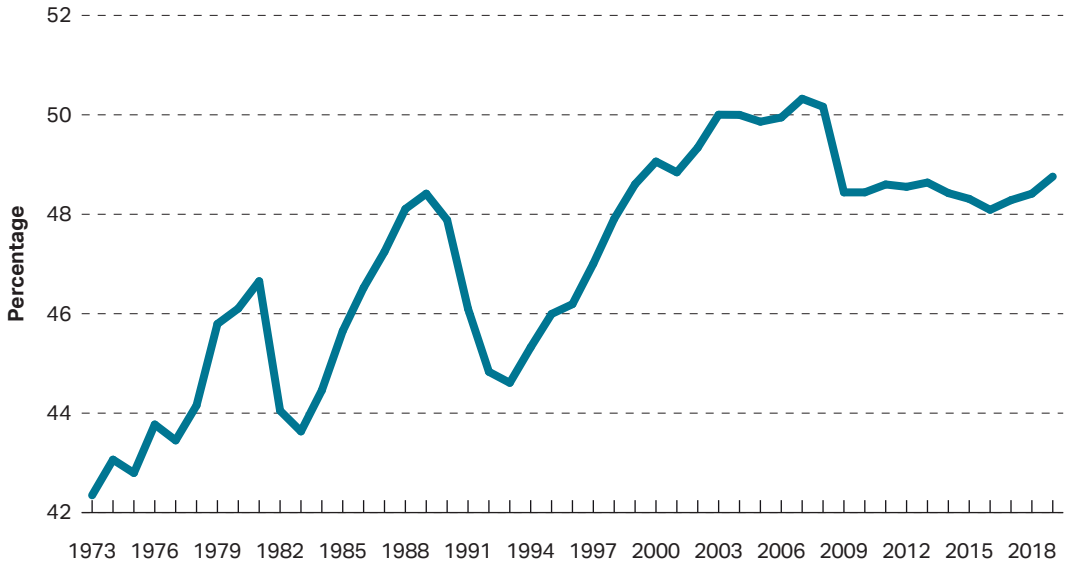
Like personal and capital gains tax, the corporate income tax (CIT) can also affect employment through its effects on investment. Theoretically, in the seminal model of Harberger (1962), there are two opposite effects of the corporate income-tax rate on labour demand: the output effect and the substitution effect. An increase in the CIT rate increases the cost of capital, and this reduces output and labour demand (and hence employment). This is the output effect. But, the reduction in the labour demand lowers the wage rate, making labour relatively cheaper. Employers then substitute labour for capital, and this increases the labour demand. However, evidence shows that the output effect dominates, and therefore the net effect of an increase in the CIT rate would be a fall in employment. Further, a higher corporate income tax raises the cost of capital and this reduces the return from investment. The reduction in private investment causes a decrease in labour demand by firms, which adversely affects employment in an economy.

3.2 Data

The data for our empirical analysis come from various sources. We obtain the data on GDP, employment, unemployment rate, population, and the Consumer Price Index (CPI) from Statistics Canada. Provincial and federal CIT and PIT rates come from the *Finances of the Nation*. The federal government's CIT revenue, PIT revenue, budget deficit, debt, and intergovernmental grants come from Finance Canada's *Fiscal Indicators* of 2020. A detailed description of the key variables of interest and their data sources are shown in **Appendix 1** (p. 28).

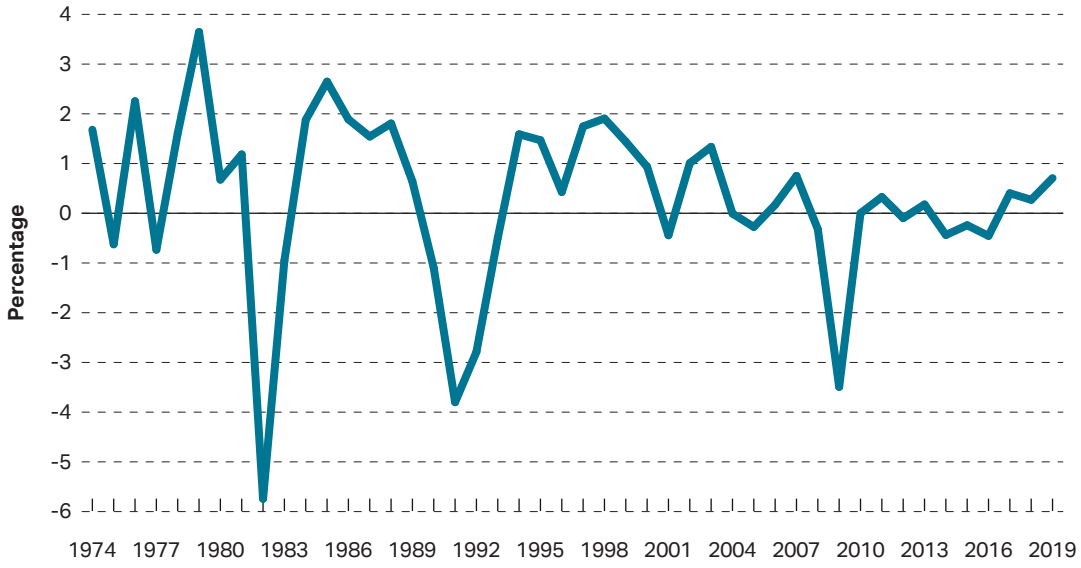
As in many other countries, in Canada the private sector is the principal engine of job creation. During the period under investigation (1973–2019), this sector's contributions to employment evolved, and it accounted for about 80% of total employment in the country. **Figure 1a** shows the private-sector employment rate in the country. While it saw a significant increase before 2000, it has been showing a relatively downward trend since 2008. As **Figure 1b** also shows, the growth rate of private employment exhibited a lot of variation during the period under study. Note in particular the substantial decrease in the growth of the private employment rate during the known recession years of 1982, 1993, and 2009.

Figure 1a: Private-sector employment rate (%) in Canada, 1973–2019



Source: Author's computation based on data from Statistics Canada as indicated in Appendix 1.

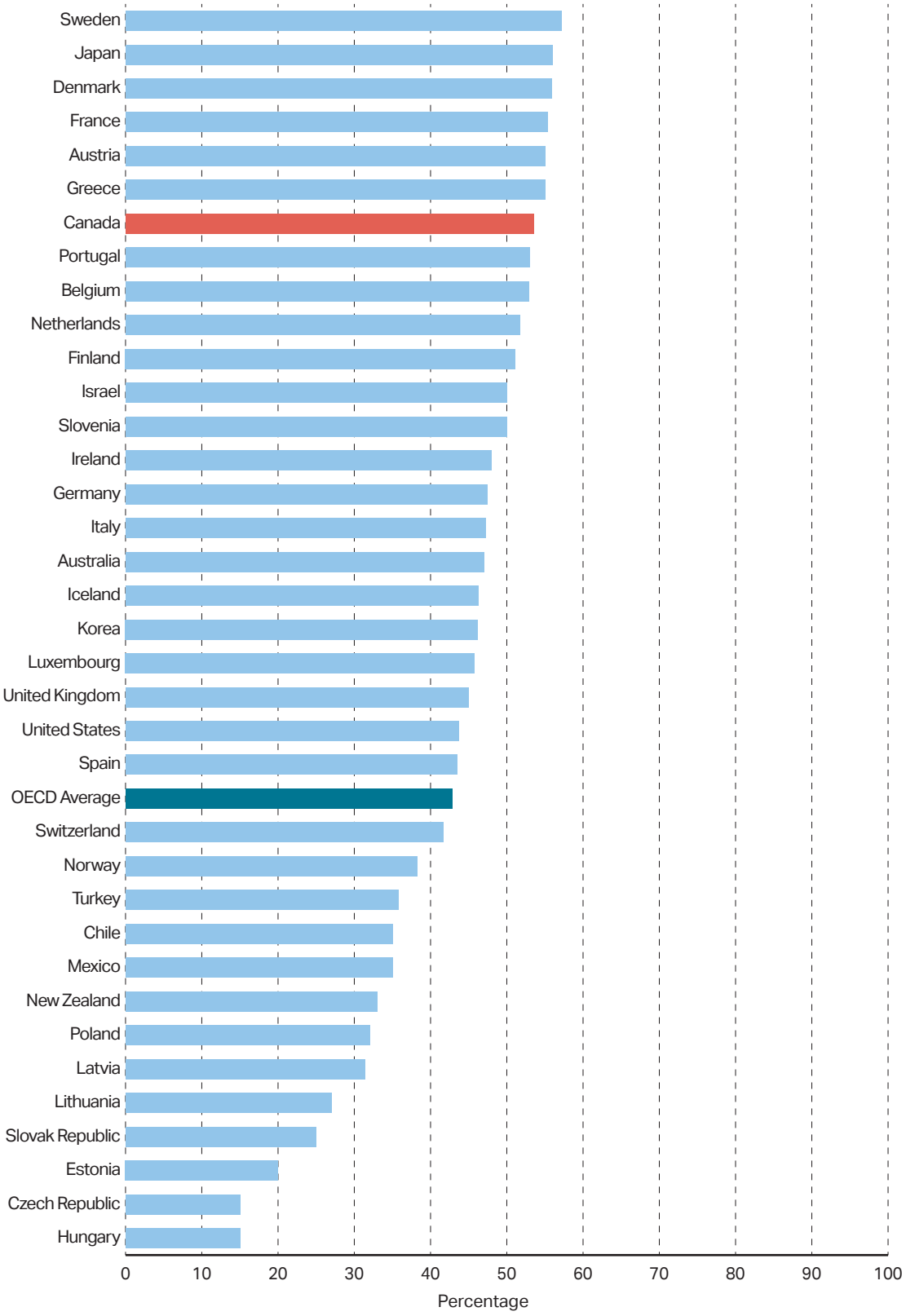
Figure 1b: Growth rate (%) of private-sector employment rate in Canada, 1974-2019



