UNIVERSITY OF CALGARY

THE SCHOOL OF PUBLIC POLICY
SPP Research Papers

Volume 9 • Issue 37 • November 2016

2015 TAX-COMPETITIVENESS REPORT: CANADA IS LOSING ITS ATTRACTIVENESS[†]

Philip Bazel and Jack Mintz[*]

SUMMARY

It can be easy for Canadians who appreciate the qualities of their country to overestimate the power that it also has to lure investment in a world where so many other destinations are competing for capital. Canadians can take pride in our political stability and our highly educated workforce, and we do have good communication and transportation infrastructure, but a great number of other countries offer those things, too, at roughly the same level. Meanwhile, Canada suffers in the eyes of investors for being a relatively small market, distant from large export destinations, with a cold climate and geographic vastness that only raise the cost of doing business here. Canada has been able to overcome its disadvantages in recent years largely by being highly competitive on business taxes. Unfortunately, the tendency of Canadian provincial and federal governments lately to raise taxes on business has been rapidly erasing that slight advantage. Dangerously, Canada is beginning to lose its competitive edge.

It is difficult enough in a world of slower global growth to attract investment, but some major economies with whom Canada directly competes for investment have recognized the need in this challenging environment to make themselves even more attractive to investors. It is true that some countries, such as Belgium, Chile, Brazil, Greece and India have, like Canada, enacted certain policies — primarily higher business taxes — that have increased their marginal effective tax rate (METR). Still, other important peer countries have been working to lower theirs; notably Denmark, Japan, France, Portugal, Switzerland and the U.K. As a result of their cuts, and because of changes to policies in Canada that have increased METRs here, Canada has sunk from having the 16th-highest burden on capital in the OECD (which was at least in the middle of the pack) to having the 13th highest. We now have the sixth-highest rather than lowest METR in the G7.

[†] We would like to acknowledge the work of Duanjie Chen in the development of the international METR model, and thank her for her continued support and advice as we develop the model further. We thank two anonymous referees and the editor, Bev Dahlby, for helpful comments.

[*] Respectively, Research Associate and President's Fellow, The School of Public Policy, University of Calgary.

In a compilation of 92 countries, Canada finds itself in the middle of the pack with the 35th highest tax burden on capital.

The blame for this is shared by provincial and federal governments. In recent years, governments in Newfoundland and Labrador, New Brunswick, Alberta and B.C. have all raised business taxes (Alberta now has a higher corporate income tax than B.C. Ontario or Quebec). Quebec has scaled back incentives for investors, Manitoba increased its sales tax, and B.C. eliminated the harmonized sales tax, reintroducing the burden on business inputs implicit in the provincial retail sales tax.

With the U.S. election of Donald Trump and a Republican Congress promising to reduce corporate income tax rates, as well as the recent affirmation by British Prime Minister Theresa May to lower the U.K. corporate income tax rate to 17 per cent, the pressure will be to reduce, not increase corporate income taxes in the next several years. Should the U.S. dramatically reduce its corporate tax rate, Canada will lose its business tax advantage altogether.

Just as concerning, Canada has created a tax system that discriminates against the service sector, including transportation, communications, construction, trade, and business and financial services, all of which are among the fastest-growing sectors, and play a key role in facilitating innovation, infrastructure and trade. Canada's tax policies continue to favour slower-growing sectors, namely manufacturing and resources.

The good news is that Canada can regain competitiveness without drastic tax reform. It is clear that there needs to be greater neutrality among sectors so that service industries are not discriminated against (the same is true for large businesses versus small businesses). Meanwhile, those provinces that still have a retail sales tax can improve their attractiveness by moving to the HST, as other provinces have. The federal government is also in the midst of reviewing subsidies and other tax expenditures that create an unlevel playing field. However, instead of spending that money as it plans to, it should consider Canada's falling competitiveness and use the revenues to lower the corporate income tax. With the savings, it could afford to cut that tax from 15 to 13 per cent, not only remaining revenue neutral, but likely actually increasing the corporate tax base in the process.

Since the 2008 financial crisis, global annual economic growth has stalled. The global GDP growth of over four per cent seen during the years 2003–07 has declined to a post-2012 average of 2.5 per cent.[1] Along with other industrialized economies, Canada's post-2012 growth has been barely more than two per cent, which is disappointing to say the least and a sharp decline compared with previous years in this century. Job creation and business investment has not been as robust as it was in the previous decade, reflecting the challenging global economic environment.

Despite the past global headwinds, the improvements made to Canada's corporate tax structure between 2000 and 2012 provided support for better investment performance.[2] Canada moved from having the second-highest tax burden on new investment in 2000 to the middle of the pack among industrialized economies by 2012. Growth in real investment in the private sector increased in the post-2000 decade compared to the previous decade.[3] However, this improvement in the business tax structure could not counter the difficult post-2008 global economy, which has translated into poorer private sector investment in Canada and elsewhere.

Since 2012, however, Canada has been losing its international tax attractiveness for business investment. Its effective corporate tax rate on new investment has risen from 17.5 per cent in 2012 to 20.0 per cent in 2015, an increase of 14 per cent over the period due primarily to higher provincial corporate income tax rates; the B.C. government's reversal of its sales tax reform, with its return to the former provincial retail sales tax; and reductions in tax preferences at federal and provincial levels. This is not consistent with global trends. G7, G20 and OECD countries have generally reduced their effective tax rates on investment since 2012, resulting in Canada moving up from 16th- to 13th-highest tax burden on capital among 33 OECD countries as of 2015. With the 2016 budget's changes, the picture has not improved as Canada's effective tax rate has jumped up slightly to 20.1 per cent.

This higher tax on capital investment in Canada since 2012 translates into a loss in private investment by 0.9 percentage points, or $6.5 billion.[4] Capital investment is important for a nation's labour productivity as it provides the means and technology for the workforce to produce more goods and services.

Some other industrialized countries, concerned over growth, are using the business tax structure to improve economic performance. G7 countries like the United Kingdom and Italy have made significant changes to their corporate taxes to lower tax burdens on capital since 2014[5]. Not only is our corporate tax regime looking less favourable, but other

---

1 The World Bank website, "GDP growth (annual %)," http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG.

2 As documented in earlier global tax-competitiveness reports and discussed below, tax reforms introduced by federal and provincial governments have improved investment performance, after taking into account other factors that influence investment. Obviously, the financial crisis and more recent decline in commodity prices have hurt demand for investment in Canada and elsewhere.

3 D. Chen and J. Mintz, "The 2012 Global Tax Competitiveness Ranking: A Canadian Good News Story," University of Calgary School of Public Policy Research Paper 5, 28 (2012).

4 This calculation is based on private sector investment (Statistics Canada, CANSIM Table 029-0048 2012-2015) and an elasticity of capital investment to the cost of capital equal to 0.7.