Source: Author's computation based on data from Statistics Canada as indicated in Appendix 1.

As the OECD discusses (2011), tax rates and tax policy can influence private-sector employment in a country adversely. However, the Canadian federal government raised the top marginal PIT rate from 29% to 33% in 2016 to raise revenue. Consequently, as shown in **figure 2**, in 2019, the last year covered by our investigation, Canada's federal and provincial combined top PIT rate of about 53.5% was the seventh highest among

Figure 2: Top marginal personal income tax rate (%) in OECD countries, 2019

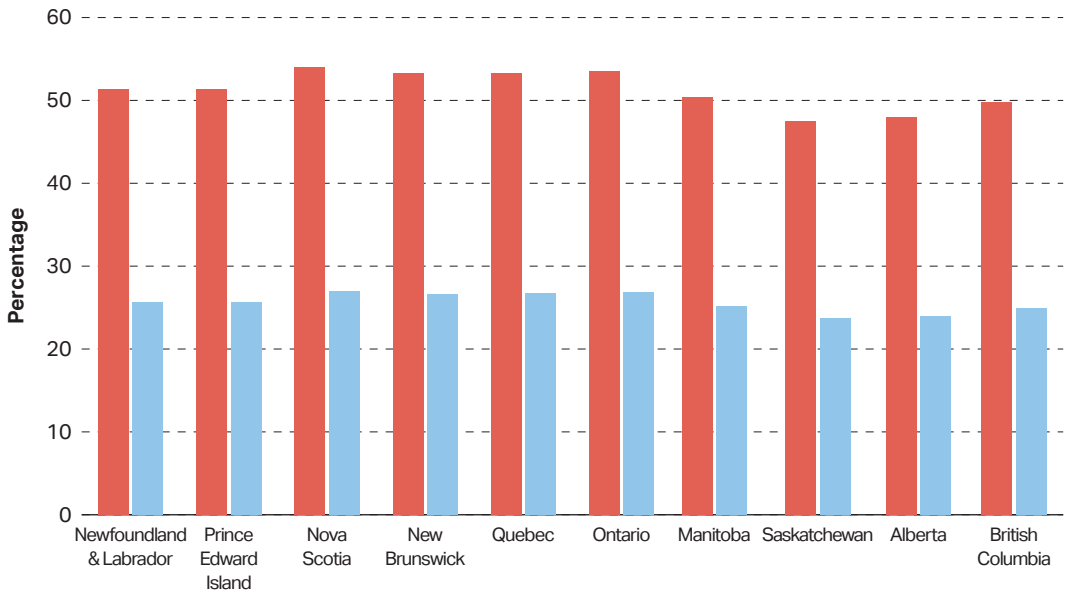


Source: OECD, *OECD.Stat*, <https://stats.oecd.org/Index.aspx?DataSetCode=TABLE_II1>.

the 36 OECD countries.[3] In the same year, the United States' top income-tax rate was 43.7%, and the OECD average was about 42.8%. This suggests that Canada's income-tax system is less competitive than those of other OECD countries.

In Canada, half of capital gains are subject to the personal income-tax rate. Thus, the higher federal PIT rate also means higher capital gains taxes. The top federal capital-gains tax rate was 16.5% in 2019. As a result of variations in provincial PIT rates, the combined federal and provincial income and capital gains taxes one faces vary from province to province. **Figure 3** shows that the top federal and provincial combined marginal PIT rate ranges from 47.5% in Saskatchewan to 54% in Nova Scotia. Similarly, in 2019, the top capital gains tax rate ranges from 23.7% in Saskatchewan to 26.8% in Ontario.

Figure 3: Combined top marginal PIT and capital gains tax rates (%) across the Canadian provinces, 2019



Source: Author's computation based on data obtained from *Finances of the Nation*.

There are many theoretical and empirical studies showing that capital is highly mobile across borders. If capital moves from a high-tax jurisdiction to a low-tax jurisdiction, the change in businesses' location has important implications for job creation by the private sector. The corporate income-tax rate is also an essential factor. Countries often attempt to lower the corporate income-tax rate to attract businesses to their jurisdiction

3. Note that the combined top PIT rate that the OECD shows for Canada is only a representative, that of Ontario, rather than the rate in every province. Actually, the combined top PIT rate ranges from 47.5% for Saskatchewan to 54% for Nova Scotia.

but Canada's corporate income-tax rate is less competitive compared to that of many other members of the OECD (**figure 4**). Canada's combined federal and provincial corporate income-tax rate of 26.62% in 2019 was higher than the 25.89% of the United States and the corresponding OECD average CIT rate of 23.47%.[4]

The discussion above shows that Canada's personal income-tax system is less competitive than its corporate income-tax system compared to the PIT and CIT systems in the United States, our prominent neighbour and trading partner, and other OECD countries. As Chen and Mintz (2010) and others have explained, the federal government's previous significant reduction of the CIT rate from 21.8% in 2007 to 15% in 2012 improved Canada's standing in the OECD. Contrary to this attempt to improve the country's tax competitiveness, the federal government has since hiked the statutory marginal top PIT rate from 29% to 33% in 2016 to raise more revenue. A number of previous empirical studies show that such an increase in the tax rate has adverse effects on economic activities and harms the private sector's job creation capacities. In the following section, we specify the empirical model that we use to investigate whether cuts to the income-tax rate will boost private employment in Canada.

3.3 Specification

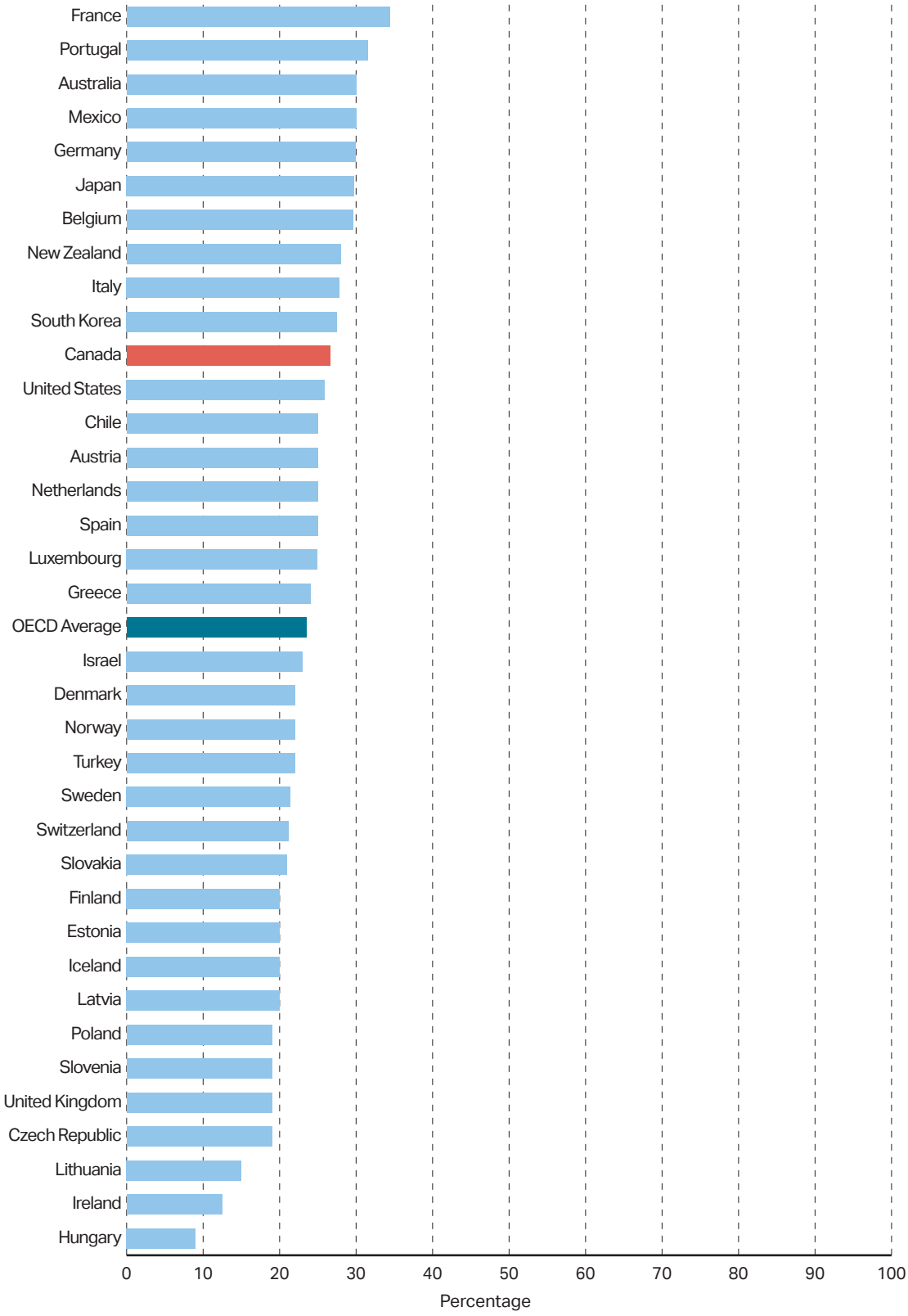
Based on the theoretical underpinning discussed in section 3.1, we specify the following reduced-form employment equation following the approaches of previous researchers such as Dalenberg and Patridge (1995), Mark, McGuire, and Papke (2000), Chodorow-Reich, Feiveson, Liscow, and Woolston (2012), and others. The model is specified as:

$$\Delta ln\, E_t = \beta_0 + \beta_1 \Delta PIT_{t-1} + \beta_2 \Delta CGI_{t-1} + \beta_3 \Delta DTC_{t-1} + \beta_4 \Delta CIT_{t-1} + other\ variables + u_t \quad (1)$$

where Δ denotes change, $ln\, E_t$ is the logarithm of the private sector employment rate (E_t) in year t, PIT_{t-1} denotes the federal top marginal personal income-tax rate of the year $t-1$ (including any applicable surtaxes), CGI_{t-1} stands for the capital gains inclusion rate, DTC refers to the dividend tax credit, the CIT_{t-1} denotes the general corporate income-tax rate of the federal government, and u_t is the error term. We follow Statistics Canada's definition and define the private-sector employment rate as the number of persons employed in the private sector expressed as the fraction of the population 15 years of age and over.

4. The 26.62% that was chosen by the OECD as representative of Canada reflects only the rates of the two largest provinces, Quebec and Ontario. The actual rate ranges widely in 2019 from roughly 26% in Alberta to as high as 31% in Prince Edward Island and Nova Scotia.

Figure 4: Top corporate income tax rate (%) in OECD countries, 2019



Source: OECD, *OECD.Stat*, <https://stats.oecd.org/Index.aspx?DataSetCode=TABLE_II1>.

As it is known, the Canadian personal income-tax (PIT) system is progressive and different statutory income tax rates apply to the different income-tax brackets. Thus, the choice of the personal income-tax rate is challenging in empirical studies. Following earlier authors such as Feld and Kirchgässner (2002), Lee and Gordon (2005), and Ferede (2013, 2019b), among others, we use the statutory top marginal PIT rate in our analysis. We use statutory rather than effective tax rates as the latter often vary over time even if there is no change in tax policy because of how they are constructed. Further, previous empirical studies (such as Mertens and Olea, 2018) also show that most of the economic responses are the result of marginal income tax rates rather than average tax rates.

As discussed previously, an increase in the top marginal statutory PIT rate can affect employment through two channels: entrepreneurship and labour supply. A higher PIT rate discourages risk-taking by entrepreneurs as a significant part of their financial gains will be taxed away if they become successful. This discourages entrepreneurship, which reduces the private sector's capacity to create jobs in an economy for many reasons (OECD, 2011). Similarly, we expect a higher income-tax rate to reduce the after-tax wage rate of workers, which negatively affects the labour supply and the employment rate. In addition, to assess the effect of capital gains tax on private employment, we include the capital gains inclusion rate and the dividend tax credit for eligible corporations as additional explanatory variables. An increase in capital gains inclusion rate implies that a higher share of capital gains is subject to the income-tax system. We expect an increase in the inclusion rate to have adverse effects on private employment. Furthermore, the Canadian income-tax system uses dividend tax credit to enhance the integration of the personal and corporate income-tax systems. As discussed in Smart (2017), individuals who earn dividends from eligible corporations obtain dividend tax credit, recognizing that the corporation's profit (and the dividend) is already taxed at the corporate level. We expect the higher the dividend tax credit, the more incentive individuals have to earn income from corporations and this will raise the employment rate. Thus, we expect the coefficient of *DTC* to be positive.

As we discussed before, the CIT rate can indirectly affect the employment level in an economy through its effects on private investment. An increase in the CIT rate reduces private investment, and this decreases labour productivity. This, in turn, affects the wage rate and the labour supply adversely. Further, the increase in CIT increases the cost of capital, and this causes a decline in output and labour demand. As a result, we expect the CIT rate to have a negative relationship with private employment.

Our dependent variable is the change in the logarithm of the employment rate, and it represents the annual growth rate of the private employment rate. Following Mark, McGuire, and Papke (2000), Barro and Redlick (2011), and others, we use one-period lagged values of the tax rates as explanatory variables to account for the possible lag effects of tax rates. Such a specification also has the additional benefit of minimizing the empirical problem associated with the potential endogeneity of tax rates. As discussed in Barro and Redlick (2011), lagged tax-rate changes are predetermined and can be treated as exogenous. Thus, our key identifying assumption is that one-period lagged changes in the tax rates are predetermined with respect to current employment growth. Regarding the functional form of the empirical model, we choose to employ the semi-log specification as it is quite commonly used in the empirical literature. The functional form assumes that the elasticity of employment with respect to the tax rate is a linear function of the tax rate. See, for instance, Burman and Randolph (1994). In our sensitivity analysis, we also experiment with a log-log specification that implicitly assumes an approximately constant elasticity of employment with respect to the tax rate.

In the empirical analysis, the main variables of interest are the PIT rate, the capital gains inclusion rate, the dividend tax credit, and the CIT rate. Thus, in equation 1 above, our key coefficients are β_1, β_4, β_3, and β_4. As argued before, with the exception of β_3, based on previous theoretical and empirical evidence, we expect these coefficients to be negative. On the other hand, for the reasons explained above, we expect β_3 to be positive. Note that according to the above specification, β_1 shows the percentage change in next year's private employment rate if the top PIT rate is changed by one percentage point. We also include other control variables, which are often deemed as important determinants of employment growth.[5]

The employment rate tends to fluctuate with the ups and downs in economic activity. In the literature, the business cycle is commonly measured by the output gap, which measures the difference between an economy's actual output and its potential output. We measure the business cycle by the cyclical component of Canadian real GDP.[6] Since

5. One can argue that many variables that are not included in our model may affect private employment. It is known that including all of the many possible determinants of employment that the literature identifies is not feasible. However, as long as the omitted variables are orthogonal to the lagged tax-rate changes, given the other control variables, our estimation results will not be affected by omitted variable bias.

6. We use the recent time-series filter method of Christiano and Fitzgerald (2003), which is known to be more powerful than other time-series filter techniques.

the employment rate tends to go down during downturns and go up during economic recoveries, we expect our measure of the business cycle to have positive effects on the employment rate.