5 To counter the economic uncertainty created by its referendum supporting Brexit, the United Kingdom announced that it would reduce its corporate income tax rate to 15 per cent. Currently it is 20 per cent, and there was already a plan to lower the rate to 17 per cent by 2019. Prime Minister May recently reaffirmed adopting the 17 per cent rate.

impediments to investment, including hikes to personal income, sales and excise tax and regulatory holdups, are hurting Canada's image as an attractive place to do business.

With the U.S. election of Donald Trump and a Republican Congress promising to reduce corporate income tax rates as well as the recent affirmation by the Prime Minister May to lower the U.K. corporate income tax rate to 17 percent, the pressure will be to reduce, not increase corporate income taxes in the next several years. This includes Canada.

Given that Canada is a relatively small market, has a cold climate and is distant from large populations, there are fewer economic advantages for businesses to locate here rather than elsewhere. Sure, Canada has a well-educated labour force, political stability and good communication and transportation infrastructure, but these factors, while conducive to investment, are not significantly better than in other major industrialized countries.[6] Public policies that help Canada narrow the competitive gap, such as an attractive tax and regulatory regime, help increase the incentive to invest and create jobs here.

Part of a fair, efficient, and attractive tax regime is neutrality — an even playing field and comparable tax burdens across business activities. Tax systems that favour one type of investment over another through accelerated depreciation, tax credits, exemptions and other preferences can undermine growth by shifting capital from high-profit to low-profit economic opportunities. Canada has a business tax structure that discriminates against the service sectors, including transportation, communications, construction, trade and other business services, which are fast-growing sectors. Indeed, as we show below, other countries, including the United States, have a more even-handed approach when dealing with varied major business activities.

The federal government is wisely reviewing tax expenditures in Canada, which could result in it reducing distortions by achieving a more level playing field among business activities. While the Liberals indicated during the last election campaign that their government would use the revenues from any tax reforms to fund new spending, we believe this would be a critical error. Given that Canada is losing its reputation as an attractive location for business investment, we would argue that revenues from the tax-expenditure exercise should be used to reduce the corporate income tax rate, which would also reduce discrimination against the service sector. Canada has benefited from reductions in the corporate tax rate and the increased neutrality that was achieved through a series of reforms that began in 2000. Our experience suggests the following:[7]

- The reduction in effective tax rates on capital since 2000 has improved capital investment, after taking into account other economic factors that influence investment. Roughly, the effective tax rate on new investment has fallen by one-half, resulting in $80 billion in additional private investment (an increase of 19 per cent).
- Base-broadening since 2000 has shrunk the difference between statutory and effective corporate income taxes paid as a share of profits, thereby leading to a more neutral corporate income tax system.

---

6 In the case of public and private infrastructure, Canada is slipping too. See McKinsey Global Institute, "Bridging Global Infrastructure Gaps" (2016).

7 See D. Chen and J. Mintz, "The 2014 Tax Competitiveness Report: A Proposed Business Tax Reform Agenda," University of Calgary School of Public Policy Research Paper 8, 4 (February 2015).

- The reduction in statutory corporate income tax rates has resulted in little change to corporate income tax revenue as a share of GDP, which was roughly three per cent of GDP, on average, from 2001 to 2015 (in contrast to 2.4 per cent of GDP, which was its average between 1991 and 2000). Base-broadening and internationally competitive tax rates have given companies a strong incentive to keep profits in Canada.

It is appealing in policy terms to continue a path of reducing corporate income tax rates without significantly hurting revenues available to the government to fund public services. Internationally competitive tax rates and neutrality are wise policy objectives for both federal and provincial governments to pursue.

WHAT IS NEW IN THIS REPORT?

Tax competitiveness for capital investment is based on an analytical measure of the *marginal effective tax rate* (METR). The METR is the annualized value of corporate taxes paid as a percentage of the pre-tax profitability of marginal investments. Marginal investments are those that are incremental to the economy: they earn sufficient profit to be taxable, to attract financing from investors and to cover risk. At the margin, businesses invest in capital until the rate of return on capital, net of taxes and risk, is equal to the cost of financing capital (their interest rate). If the rate of return is more (less) than financing costs, firms will invest more (less) in capital. Thus, if a government increases the tax rate, it will result in businesses rejecting marginal projects that would otherwise be profitable if the tax burden were smaller.

Taxes that impinge on capital investment include corporate income taxes (both the tax rate and tax base), sales taxes on capital purchases (such as retail sales taxes), asset-based taxes (capital taxes and property taxes), and transfer taxes on real estate and financial transactions. In our analysis, we have included most taxes; however, we have not integrated municipal property taxes, as they are difficult to measure due to variation in municipal rates and bases and cannot be compiled by industry sector (even for Canada alone).

In our analysis, we use similar capital structures to isolate tax differences among 92 countries. The capital structures, reflecting the distribution of assets among machinery, buildings, inventory and land investments, are based on Canadian data. We include all industries except oil and gas, mining and finance.[8] Economic depreciation rates for assets are also based on Statistics Canada estimates. Bond interest rates reflect differences in inflation rates across countries (following the purchasing-power-parity assumption that implies interest rates rise one point with each one-point increase in inflation). Equity costs are based on a marginal supplier of finance equating the after-tax rates of return on stocks and bonds (the marginal investor is assumed to be a G7 investor holding an international portfolio of bonds and equities).

[8] Much work is needed to analyze taxes in these sectors, so international comparisons have been more limited. For some international comparisons, see J. Mintz, and D. Chen, "Capturing Economic Rents from Resources through Royalties and Taxes," University of Calgary School of Public Policy Research Paper 5, 30 (2012); and D. Crisan and J. Mintz, "Alberta's New Royalty Regime is a Step Towards Competitiveness: A 2016 Update," University of Calgary School of Public Policy Research Paper 9, 35 (October 2016). Mintz and Nikolakakis found that the financial sector is most heavily taxed on investments by provincial capital taxes and non-refundable sales taxes on capital purchases: Jack Mintz and Angelo Nikolakakis, "Tax Policy Options for Promoting Economic Growth and Job Creation by Leveraging a Strong Financial Services Sector" (Toronto: Financial Services Alliance, December 2015).

In this 2015 analysis, we have undertaken several model changes to improve the analysis, thus making our results not strictly comparable to earlier reports. We have updated: tax parameters; G7 personal tax rates on interest, dividends and capital gains; interest rates; and inflation rates. We have also made adjustments to general asset-based taxes such as Japan's tax on fixed assets for each year. The appendix provides a review of the theory and new parameters used in the model.

The largest change is the inclusion of transfer taxes, which are particularly important in some countries like Australia,[9] China, India, Luxembourg, Morocco, Portugal and Thailand. Transfer taxes affect not only investment decisions but also affect the holding period for assets by discouraging firms from substituting new assets for old. These taxes were included only for 2015 and not backdated to 2005.

HOW DID METRS CHANGE IN 2015?

Despite many governments challenged by continuing fiscal deficits and high debt, there has been a slight downtick in the tax burden on capital in 2015, at least on average among industrialized countries. Some countries have reduced business taxes on investment, including Denmark, Estonia, Germany, Italy, Japan, Spain, Switzerland and the United Kingdom. Some others have increased the METR, such as Brazil, Belgium, Canada and Hungary. Many countries have barely changed their business tax regimes; this would include, notably, the United States which has the third-highest tax on capital among the 92 countries measured. Overall, while OECD nations have reduced the tax burden on capital slightly, the average METR increased in other parts of the world.

As shown in Figure 1 and Table 1, the tax burden on new investment in Canada has risen 14 per cent from 17.5 per cent in 2012 to 20 per cent in 2015 (the METR for 2016 is 20.1 per cent as shown later in this report). This can largely be attributed to increases in the corporate income tax rate by governments in New Brunswick, Alberta, and British Columbia, as well as B.C.'s abandonment of the creditable HST and return to the provincial retail sales tax in 2013.

As a result, Canada is ranked less favourably, since most countries have continued to reduce taxes on capital investment since 2012.

Canada now has the sixth-highest METR in the G7, with Italy having the lowest. On average, G7 countries have reduced their METR since 2012 (the simple average falling from 30.3 to 26.8 per cent, while the weighted average has fallen from 33.8 to 31.8 per cent). Both among G20- and OECD-country groupings, Canada has the 13th-highest METR in 2015, compared to its ranking of 16th highest in 2012.

[9] See Jack Mintz, Philip Bazel and Duanjie Chen, "Growing the Australian economy with a competitive company tax" (Minerals Council of Australia, March 2016).

FIGURE 1 **MARGINAL EFFECTIVE TAX RATES BY YEAR FOR CANADA AND COUNTRY GROUPINGS: SIMPLE AVERAGES 2005–15**

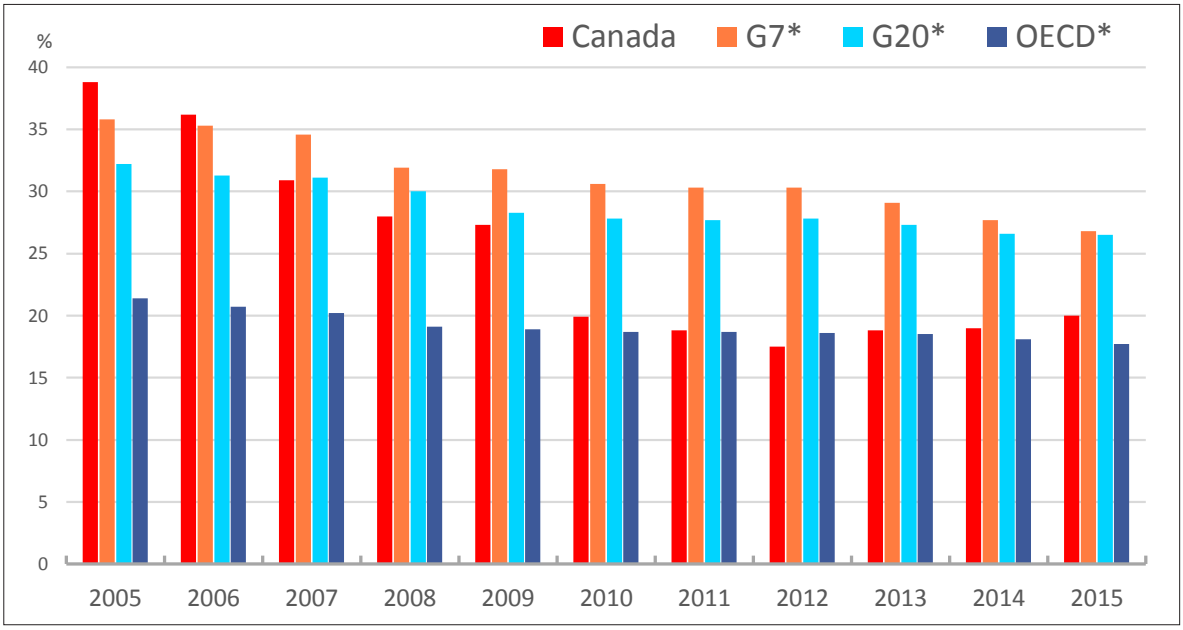


TABLE 1 **SIMPLE AND WEIGHTED METRS**

METR	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Canada	38.8	36.2	30.9	28.0	27.3	19.9	18.8	17.5	18.8	19.0	20.0
G7*	35.8	35.3	34.6	31.9	31.8	30.6	30.3	30.3	29.1	27.7	26.8
G7 w	36.3	36.1	35.9	34.4	34.4	33.9	33.8	33.8	33.1	32.5	31.8
G20*	32.2	31.3	31.1	30.0	28.3	27.8	27.7	27.8	27.3	26.6	26.5
G20 w	36.6	36.3	36.2	35.0	32.6	32.2	32.1	32.2	31.6	31.1	30.8
OECD*	21.4	20.7	20.2	19.1	18.9	18.7	18.7	18.6	18.5	18.1	17.7
OECD w	32.7	32.3	31.9	30.7	30.6	30.3	30.2	30.2	29.6	29.1	28.5

* = Simple average, w= GDP-weighted average.