In addition to income tax rates, employees' and employers' social contribution payments can affect both labour supply and labour demand, ultimately influencing the employment rate. Thus, we include the payroll tax rate as an additional control variable. The payroll tax rate is the sum of the Canada Pension Plan (CPP) contributions and Employment Insurance (EI) premiums of both employees and employers. Generally, we expect a higher payroll tax paid by employers to raise the cost of hiring and reduce labour demand. Similarly, increases in the employees' social contribution tend to reduce the after-tax wage payment, and this reduces the incentive to work. These two effects imply that payroll taxes tend to affect the employment rate adversely.

Although our primary focus is on federal taxes and their effects on private employment creation, it is known that provincial governments also levy similar personal and corporate income taxes. Thus, we control for the effects of provincial tax policies by including the weighted average provincial top marginal income-tax rate and provincial general corporate income-tax rate. We use the provincial taxable income as a weight for computing the average provincial top PIT rate. Similarly, we weight the provincial CIT rate using the corporations' profits of the provinces. We expect these provincial tax rates to have negative effects on private employment.

Finally, we account for the effect of the cost of capital on employment by controlling for the real interest rate in our analysis. The higher cost of capital discourages private investment, and this causes a reduction in the private employment rate. Thus, we expect the coefficient of the interest rate to be negative. **Table 1** shows a summary of basic statistics for our variables of interest.

Table 1: Summary statistics, 1973–2019

Variable	Mean	Std. Dev.	Min	Max
The growth rate of Private employment rate	0.003	0.017	−0.057	0.036
The growth rate of Total employment rate	0.002	0.014	−0.050	0.023
Private employment rate	0.470	0.022	0.423	0.503
Total employment rate	0.595	0.018	0.555	0.626
Federal top marginal PIT rate	0.337	0.059	0.290	0.470
Federal CIT rate	0.275	0.083	0.150	0.390
Federal top capital gains tax rate	0.189	0.038	0.145	0.239
Capital gains inclusion rate	0.564	0.106	0.500	0.750
Dividend tax credit	0.170	0.040	0.133	0.250
Budget deficit (per capita in $2002)	766.9	830	−679.5	2,395
Total payroll tax rate	0.115	0.029	0.060	0.149
Provincial CIT rate	0.122	0.007	0.106	0.135
Provincial PIT rate	0.189	0.016	0.168	0.222

Source: Authors' calculations based on data sources shown in Appendix 1.

4. Empirical Results and Discussions

4.1 Empirical results

This section reports and discusses the empirical results. The estimated empirical results are presented in **table 2** below. Note that the estimation period covers the period from 1973 to 2019. However, the number of observations is reduced to 45 because of differencing and using the lagged differenced values of the tax rates. As indicated before, while the dependent variable is the change in the logarithm of the private employment rate, we use one-period lagged changes of the fiscal variables as controls.[7] However, a contemporaneous measure of the business cycle is used to capture the fluctuations in the private-employment rate associated with the business cycle. Note also that we use heteroscedasticity and autocorrelation robust standard errors in all our regressions. Our discussion of the results focuses on the effects of the key variables of interest, that is, the federal PIT rate, the federal capital gains tax rate, the dividend tax credit, and the federal CIT rate. Due to our semi-log specification, the coefficients of these variables show the semi-elasticity of the private employment rate with respect to the tax rates. Thus, the estimated coefficients imply the percentage change in private employment associated with a one percentage-point change in the tax rates. Note also that in all our regressions, we include the real per-capita budget deficit of the federal government as an explanatory variable. Thus, one can interpret the coefficient estimates of the tax rates as the effect of revenue-neutral tax-rate changes on the employment rate.

We begin in **column (1)** by estimating the private employment rate on the key tax variables using the Ordinary Least Squares (OLS) estimation method. The results indicate that while the coefficients of the federal PIT rate and the capital gains inclusion rate are negative and statistically significant, the other explanatory variables are insignificant. The federal PIT rate coefficient is negative and statistically significant at the 5% level, suggesting that a higher PIT rate has adverse effects on job creation in the private sector. The coefficient estimate implies that a one percentage-point reduction in the federal top PIT rate is associated with about a 0.132% rise in the private employment rate in the country. Furthermore, as indicated previously, an increase in the capital gains inclusion rate implies that a higher share of capital gains is subject to the income-tax system. Our result in column (1) shows that the coefficient of the capital gains inclusion

7. Empirical estimation using first differences of the variables is necessitated to avoid spurious regression as all the variables are non-stationary or I(1) in levels. The variables are stationary in first differences.

Table 2: The effects of federal income tax on employment, 1973–2019

	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV	(6) IV
Federal PIT rate	−0.132**	−0.097**	−0.071**	−0.211***	−0.343***	−0.249***
	(0.054)	(0.049)	(0.034)	(0.057)	(0.053)	(0.072)
Capital gains inclusion rate	−0.048***	−0.039**	−0.038***	−0.063***	−0.083***	−0.053***
	(0.019)	(0.016)	(0.011)	(0.020)	(0.017)	(0.011)
Dividend tax credit	0.132	0.075	0.051	0.177**	0.234***	0.257**
	(0.103)	(0.090)	(0.082)	(0.078)	(0.084)	(0.109)
Federal CIT rate	0.131	0.058	0.092	−0.254*	−0.338*	−0.148*
	(0.090)	(0.074)	(0.077)	(0.152)	(0.182)	(0.077)
Federal budget deficit	−0.000***	−0.000	−0.000	−0.000	−0.000**	−0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Business cycle		0.664***	0.629***	0.649***	0.573***	0.592***
		(0.196)	(0.177)	(0.179)	(0.179)	(0.115)
Payroll taxes			−0.644**	−0.474*	−0.479**	−0.808***
			(0.312)	(0.276)	(0.230)	(0.270)
Provincial CIT rate					0.852**	1.403***
					(0.378)	(0.187)
Provincial PIT rate					0.018	−0.175***
					(0.116)	(0.061)
Interest rate						−0.253***
						(0.048)
Constant	0.003***	0.003**	0.004**	0.002	0.001	0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Over-id test (p-value)				0.561	0.990	0.467
Observations	45	44	44	44	44	44
R-squared	0.060	0.284	0.311	0.252	0.226	0.443

Notes: The dependent variable is the change in the log of the private employment rate. All the variables enter in the regressions as one-period lagged changes. In columns 4 to 6, the federal PIT rate and CIT rate are treated as endogenous. The instruments used are one- and two-period lagged values of US PIT rate and US CIT rate, as well as the federal governing party dummy interacted with the two-period moving average growth rate of the federal government debt-to-GDP ratio. Heteroscedasticity and autocorrelation robust standard errors in parentheses. Significance levels are shown by * for 10%, ** for 5%, and *** for 1%.

rate is, as expected, negative and statistically significant, suggesting the adverse effects of capital gains tax on employment. The estimated coefficients show that a one percentage-point reduction in the capital gains inclusion rate is associated with a 0.048% reduction in the private employment rate. The coefficient of the budget deficit is also negative and statistically significant, suggesting the adverse effects of the budget deficit on private-sector job creation. Note that the results of the column also show that, contrary to our expectation, the coefficient of the CIT rate is positive, although it is statistically insignificant. We suspect this unexpected result may be due to the potential endogeneity of the CIT rate. The coefficient of the dividend tax credit is positive as expected, but it is also statistically insignificant.

It is known that employment and economic activities are very related in any country. During economic downturns, economies shed many jobs, and the employment rate falls with the economy. The opposite happens during economic expansions. Consequently, in **column (2)**, we re-estimate the model by accounting for the effects of the business cycle on employment. We measure the business cycle by the CF-filtered series of real GDP. The coefficient of the business cycle is, as expected, positive and statistically significant. The results indicate that the business cycle has a positive effect on employment rate. More importantly, the coefficients of the federal PIT rate and the capital gains inclusion rate continue to be negative and statistically significant.

In addition to the personal and corporate income-tax systems, the federal government relies on social contributions from both employees and employers as an important revenue source. Thus, we include the payroll tax rate as an additional control variable in **column (3)**. As expected, the coefficient of the payroll tax rate is negative and statistically significant. As before, the coefficients of the PIT rate and the capital gains inclusion rate continue to be negative and statistically significant, suggesting the robust adverse effects of these taxes on private employment. The coefficient of the business cycle continues to have a statistically significant positive impact on employment.

So far, our analysis relies on the OLS estimation method, assuming that all the relevant explanatory variables of interest are exogenous. However, one may find such an assumption unrealistic and may consider the tax rates as endogenous. Governments may initiate changes in tax policy in response to economic situations. For instance, during economic downturns and periods of significant job losses, governments may reduce the tax rates to stimulate the economy. If this is the case, then the tax rates may be endogenous in the employment regressions. Although our use of one-period lagged values of the explanatory variables can partly mitigate the potential problem of

endogeneity associated with the key variables of interest, one may be concerned that there may still be some lingering endogeneity problems in the empirical model. To address this concern, in columns (4), (5), and (6), we treat the federal PIT and CIT rates as endogenous and use the two-stage least squares instrumental-variable (IV) estimation method. A common challenge in empirical studies based upon aggregate data that rely on IV estimation methods is finding appropriate instruments that are related to the endogenous explanatory variables, but which are orthogonal to the dependent variable. Because the United States is our immediate neighbour and main trading partner, US tax rates often influence tax policy and tax policy discussions in Canada. Thus, in our analysis, we use the US CIT rate, the US PIT rate, and the party dummy interacted with the two-period moving average growth rate of the federal debt-to-GDP ratio as instruments. See Lee and Gordon (2005) and others for a similar use of such instruments. The party dummy is equal to one if the governing federal government is Liberal and zero otherwise. More specifically, we use one-period lagged values of the US CIT rate as an instrument for the federal CIT rate. We also use one- and two-period lagged values of the top PIT rate of the United States as instruments for the federal PIT rate. We also include the federal governing party dummy interacted with the two-period moving average growth rate of the federal debt-to-GDP ratio as an additional instrument for the tax rates. Various statistical tests confirm the appropriateness of these instruments. More specifically, since the empirical model is overidentified, we report the Hansen J statistic for overidentification. The null hypothesis of this test statistic is that the instruments are valid.

Column (4) reports the IV estimation results of our empirical model. The coefficients of all our key variables of interest are now statistically significant with their respective expected signs. The PIT rate and the capital gains inclusion rate continue to be negative and statistically significant, suggesting the robust adverse effects of these taxes on employment. In absolute value, the coefficient estimates are now higher. Note also that once the endogeneity of the federal CIT rate is addressed, the coefficient of the variable becomes negative and statistically significant. Thus, this implies that, like the top PIT and capital gains tax rates, the CIT rate also has adverse effects on private-sector employment creation. This is consistent with the results of previous studies, like that of Ljungqvist and Smolyansky (2014). However, the coefficient of payroll taxes remains positive but statistically insignificant.

In **column (5)**, we account for the effects of relevant provincial governments' tax policies on employment. More specifically, we include the weighted-average provincial top PIT and CIT rates as additional control variables. For the provincial PIT and CIT rates,

the weights are based on provincial taxable income and corporate profits, respectively. Contrary to our expectations, the coefficients of the provincial PIT rate and CIT rate are positive, but the former is statistically insignificant. More interestingly, column (5) shows that the coefficients of our key variables of interest continue to be negative and statistically significant. The numerical magnitudes of the coefficient estimates are also now higher in absolute value once we control for provincial tax rates. This shows the robust adverse effects of the federal top PIT rate and capital gains tax rate. Note also that the coefficient of CIT is negative, and it is statistically significant at the 10% level.

Finally, in **column (6)**, we include the real interest rate as an additional control variable to capture the potential effects of the cost of capital on employment. As column (6) contains all the relevant explanatory variables, it shows our primary empirical model, and we focus our discussions on the results of this column. All our key variables of interest have the expected signs and are statistically significant. More importantly, the coefficient of the federal PIT rate is −0.249, and it is statistically significant at the 1% level. The results suggest that a one percentage-point cut in the federal top PIT rate leads to an increase in the private employment rate of about 0.25% in the year following the cut in the tax rate. Further, according to the empirical results, a one percentage-point reduction of the federal capital gains inclusion rate and CIT rate are associated with an increase in the private employment rate of about 0.053% and 0.155%, respectively, in the year following the rate cuts. The payroll tax rate and the real interest rate, as expected, also have statistically significant adverse effects on employment. On the other hand, consistent with our expectation, the dividend tax credit and the business cycle have statistically significant effects on the private employment rate. The overidentification test statistic confirms the appropriateness of the instruments as we do not reject the null hypothesis of the validity of the instruments.

What are the policy implications of our key results reported in column (6)? Chen and Mintz (2010) argue that, as a result of the previous federal government's CIT rate reductions, Canada's business tax structure showed a significant improvement in tax competitiveness. However, Canada continues to have one of the highest marginal top PIT rates among OECD countries. So, if Canada wants to improve its overall tax competitiveness and encourage private-sector job creation, reducing the top PIT rate looks very attractive. Our result suggests that, if the federal government cuts the top marginal PIT rate from the current 33% to 29% (the rate prevailing before the 2016 tax-rate increase), the private employment rate will increase by about 1%. This seemingly small rise in the employment rate corresponds to an increase in private-sector jobs of roughly 110,000

in the year following the tax cut.[8] Note that since we control the capital gains inclusion rate, this estimate also accounts for the corresponding effects associated with the reduction in capital gains tax rate.[9] Thus, an important policy implication of our results is that, if the Canadian federal government wishes to encourage private-sector job creation and reduce the economic cost of the top marginal PIT rate that is also associated with higher capital gains tax, cutting the top marginal PIT rate looks very attractive. Such a policy change will also significantly improve the overall tax competitiveness of Canada. Obviously, there may be a short-term revenue loss associated with such a policy. However, previous empirical analyses, such as Ferede, 2019, suggest that the revenue loss is relatively minimal once the positive behavioural responses of taxpayers associated with the tax cut are taken into consideration. This suggests that reducing the top marginal PIT rate that applies to individual income and half of the capital gains have the potential to improve the economic conditions of Canada and create more jobs for Canadians.

How do our results compare with those of similar earlier studies? Direct comparison with estimates of previous studies is often difficult because of variations in empirical specifications and methodologies. Further, to the best of our knowledge, there is no comparable previous Canadian study on the issue. However, our results are broadly consistent with the findings of earlier studies. A study by Feld and Kirchgässner (2002) for Swiss cantons obtained estimates of employment elasticity with respect to the top marginal PIT rate and CIT rate that are roughly the same as what we find in this paper.[10] However, they used total employment rather than private-sector employment as a dependent variable.

4.2 Sensitivity analysis

In this section, we conduct a sensitivity analysis to check the robustness of our key findings. We assess our results' sensitivity to the use of alternative estimation methods, specifications, tax measures, and dependent variables. The results are shown in **table 3**. Note that the robustness checks are conducted based on our main regression estimate

8. During the period under investigation (1973–2019), the average private-sector employment level was 11.1 million. Thus, given the level of the population, the job gains associated with the 4 percentage-points cut in the PIT rate = −4 * (−0.249/100) * 11.1 millions =110 thousand.

9. Given the capital gains inclusion rate, a reduction of the federal top PIT rate from 33% to 29% also means that the capital gains tax rate for those individuals in the top income tax bracket falls from 16.5% to 14.5%.

10. Using the period average federal top PIT rate of 33.7%, our semi-elasticity estimate of −0.249 corresponds to an employment elasticity (with respect to the federal PIT rate) of about −0.084. This is well within the range of comparable elasticity estimates of those by Feld and Kirchgassner (2002).

Table 3: Robustness checks for employment equations, 1973–2019

	(1) LIML	(2) GMM	(3) Log-log	(4) Linear	(5) Using total employment	(6) Federal-provincial combined rates	(7) Control for demographics
Federal PIT rate	−0.269***	−0.250***	−0.161***	−0.121***	−0.160**	−0.121**	−0.164**
	(0.078)	(0.074)	(0.022)	(0.033)	(0.073)	(0.059)	(0.067)
Capital gains inclusion rate	−0.055***	−0.052***	−0.036***	−0.026***	−0.049***	−0.041**	−0.031**
	(0.011)	(0.011)	(0.009)	(0.005)	(0.009)	(0.020)	(0.013)
Dividend tax credit	0.268**	0.254**	0.053**	0.117**	0.193***	0.214*	0.150
	(0.110)	(0.102)	(0.024)	(0.048)	(0.049)	(0.120)	(0.095)
Federal CIT rate	−0.164*	−0.153*	−0.079	−0.063*	−0.193***	−0.240	−0.044
	(0.084)	(0.078)	(0.049)	(0.035)	(0.069)	(0.189)	(0.083)
Population 15 to 64 years of age							1.352***
							(0.453)
Overid-test (p-value)	0.444	0.423	0.693	0.437	0.269	0.458	0.450
Observations	44	44	44	44	44	43	44
R-squared	0.434	0.441	0.231	0.437	0.445	0.362	0.513

Notes: Heteroscedasticity and autocorrelation robust standard errors in parentheses. Significance levels are shown by * for 10%, ** for 5%, and *** for 1%. In column 5, the dependent variable is the change in the log of total employment rate. In all regressions, we use instruments similar to table 2, but in column 6, we include two- and three-period lagged values of provincial primary budget deficit-to-GDP ratio as additional instruments.

shown in column (6) of table 2. We report only the coefficient estimates of our key variables of interest. The coefficient estimates of the other control variables are not reported in table 3 for the sake of brevity.