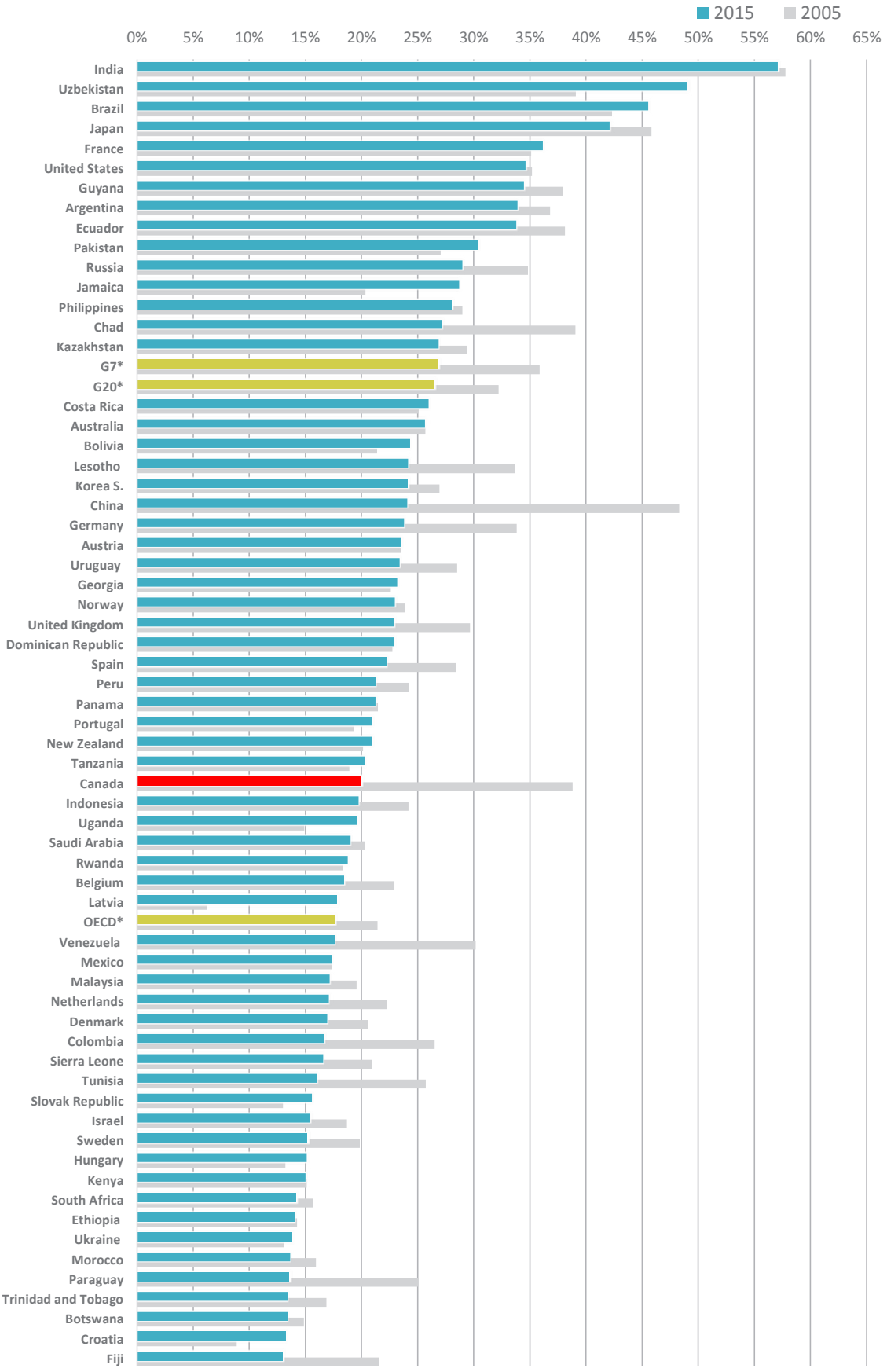
TABLE 2 **CANADA'S RANK AMONG COUNTRY GROUPS FROM HIGHEST TO LOWEST METR**

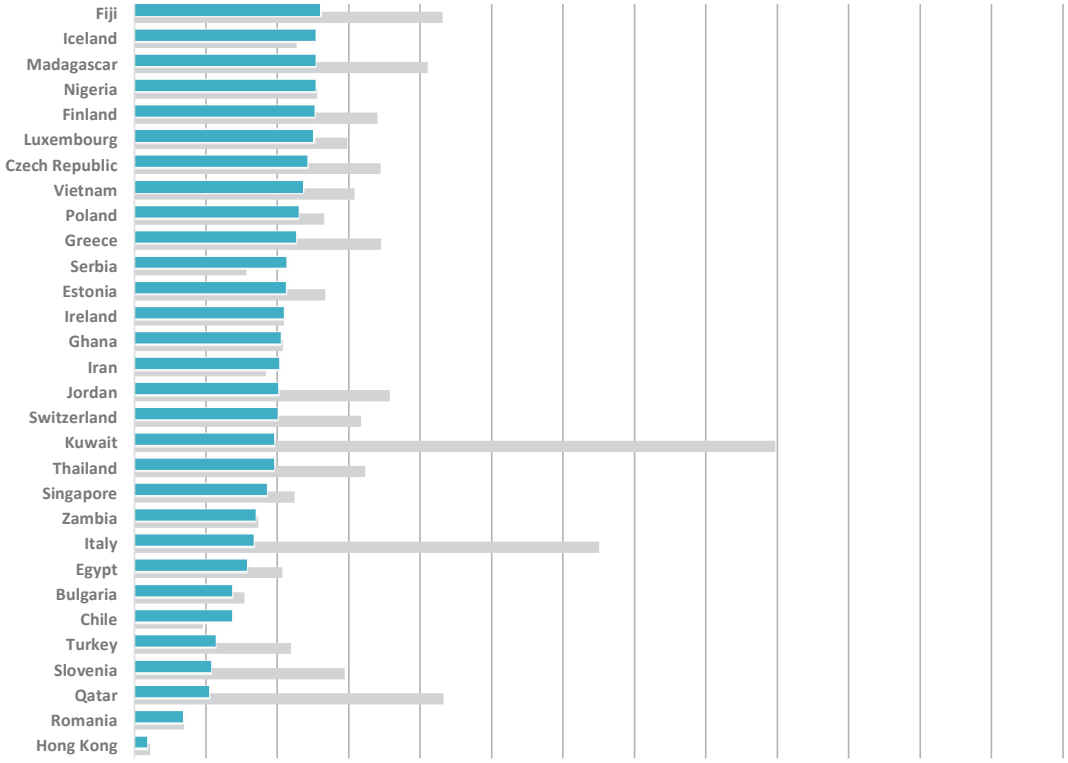
Canada's Rank	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
G7	2	2	6	5	5	7	7	7	7	6	6
G20	5	5	11	10	9	15	16	16	16	15	13
OECD	2	2	6	5	5	13	14	16	14	13	13

Notes: Rank is descending; a higher ranking equates to a higher METR.

Among the 92 countries in this study, Canada has the 35th-highest tax burden on capital in 2015. This is a significant improvement from 2005 when it was eighth highest of 92 countries (India, Japan, China and Kuwait had the highest METRs). As shown in the appendix with year-by-year METRs for the 92 countries, the average METR among our group of 92 countries rose from 18.0 to 18.6 per cent (simple average) from 2014 to 2015. The 2015 METR for our select group of 92 countries, however, is 3.3 percentage points less than it was in 2005.