Our primary empirical analysis is based on the two-stage least squares (2SLS) instrumental-variable (IV) estimation method that uses various variables as instruments for our key variables of interest. However, a number of previous studies indicate that, if the instruments are weakly related to the endogenous variables, 2SLS may provide a biased estimate. Thus, if one is concerned with the potential problem of weak instruments, the Least Information Maximum Likelihood (LIML) estimation is better and commonly used, as such an approach is not affected by the presence of weak

instruments. Consequently, in **column (1)** of table 3, we estimate our empirical model using the LIML method. While 2SLS and LIML are asymptotic equivalents, the latter generally has better small-sample properties and is less affected by the presence of weak instruments in the model. We also use the General Method of Moments (GMM) estimation method in **column (2)** as a robustness check to see if the coefficient estimates are sensitive to the use of this efficient estimation method. The results show that our key tax-rate variables continue to have adverse effects on employment. The magnitudes of the coefficient estimates are also comparable to those of our main result in table 2. This provides us with an assurance that our key findings are not driven by the use of weak instruments.

As indicated before, the main empirical model of this paper relies on a semi-log specification. In such a specification, the elasticity of employment with respect to the tax rates are not constant, and they vary with the tax rates. We believe such an approach captures the reality better. However, other studies such as that by Feld and Kirchgässner (2002) use log-log specifications where both the dependent variable and the explanatory variables are in their logarithmic form. In the log-log specification, the coefficient estimates represent elasticities, and they are assumed to be constant. To compare our results with those of previous studies that use log-log specification and check the robustness of our results, we use log-log specification in **column (3)**. We also use a linear model (where both the dependent and independent variables are in their linear forms) in **column (4)**. In both cases, the coefficients of the tax rates continue to be negative and statistically significant, suggesting the robustness of our results to the use of various alternative specifications. Note also the magnitude of the elasticity estimates shown in column (3) are comparable to those of Feld and Kirchgässner (2002) for Swiss Cantons.

We also check the sensitivity of our results to the use of an alternative dependent variable in **column (5)**. That is, we use the total employment rate instead of the private employment rate. The coefficients of the tax rates are again consistently negative and statistically significant. This suggests that our main result is robust to the use of different measures of employment. Compared to the main result of column (6) of table 2, the coefficient estimates for the PIT rate and the capital gains inclusion rate are lower. This is expected because the total employment rate includes public-sector employment, which is less likely to be adversely affected by the federal tax rates.

So far, our empirical analysis treats the federal and provincial tax rates separately. This is justified as the main objective and scope of the current project is to assess the impact of the federal tax rates rather than provincial rates on employment. However, we

include the provincial personal and corporate income-tax rates in order to circumvent the potential for omitted variable bias. One may be concerned with this approach and wish to see the impact of the combined federal and provincial tax rates as key variables of interest. Note that combining the provincial and the federal tax rates implicitly assumes that the provincial and federal tax rates have the same effects on private-sector employment. One may find such an implicit assumption unrealistic because, while changes to the provincial tax rate can cause interprovincial mobility, changes to the federal tax rate do not. Nonetheless, as a further check on the robustness of our key finding to such an approach, in column (6), we use the federal and provincial combined PIT and CIT rates. The results show that all our key variables, with the exception of the CIT rate, have the expected signs and are statistically significant, suggesting the robustness of our key results.

Finally, in column (7), we include the share of the working-age population (those between 15 and 65 years of age) as an additional control variable to account for the possible demographic effects on the employment rate. The coefficient of this newly introduced explanatory variable is positive and statistically significant, suggesting that an increase in the working-age population raises the employment rate. More importantly, the coefficients of our key variables of the top PIT rate and capital inclusion rate continue to be negative and statistically significant. However, the coefficients of the federal CIT rate and the dividend tax credit are statistically insignificant, although they still have their respective expected signs.

In sum, the various robustness checks above confirm that income-tax rates have adverse effects on employment. The finding that a reduction in the top PIT rate, which also reduces the capital gains tax, boosts private-sector employment is robust to various sensitivity checks. The results are also consistent with the findings of previous empirical studies, and they provide empirical support for reductions in the PIT rate in the country. Thus, if the Canadian federal government wishes to encourage job creation and improve the country's employment level, cutting the top PIT rate looks like a worthy policy choice.

5. Conclusions

The unprecedented job losses caused by COVID-19 and the question of whether and when Canada will recover these jobs is an important issue that policy makers and analysts have been wondering about lately. While the Canadian federal government is currently attempting to boost employment through additional investment in infrastructure, it ignores the use of potent tax-policy tools to encourage job creation. Among OECD countries, although Canada is currently relatively competitive in corporate taxation, it is less competitive in its personal income-tax system. In fact, Canada's statutory top marginal PIT rate, which also applies to half of capital gains, is at present the seventh highest in OECD and also higher than that of the United States. Although, on average, about 80% of all the jobs in Canada are created by the private sector, the sector faces various tax burdens that raise the cost of hiring and ultimately affect the level of employment adversely. A number of previous theoretical and empirical studies also show that cutting the top income-tax rate can have positive effects on employment. However, there is a paucity of empirical evidence on this vital issue in the Canadian context.

This study's main objective is to investigate the effect of income taxes on employment using aggregate Canadian data over the period from 1973 to 2019. We find that the federal top marginal personal income, capital gains, and corporate income-tax rates have adverse effects on private-sector employment. The empirical findings are also robust to various sensitivity checks. The results suggest that a one percentage-point cut in the federal top PIT rate leads to an increase in the employment rate by about 0.25% in the year following the tax rate cut. If the federal government cuts the top statutory marginal PIT rate from the current 33% to 29%, about 110 thousand jobs will be created by the private sector in the year following the tax cut. Thus, an important policy implication of this paper is that, if the Canadian federal government wishes to encourage job creation and reduce the economic cost of the top marginal PIT rate that is also associated with higher capital gains tax, cutting the top marginal PIT rate is a crucial and valuable policy choice to consider. Such a policy change will also have an additional advantage of significantly improving Canada's overall tax competitiveness in relation to other OECD countries.

Appendix 1. Definitions of Variables; Data Sources

Variable	Definition	Sources
Employment	Private employment	Statistics Canada, *Historical Statistics of Canada (1972–1975)*; table 14-10-0027-01 (1976–2019)
Adult population	Population 15 years of age and over	Statistics Canada, table 17-10-0005-01
Population	Total population	Statistics Canada, table 17-10-0005-01
Top PIT rate	Federal government's statutory top marginal PIT rate	*Finances of the Nation* <https://financesofthenation.ca/statutory-tax-rates/>
CIT rate	Federal government's statutory general CIT rate	*Finances of the Nation* <https://financesofthenation.ca/statutory-tax-rates/>
Provincial top PIT rate	Provincial governments' statutory top marginal PIT rate	*Finances of the Nation* <https://financesofthenation.ca/statutory-tax-rates/>
Provincial CIT rate	Provincial governments' statutory general CIT rate	*Finances of the Nation* <https://financesofthenation.ca/statutory-tax-rates/>
Debt-to-GDP ratio	Federal government's debt-to-GDP ratio	*Finances of the Nation* <https://financesofthenation.ca/statutory-tax-rates/>
Payroll taxes	Employment Insurance premiums; Canada Pension Plan contributions (employees and employers)	Canada Revenue Agency
Unemployment rate	Canada's aggregate unemployment rate	Statistics Canada, table 14-10-0023-01
Corporate income-tax revenue	Federal government's CIT revenue	Government of Canada, *Fiscal Reference Table 2020*
Personal income-tax revenue	Federal government's PIT revenue	Government of Canada, *Fiscal Reference Table 2020*
Federal transfers expenditure	Federal government's	Government of Canada, *Fiscal Reference Table 2020*
Corporations' profit	Corporations profit before tax or net operating surplus	Statistics Canada, table 36-10-0324-01; table 36-10-0221-01
CPI	Consumer Price Index	Statistics Canada, table 18-10-0005-01