FIGURE 2 METRS BY COUNTRY: 2015 AND 2005



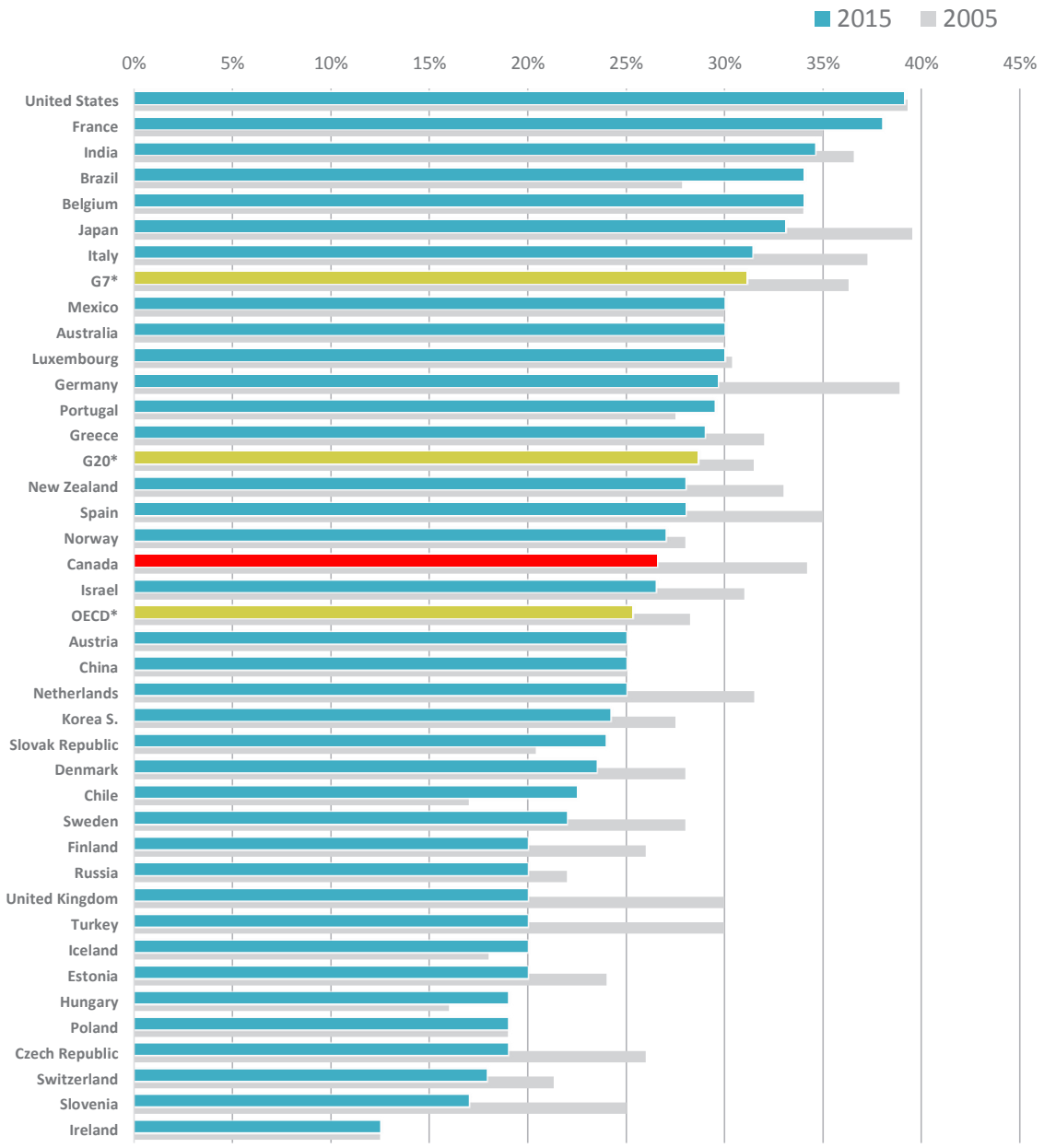


*Simple Average. *Source:* Authors' calculations; primary calculation inputs are provided in the appendix.

ARE COUNTRIES LIKE CANADA LESS INTERESTED IN REDUCING BUSINESS TAX BURDENS?

In the last decade, countries have generally reduced statutory corporate income tax rates in the interest of encouraging capital investment and encouraging companies to keep taxable profits in their jurisdiction. With initiatives to expand the tax base, corporate tax revenues need not fall even though statutory corporate tax rates fell. As seen in Figure 3 (and Table A.1 in the appendix), corporate income tax rates fell in the decade in almost all countries. The general corporate income tax rate fell from 28.6 per cent in 2005 to 25 per cent in 2015 among 92 countries (the OECD average fell from 28.2 to 25.3 per cent in the same period).

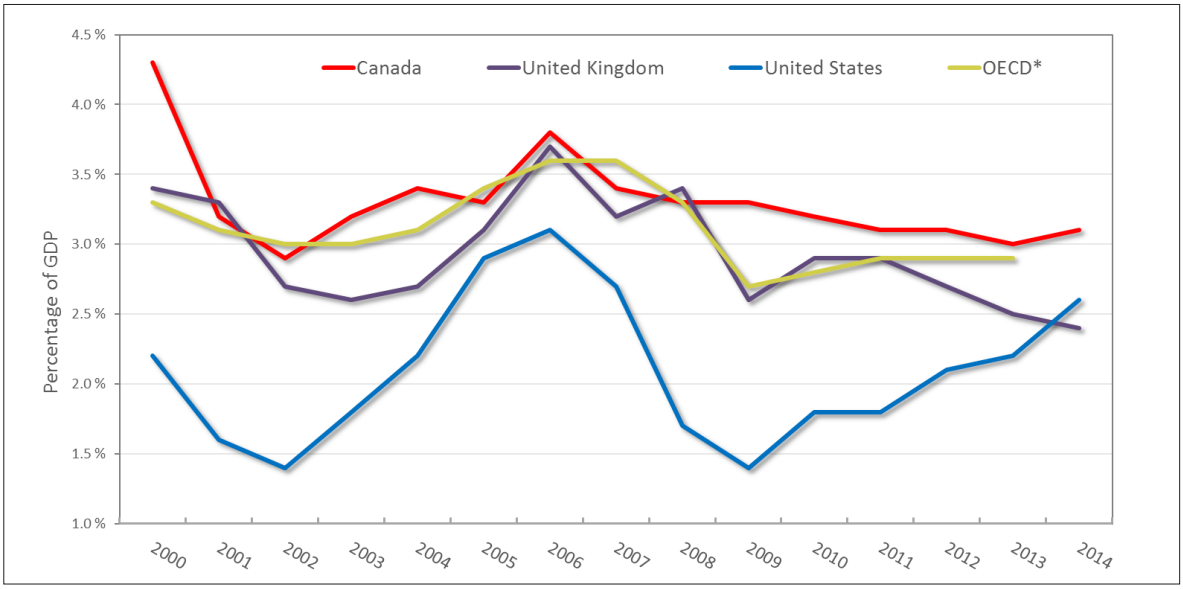
FIGURE 3 EFFECTIVE CORPORATE INCOME TAX RATES FOR OECD COUNTRIES IN 2005 AND 2015



* Simple Average. *Source:* KPMG and authors' estimates, adjusted to reflect the effective rather than simple statutory rate.