Appendix 2. Federal, Provincial and Combined Tax Rates, 1973–2019

	Federal PIT rate	Provincial PIT rate	Combined PIT rate	Federal CIT rate	Provincial CIT rate	Combined CIT rate
1973	0.470	0.165	0.635	0.390	0.118	0.508
1974	0.470	0.166	0.636	0.380	0.118	0.498
1975	0.470	0.166	0.636	0.370	0.119	0.489
1976	0.470	0.165	0.635	0.360	0.122	0.482
1977	0.430	0.202	0.632	0.360	0.123	0.483
1978	0.430	0.213	0.643	0.360	0.127	0.487
1979	0.430	0.210	0.640	0.360	0.130	0.490
1980	0.430	0.209	0.639	0.378	0.128	0.506
1981	0.430	0.214	0.644	0.378	0.127	0.505
1982	0.340	0.189	0.529	0.378	0.114	0.492
1983	0.340	0.193	0.533	0.369	0.114	0.483
1984	0.340	0.197	0.537	0.360	0.117	0.477
1985	0.357	0.192	0.549	0.369	0.106	0.475
1986	0.379	0.185	0.564	0.378	0.112	0.490
1987	0.350	0.191	0.541	0.366	0.118	0.484
1988	0.299	0.173	0.472	0.330	0.118	0.448
1989	0.306	0.170	0.476	0.288	0.119	0.407
1990	0.313	0.171	0.485	0.288	0.113	0.401
1991	0.319	0.175	0.494	0.288	0.112	0.400
1992	0.318	0.181	0.498	0.288	0.121	0.409
1993	0.313	0.201	0.515	0.288	0.128	0.417
1994	0.313	0.210	0.523	0.288	0.134	0.422
1995	0.313	0.209	0.522	0.291	0.133	0.425
1996	0.313	0.208	0.521	0.291	0.134	0.426

	Federal PIT rate	Provincial PIT rate	Combined PIT rate	Federal CIT rate	Provincial CIT rate	Combined CIT rate
1997	0.313	0.202	0.515	0.291	0.135	0.426
1998	0.313	0.195	0.508	0.291	0.133	0.424
1999	0.309	0.188	0.496	0.291	0.133	0.424
2000	0.305	0.181	0.485	0.291	0.134	0.425
2001	0.290	0.170	0.460	0.281	0.127	0.408
2002	0.290	0.166	0.456	0.260	0.125	0.385
2003	0.290	0.166	0.456	0.239	0.124	0.363
2004	0.290	0.166	0.456	0.218	0.128	0.346
2005	0.290	0.165	0.455	0.218	0.125	0.344
2006	0.290	0.164	0.454	0.218	0.125	0.343
2007	0.290	0.164	0.454	0.218	0.120	0.339
2008	0.290	0.163	0.453	0.195	0.119	0.314
2009	0.290	0.163	0.453	0.190	0.124	0.314
2010	0.290	0.163	0.453	0.180	0.119	0.299
2011	0.290	0.163	0.453	0.165	0.114	0.279
2012	0.290	0.168	0.458	0.150	0.113	0.263
2013	0.290	0.178	0.468	0.150	0.113	0.263
2014	0.290	0.181	0.471	0.150	0.113	0.263
2015	0.290	0.184	0.474	0.150	0.117	0.267
2016	0.330	0.186	0.516	0.150	0.118	0.268
2017	0.330	0.186	0.516	0.150	0.118	0.268
2018	0.330	0.187	0.517	0.150	0.119	0.269
2019	0.330	0.187	0.517	0.150	0.117	0.267

Note: The provincial PIT rate is the weighted average (weighted by the taxable income of provinces) top PIT rate of the 10 provinces. The Quebec federal abatement is taken into account in the computation. Similarly, the provincial CIT rate is the weighted average (weighted by the corporate profit of provinces).

References

Burman, L.E., and W.C. Randolph (1994). Measuring Permanent Responses to Capital-Gains Tax Changes in Panel Data. *American Economic Review* 84, 4: 794–809.

Card, D., J. Kluve, and A. Weber (2018). What Works? A Meta-Analysis of Recent Active Labor Market Program Evaluations. *Journal of the European Economic Association* 16, 3: 894–931.

Carlton, D.W. (1983). The Location and Employment Choices of New Firms: An Econometric Model with Discrete and Continuous Endogenous Variables. *Review of Economics and Statistics* 65: 440–449.

Carroll, R., D. Holtz-Eakin, M. Rinder, and H.S. Rosen (2000). Income Taxes and Entrepreneurs' Use of Labor. *Journal of Labour Economics* 18, 2: 324–351.

Chen, D., and J. Mintz (2010). *Canada's Tax Competitiveness after a Decade of Tax Reforms: Still an Unfinished Plan*. SPP Briefing Papers 3, 5 (May). <https://www.policyschool.ca/wp-content/uploads/2016/03/taxcorp.pdf>, as of March 30, 2021.

Chen, D., S. Qi, and D. Schlagenhauf (2018). Corporate Income Tax, Legal Form of Organization, and Employment. *American Economic Journal: Macroeconomics* 10, 4: 270–304.

Chodorow-Reich, G., L. Feiveson, Z. Liscow, and W. Woolston (2012). Does State Fiscal Relief During Recessions Increase Employment? Evidence from the American Recovery and Reinvestment Act. *American Economic Journal: Economic Policy* 4, 3: 118–145.

Christiano, L. J., and T. J. Fitzgerald (2003). The Band Pass Filter. *International Economic Review* 44: 435–465.

Clemens, J., C. Lammam, and M. Lo (2014). The Economic Costs of Capital Gains Taxes in Canada. In C. Lammam and J. Clemens, eds., *Capital Gains Tax Reform in Canada: Lessons from Abroad* (Fraser Institute): 17–46. <https://www.fraserinstitute.org/research/capital-gains-tax-reform-canada-lessons-abroad>, as of 30 March, 2021.

Connolly, Amanda (2020). Trudean pledges $10B he says will creat 60K jobs in infrastructure, clean tech. *Global News* (October 1). <https://globalnews.ca/news/7370804/justin-trudeau-billions-infrastructure-bank-climate-change/amp/>, as of March 31, 2021.

Dalenberg, D. R., and M. Partridge (1995). The Effects of Taxes, Expenditures, and Public Infrastructure on Metropolitan Employment. *Journal of Regional Economics* 35: 617–640.

Davis, S., and M. Henrekson (2004). *Tax Effects on Work Activity, Industry Mix and Shadow Economy Size: Evidence from Rich-Country Comparisons*. NBER Working Paper No. 10509. National Bureau of Economic Research.

Djankov, S., T. Ganser, C. McLiesh, R. Ramalho, and A. Sheleifer (2010). The Effect of Corporate Taxes on Investment and Entrepreneurship. *American Economic Journal: Macroeconomics* 2, 3: 31–64.

Ebrahimi, P., and F. Vaillancourt (2016). *The Effect of Corporate Income and Payroll Taxes on the Wages of Canadian Workers*. <https://www.fraserinstitute.org/studies/the-effect-of-corporate-income-and-payroll-taxes-on-the-wages-of-canadian-workers>, as of March 31, 2021.

Fairlie, R.W., and J. Miranda (2017). Taking the Leap: The Determinants of Entrepreneurs Hiring Their First Employee. *Journal of Economics & Management Strategy* 26, 1: 3–34.

Faulk, D. (2002). Do State Economic Development Incentives Create Jobs? An Analysis of State Employment Tax Credits. *National Tax Journal* 55, 2: 263–280.

Feld, L.P., and G. Kirchgassner, (2002). The Impact of Corporate and Personal Income Taxes on the Location of Firms and on Employment: Some Panel Evidence for the Swiss Cantons. *Journal of Public Economics* 87: 129–155.

Ferede, E. (2019a). *The Revenue Effects of Tax Rate Increases on High-Income Earners*. <https://www.fraserinstitute.org/sites/default/files/revenue-effects-of-tax-rate-increases-on-high-income-earners.pdf>, as of March 31, 2021.

Ferede, E. (2019b). Entrepreneurship and Personal Income Tax: Evidence from Canadian Provinces. *Small Business Economics*. <https://doi.org/10.1007/s11187-019-00226-w>, as of March 31, 2021.

Ferede, E. (2013). Income Tax Progressivity and Self-employment: Evidence from Canadian Provinces. *Small Business Economics* 40, 1: 141–153.

Ferede, E., and B. Dahlby (2012). The Impacts of Tax Cuts on Economic Growth: Evidence from Canadian Provinces. *National Tax Journal* 65: 563–594.

Gentry, W.M. (2010). Capital Gains Taxation and Entrepreneurship. Mimeo. Economic Department, Williams College.