Although statutory tax rates have fallen, corporate taxes have risen as a share of GDP among OECD countries, from 2.7 per cent of GDP (1990–2000) to 3.1 per cent (2001–2014). For Canada, corporate income taxes as share of GDP also rose from 2.9 to 3.2 per cent in this period. Despite having a high corporate income tax rate, the United States collects a low amount of corporate income tax revenue as a share of GDP, in part due to various tax incentives and in part due to companies proving less willing to keep their profits in the United States.

FIGURE 4 CORPORATE INCOME TAXES AS A SHARE OF GDP FOR CANADA, THE U.S., THE U.K., AND OECD



*Simple Average

Source: OECD Revenue Statistics.

In 2015, statutory corporate income tax rates among OECD countries slightly decreased from 25.5 to 25.3 per cent (see Table A.1 in the appendix). G7 and G20 average corporate rates also declined (whether measured as simple or GDP-weighted averages). Among the 92 countries, corporate income tax rates have remained stable at 25.0 per cent (using the simple average). Are the rate-cutting days now over?

Certainly governments have become more concerned about tax competition that could hurt revenues, resulting in greater reliance on taxes paid by their own residents. The desire to increase taxes grew as a reaction to reports that companies are not paying sufficient tax in some jurisdictions.[10] The G20 countries in 2013 were provided an action plan to combat base erosion and profit shifting following a request to the OECD.[11] Recommendations, including country-by-country reporting, have been adopted. Further actions will be taken in the future.

Nonetheless, some countries, including Canada, are increasing tax burdens on capital. Those G20 and OECD countries that have significantly increased taxes on capital include:

- **Belgium**: Its METR rose 3.1 percentage points from 15.3 to 18.4 per cent, largely as a result of a reduction in its allowance for equity financing well below a firm's cost of equity financing.
- **Brazil:** Its METR rose 3.8 percentage points to 45.5 per cent, largely due to higher inflation as well as some increases in contribution taxes that increased financial costs.

---

10 See J. Mintz and V. B. Venkatachalam, "The Problem with the Low-Tax Backlash: Rethinking Corporate Tax Policies to Adjust for Uneven Reputational Risks," University of Calgary School of Public Policy Research Paper 8, 24 (2015). This list has included Starbucks, Bank of America, General Electric, Pfizer, Eli Lilly, Oracle, Facebook, Apple, Microsoft, Verizon, and Federal Express (for example: Tom Bergin, "Starbucks to move European base to London, pay more UK tax," Reuters, April 16, 2014, http://uk.reuters.com/article/uk-starbucks-unitedkingdom-idUKBREA3F03820140416). The recent media uproar over the so-called "Panama papers" has also raised public ire over tax evasion and avoidance.

11 See OECD website, "Global Forum on Transparency and Exchange of Information for Tax Purposes," https://www.oecd.org/g20/topics/taxation/.

- **Chile**: Corporate income tax rates were raised by 1.5 percentage points to 22.5 per cent. In **Canada**, corporate income tax rates rose 0.3 points to 26.6 per cent; in **Greece** they rose three points to 29 per cent; and in **India**, corporate income tax rates increased 0.6 points to 34.6 per cent.

Yet, despite the concerns raised about tax competition and base erosion, a majority of governments have avoided increasing or have even reduced corporate income tax rates and taxes on business capital due to concerns about investment and job creation:

- **Denmark** reduced its corporate income tax rate in 2015 by one point to 23.5 per cent, with a further reduction planned in 2016 to 22 per cent. It is also broadening the tax base by tightening provisions related to avoiding withholding taxes paid by non-residents.
- Countries with relatively higher tax burdens on capital have been reducing their corporate income tax rates, including **Japan**, which reduced it by almost four points to 33.1 per cent in 2015. Japan's METR is highest in the G7 at 42.1 per cent due to its fixed-assets tax of 1.7 per cent on real property and 1.4 per cent on depreciable property.
- **Portugal** lowered its corporate income tax rate by two points to 29.5 per cent.
- **France** increased corporate taxes with the introduction of a surtax in 2013 resulting in an overall corporate income tax rate of 38 per cent, fourth highest in the world. The surtax is to be dropped after 2016, resulting in a 3.53-percentage-point reduction in the corporate income tax.
- The **United Kingdom** continues to reduce corporate income tax rates substantially — at 20 per cent in 2015 (compared to 30 per cent in 2007) — while tightening up provisions related to the taxation of international income. It had planned to further reduce the corporate income tax rate to 17 per cent by 2019.
- **Switzerland** reduced its corporate income tax rate from 21.1 to 17.9 per cent in 2015.

Obviously, governments are conflicted over corporate taxation. They wish to protect their tax base to fund public services, but also wish to encourage private investment, which is important to growth. Polices that tighten up the tax treatment of international income provide an opportunity to reduce corporate income tax rates, enabling a country to accomplish both objectives.

MYTHS ABOUT CORPORATE INCOME TAXATION[12]

Corporate taxation is a complex subject and not easily understood by the broad public. Political debate often tends to become simplified, resulting in several myths about what a company tax can achieve.

Myth 1: Corporate taxes are paid by the rich.

While the legal incidence of the corporate tax falls on the corporation, its economic

[12] This section is partly derived from Mintz, Bazel and Chen, "Growing the Australian Economy."

incidence is a much different matter. It is average people who ultimately pay corporate taxes through higher consumer prices, lower wages or returns paid to owners. While the public may believe that taxing corporations improves fairness by making the rich pay more, recent economic analysis confirms that this is not likely the case.[13]

In a small open economy, corporate taxes cannot be easily shifted back to domestic or non-resident owners by reducing returns, since investors shift funds to other opportunities in international markets where returns are higher. The corporate tax is recovered by raising prices on consumers or by reducing wage payments to labour, including layoffs, or rents paid to landowners.

The world is much more complicated than suggested by the assumption of a "small open economy," resulting in some corporate tax being shifted onto the owner. Studies have shown that investors have a "home bias" to invest in domestic securities, resulting from institutional or informational barriers to trade. Smaller corporations have little or no access to international markets so that home bias is most important in these cases. Further, when corporate taxes are increased, they can impact on the old capital values leading to windfall losses to owners (and vice versa for corporate tax reductions). However, the windfall loss (gain) will be blunted by profits being shifted to (from) other jurisdictions in response.

Estimates of the incidence of company taxes in recent studies suggest the following:

- Arnold Harberger shows that labour bears almost 96 per cent of the burden of corporate tax.[14] In a similar vein, Randolph shows that labour bears 70 per cent of the corporate tax with fixed world capital stock.[15]
- Arulampalam et al. estimate that each one-dollar increase in a firm's tax liability leads to a 64-cent reduction in total compensation in the short run, and a 49-cent reduction in the long run.[16]
- Hassett and Mathur find that corporate tax rates affect wage levels across countries with a one-per-cent increase in corporate tax rates leading to nearly a 0.5-per-cent fall in wage rates."[17]
- Liu and Altshuler estimate that a one-dollar increase in corporate tax revenue decreases wages by approximately $0.60.[18]
- Ebrahami and Vaillancourt estimate that a one-point increase in the corporate income tax rate reduces the wage rate by 0.15 to 0.24 per cent.[19] A larger impact was found

---

13 See also B. Dahlby and K. Hassett, "Economic Effects of the Corporate Tax: A Review of the Recent Literature," manuscript (2016).

14 A. C. Harberger, "Corporate Tax Incidence: Reflections on what is Known, Unknown, and Unknowable," in *Fundamental Tax Reform: Issues, Choices and Implications*, ed. John W. Diamond and George R. Zodrow (Cambridge, Mass.: MIT Press, 2006).

15 W. G. Randolph, "International Burdens of the Corporate Income Tax," Congressional Budget Office Working Paper No. 09, (Washington, D.C.: 2006).

16 W. Arulampalam, M. Devereux and G. Maffini, "The Direct Incidence of Corporate Income Tax on Wages," *European Economic Review* 56, 6 (2012): 1038-1054.

17 K. Hassett, and A. Mathur, "A Spatial Model of Corporate Tax Incidence," *Applied Economics* 47, 13 (2006): 1350-1365.

18 L. Liu and R. Altshuler, "Measuring The Burden Of The Corporate Income Tax Under Imperfect Competition," *National Tax Journal* 66, 1 (2013): 215-37.

19 P. Ebrahami and F. Vaillancourt, "The Effect of Corporate Income and Payroll Taxes on the Wages of Canadian Workers" (Vancouver, B.C.: Fraser Institute, 2016).

by Ferede and McKenzie, who estimate that an increase in the corporate tax by one dollar causes wages to fall in Canada by more than one dollar.[20]

- An Australian Treasury paper estimates that two-thirds of the corporate tax falls on workers in the long run.[21]

Thus, a substantial share of the corporate income tax is shifted onto labour through higher consumer prices (thereby reducing the purchasing power of money), wage cuts or layoffs. When this occurs, the effect of the corporate income tax is regressive. To the extent that the corporate tax reduces the return on capital, affected owners consist not just of high-income earners but also workers who own equity through pension plans and other intermediaries. Further, in the case of small companies, a significant share of the corporate tax falls on the owner who derives compensation both as a return on capital and as reward for entrepreneurial effort.

Myth 2: Company investment decisions are not affected by corporate taxes.

At times, some might gain the impression that corporate taxes do not affect investment decisions, even though most companies today decide on investment plans according to their after-tax profitability. An erroneous and poorly done methodology is to conclude that tax reductions are unrelated or negatively related to investment since investment was higher in the 1950s when company rates were close to 60 per cent and not as strong when corporate taxes were reduced in later years.[22] There are two flaws to this analysis:

1. It is incorrect to simply look at the relationship between investment and corporate taxes since other factors influence investment. It is well known that, once incorporating other factors in econometric analysis, the expected negative relationship between investment and effective tax rates will prevail, as found in most investment studies.

2. Statutory corporate income tax rates are not the correct measure of taxes influencing investment. Instead the marginal effective tax rate, as measured in this study and elsewhere, is appropriate to use since it accounts for tax-base adjustments (such as depreciation, inventory and financing costs), tax credits and sales taxes on capital purchases and other taxes affecting capital investment. When corporate income tax rates were high in early years prior to 1985, tax preferences led to a much smaller base with many companies paying little or no income taxes. Corporate tax reform in 1985 (phase one) and 1987 (phase two) scaled back incentives but raised the overall marginal effective tax rate.[23] The METR rose further with the introduction of somewhat higher capital and sales taxes in the 1990s.

---

[20] E. Ferede and K. McKenzie, "Who Pays the Corporate Tax," presented at The School of Public Policy conference on corporate tax reform, University of Calgary, June 2016.

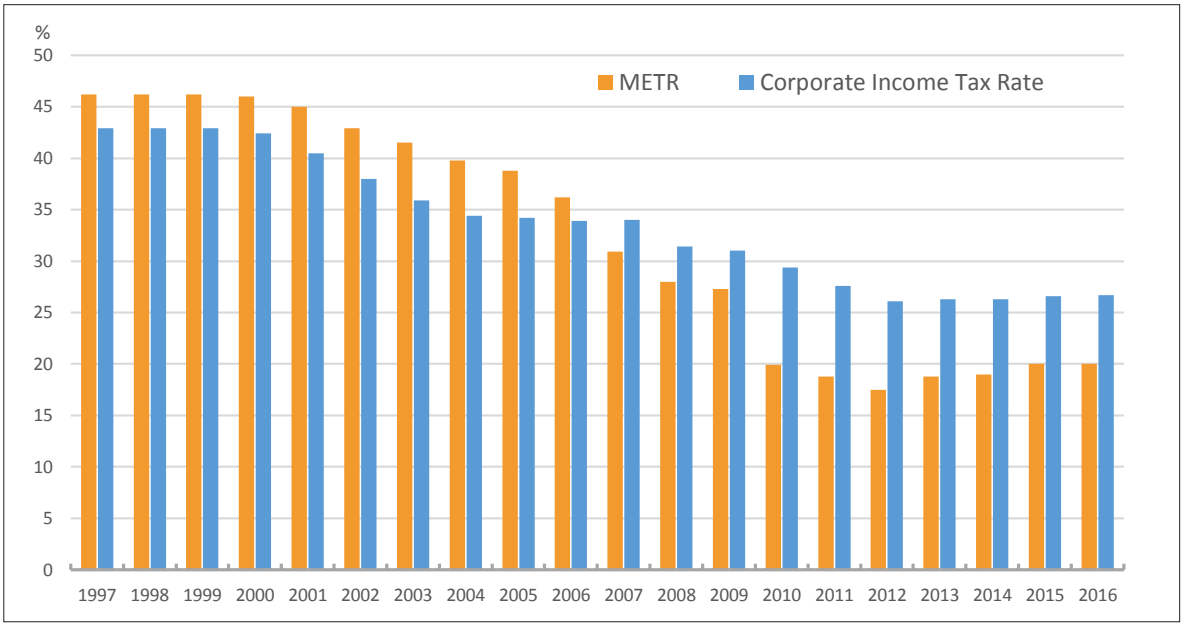
[21] R. Xavier, J. Smith and S. Wende,"The Incidence of the Company Tax in Australia," *Economic Roundup* 1 (Canberra, Australia: Treasury, 2014).