Gentry, W. M., and R.G. Hubbard (2000). Tax Policy and Entrepreneurial Entry. *American Economic Review* 90: 283–287.

Harberger, Arnold C. (1962). The Incidence of the Corporation Income Tax. *Journal of Political Economy* 70, 3: 215–240.

Hassett, Kevin A., and Aparna Mathur (2015). A Spatial Model of Corporate Tax Incidence. *Applied Economics* 47, 13: 1350–1365.

Hill, Tegan, Nathaniel Li, and Milagros Palacios (2020). *Canada's Rising Personal Tax Rates and Falling Tax Competitiveness, 2020*. <https://www.fraserinstitute.org/studies/canadas-rising-personal-tax-rates-and-falling-tax-competitiveness-2020>, as of March 31, 2021.

Houndonougbo, A. and M. Murray (2017). Millionaires or Job Creators: What Really Happens to Employment Growth When You Stick It to the Rich? *Public Finance Review* 47, 1: 112–141.

Jiwattanakulpaisarn, P., R.B. Noland, D.J. Graham, and J.W. Polak (2009). Highway Infrastructure Investment and County Employment Growth: Dynamic Panel Regression Analysis. *Journal of Regional Science* 49, 3: 263–286.

Lee, Y. and R. H. Gordon (2005). Tax Structure and Economic Growth. *Journal of Public Economics* 89, 5-6: 1027–1043.

Ljungqvist, Alexander, and Michael Smolyansky (2014). *To Cut or Not to Cut? On the Impact of Corporate Taxes on Employment and Income*. NBER Working Paper No. 20753. National Bureau of Economic Research. <https://www.nber.org/papers/w20753>, as of March 31. 2021.

Mark, S., T. McGuire, and L. Papke (2000). The Influence of Taxes on Employment and Population Growth: Evidence from the Washington, D.C. Metropolitan Area. *National Tax Journal* 53, 1: 105–123.

McKenzie, Kenneth J., and Ergete Ferede (2017). *The Incidence of the Corporate Income Tax on Wages: Evidence from Canadian Provinces*. SPP Technical Paper 10, 7 (April). <https://policyschool.ca/wp-content/uploads/2017/04/Incidence-CIT-on-Wages-McKenzie-Ferede.pdf>, as of March 31, 2021.

Mertens, K. and J. L. Olea (2018). Marginal Tax Rates and Income: New Time Series Evidence. *Quarterly Journal of Economics* 133, 4: 1803–1884. <https://doi.org/10.1093/qje/qjy008>, as of March 31, 2021.

Mertens, K. and M.O. Ravn (2013). The Dynamic Effects of Personal and Corporate Income Tax Changes in the United States. *American Economic Review* 103, 4: 1212–1247.

Milligan, K., and M. Smart (2015). Taxation and Top Incomes in Canada. *Canadian Journal of Economics* 48, 2: 655–681.

Moretti, E. and D. Wilson, D. (2017). The Effect of State Taxes on the Geographical Location of Top Earners: Evidence from Star Scientists. *American Economic Review* 107, 7: 1858–1903.

Organisation for Economic Co-operation and Development [OECD] (2011). *Taxation and Employment*. OECD Tax Policy Studies, No. 21. <https://doi.org/10.1787/9789264120808-en>, as of March 31, 2021.

Poterba, James (1989). Capital Gains Tax Policy toward Entrepreneurship. *National Tax Journal* 42: 375–389.

Saez, E., J. Slemrod, and S.H. Giertz (2012). The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review. *Journal of Economic Literature* 50, 1: 3–50.

Siegloch, S. (2014). Employment Effects of Local Business Taxes. Proceedings. Annual Conference on Taxation and Minutes of the Annual Meeting of the National Tax Association 107: 1–31.

Smart, M. (2017). Taxation of Dividend Income in Canada. *Canadian Tax Journal* 65, 2: 419–433.

Wasylenko, M., and T.A. McGuire (1985). Jobs and Taxes: The Effect of Business Climate on States' Employment Growth Rates. *National Tax Journal* 38: 497–512.

Zidar, O. (2019). Tax Cuts for Whom? Heterogeneous Effects of Income Tax Changes on Growth and Employment. *Journal of Political Economy* 127, 3: 1437–1472.

About the Author

Ergete Ferede

Ergete Ferede is Professor of Economics at MacEwan University in Edmonton, where he has held an academic appointment since 2006. He received his Ph.D. in economics from the University of Alberta. He has previously taught at Addis Ababa University (Ethiopia), University of Alberta, and University of Windsor. Dr. Ferede has been actively engaged in research on taxation policy and intergovernmental grants. He also conducts research on the efficiency costs of taxes, the effects of taxes on various economic activities, corporate income-tax policy, and tax reform. His research has been published in the *National Tax Journal*, *International Tax and Public Finance*, *Small Business Economics*, and *Public Finance Review*.

Acknowledgments

The author wishes to thank Jake Fuss and the anonymous reviewers for their comments, suggestions, and insights. Any remaining errors or oversights are the sole responsibility of the author. As the researcher has worked independently, the views and conclusions expressed in this study do not necessarily reflect those of the Board of Directors of the Fraser Institute, the staff, or supporters.

Publishing Information

Distribution

These publications are available from <http://www.fraserinstitute.org> in Portable Document Format (PDF) and can be read with Adobe Acrobat® or Adobe Reader®, versions 7 or later. Adobe Reader® DC, the most recent version, is available free of charge from Adobe Systems Inc. at <http://get.adobe.com/reader/>.

Ordering publications

To order printed publications from the Fraser Institute, please contact us via e-mail: sales@fraserinstitute.org; telephone: 604.688.0221, ext. 580 or, toll free, 1.800.665.3558, ext. 580.

Media

For media enquiries, please contact our communications department via e-mail: communications@fraserinstitute.org; telephone: 604.714.4582.

Date of issue

2021

ISBN

978-0-88975-647-2

Citation

Ergete Ferede (2021). *Will Cutting Income Tax Rates Create Jobs for Canadians?* Fraser Institute.

Supporting the Fraser Institute

To learn how to support the Fraser Institute, please contact us via post: Development Department, Fraser Institute, Fourth Floor, 1770 Burrard Street, Vancouver, British Columbia, V6J 3G7, Canada; telephone: toll-free to 1.800.665.3558, ext. 548; e-mail: development@fraserinstitute.org; or visit our web page: <http://www.fraserinstitute.org/support-us/overview.aspx>.

Purpose, Funding, and Independence

The Fraser Institute provides a useful public service. We report objective information about the economic and social effects of current public policies, and we offer evidence-based research and education about policy options that can improve the quality of life.

The Institute is a non-profit organization. Our activities are funded by charitable donations, unrestricted grants, ticket sales, and sponsorships from events, the licensing of products for public distribution, and the sale of publications.

All research is subject to rigorous review by external experts, and is conducted and published separately from the Institute's Board of Trustees and its donors.

The opinions expressed by authors are their own, and do not necessarily reflect those of the Institute, its Board of Directors, its donors and supporters, or its staff. This publication in no way implies that the Fraser Institute, its directors, or staff are in favour of, or oppose the passage of, any bill; or that they support or oppose any particular political party or candidate.

As a healthy part of public discussion among fellow citizens who desire to improve the lives of people through better public policy, the Institute welcomes evidence-focused scrutiny of the research we publish, including verification of data sources, replication of analytical methods, and intelligent debate about the practical effects of policy recommendations.

About the Fraser Institute

Our mission is to improve the quality of life for Canadians, their families and future generations by studying, measuring and broadly communicating the effects of government policies, entrepreneurship and choice on their well-being.

Notre mission consiste à améliorer la qualité de vie des Canadiens et des générations à venir en étudiant, en mesurant et en diffusant les effets des politiques gouvernementales, de l'entrepreneuriat et des choix sur leur bien-être.

Peer review—validating the accuracy of our research

The Fraser Institute maintains a rigorous peer review process for its research. New research, major research projects, and substantively modified research conducted by the Fraser Institute are reviewed by experts with a recognized expertise in the topic area being addressed. Whenever possible, external review is a blind process. Updates to previously reviewed research or new editions of previously reviewed research are not reviewed unless the update includes substantive or material changes in the methodology.

The review process is overseen by the directors of the Institute's research departments who are responsible for ensuring all research published by the Institute passes through the appropriate peer review. If a dispute about the recommendations of the reviewers should arise during the Institute's peer review process, the Institute has an Editorial Advisory Board, a panel of scholars from Canada, the United States, and Europe to whom it can turn for help in resolving the dispute.

Editorial Advisory Board