[22] See, for example, J. Brennan, "Do Corporate Rate Reductions Accelerate Growth?" (Toronto: Centre for Policy Alternatives, November 2015).

[23] It was well known that the METR rose after the corporate tax reforms of 1985–87, even though statutory tax rates were reduced. See V. Jog and J. Mintz, "Corporate Tax Reform and its Economic Impact: An Evaluation of the Phase 1 Proposals," in *The Economic Impact of Tax Reform* ed. J. Mintz and J. Whalley (Toronto: Canadian Tax Foundation, 1989).

Unfortunately, a long series of METRs based on consistent methodology are not available. As shown in Figure 5, the METR was stable from 1997–2000. After 2000 and until 2012, the METR fell more quickly with reductions in corporate tax rates and capital taxes and harmonization of sales taxes, compared to the decline in the corporate income tax rate. Since 2012, corporate income tax rates have risen slightly while the METR has risen more quickly with base-broadening initiatives.

FIGURE 5 METR AND CORPORATE INCOME TAX RATES: CANADA 1997-2016



Notes: Pre-2005 provided by D. Chen. Taken from various past publications and this report. Adjustments made to include corporate income taxes, capital taxes and sales taxes on capital purchases for 1985 and 1988 estimates for non-financial and non-resource industries. Capital weights differ in years prior to 2005, reflecting the economy at that time.

With reduced investment, economies grow less quickly, since machines, structures and intangible assets (such as research and exploration) are needed to produce goods and services in later years.[24] Some taxes particularly harm economic growth by distorting work, investment and risk-taking decisions, resulting in the economy's resources not being put to their most profitable use. This economic cost is the "deadweight loss" of taxation[25] — the loss of consumption or production caused by tax distortions. Adding this deadweight loss to the cost of raising a dollar of taxes is known as the *marginal cost of taxation.* For the federal government, the marginal cost of taxation for corporate taxes is $1.45 and for personal taxes it is $1.17. The provincial marginal cost of taxation is higher since increases in provincial taxes create a larger loss in the provincial tax base: $3.62 and $81.61 for corporate taxation in Quebec and Alberta respectively.[26]

---

[24] Our international comparisons do not include the resource sector, which invests in exploration and development. We do not include tax and grant support for research and development. For an earlier comparison of both grant and tax support for research and development in the United States and Canada, see Jack Mintz, *Most Favored Nation* (Toronto: C. D. Howe Institute, 2001).

[25] For a derivation and discussion of the marginal cost of taxation (or public funds) see B. Dahlby, *Marginal Cost of Public Funds: Theory and Applications* (Cambridge, Mass.: MIT Press, 2008).

[26] B. Dahlby, "Reforming the Tax Mix in Canada," University of Calgary School of Public Policy Research Paper 5, 14 (2012).

Myth 3: Corporate tax reductions unduly lead to large revenue losses.

When corporate tax rates are cut, governments are rightly concerned about the loss in revenues needed to fund public services. Assuming that the tax base does not change (the "mechanical" effect), the loss in revenue can be substantial for each point reduction in the company tax rate.

However, as is well known, the tax base would not remain the same — it grows (the "behavioural" effect). A reduction in corporate taxes leads to more investment and profits, thereby leading to a larger tax base. However, it takes time for capital to grow, since investment plans are not just waiting on a shelf, nor are new projects instantly "shovel ready." Nonetheless, the tax base could grow fairly quickly when companies are able to shift profits from one jurisdiction to another by rearranging financial structures. If Canada dropped its corporate tax rate, it would create an incentive for businesses to shift costs, such as interest and general administrative expenses, to other jurisdictions and keep profits in Canada.

A good example of how this can happen is Ireland, which has adopted a low corporate income tax rate, much to its economic advantage, since the late 1980s. With its tax rate of 12.5 per cent, multinationals have used transfer pricing and financing structures to shift profits to Ireland. Not only did book profits in Ireland rise dramatically, but investment growth was stellar in the 1990s. At least one study has attributed a significant share of Ireland's GDP growth to such profit-shifting strategies.[27] Although Ireland's economy was hit hard by the 2008 financial crisis, Ireland is back to being one of the fastest-growing European economies today, in part due to its corporate tax policies.[28]

The Irish experience is just one of many. Several studies demonstrate that the corporate tax base is sensitive to changes in tax rates, although estimates vary of the precise impact. Bartelsman and Beetsma conclude that when tax rates rise, two-thirds of the projected increase is lost due to profit shifting.[29] Huizinga and Laeven find that each one-percentage-point hike in the company income tax rate shrinks the tax base of European multinationals by 1.3 per cent.[30] Jog and Tang find quite large reductions in debt financing by Canadian multinationals when tax rates decline.[31] Mintz and Smart estimate that a one-percentage-point drop in the provincial tax rate expands the company tax base by 4.9 per cent for large corporations that do not allocate income across provinces, and 2.3 per cent for those that do.[32] Dahlby and Ferede estimate that a one-point increase in the federal-provincial tax rate results in a 2.3-per-cent contraction in the corporate tax base in the short run.[33] Australia's

---

27 Brendan Walsh, "The Role of Tax Policy in Ireland's Economic Renaissance," *Canadian Tax Journal* 48, 3 (2000): 658-73.

28 Paul Hannon, "In Ireland Economic Growth Soars Again," *The Wall Street Journal*, March 11, 2016, http://www.wsj.com/articles/in-ireland-economic-growth-soars-again-1457719427.

29 E. Bartlesman and R. Beetsma, "Why Pay More? Corporate Tax Avoidance through Transfer Pricing in OECD Countries," *Journal of Public Economics* 87, 9-10 (2003): 2225-2252.

30 H. Huizinga and L. Laeven, "International Profit- Shifting Within Multinationals: A Multi-Country Perspective," *Journal of Public Economics* 92 (2008): 1164-1182.

31 V. Jog, and J. Tang, "Tax reforms, Debt Shifting and Tax Revenues: Multinational Corporations in Canada," *International Tax and Public Finance* 8 (2001): 5–26.

32 J. Mintz and M. Smart, "Income Shifting, Investment, and Tax Competition: Theory and Evidence from Provincial Taxation in Canada," *Journal of Public Economics* 88 (2004) 1149- 1168.

33 B. Dahlby and E. Ferede, "What Does it Cost Society to Raise a Dollar of Tax Revenue? The Marginal Cost of Public Funds," Commentary No. 324 (Toronto: C. D. Howe Institute, 2011).

Treasury Department[34] estimated that a one-percentage-point reduction in the company tax rate would lead to a one-per-cent increase in the tax base (half the amount for "low" profit shifting).

Although governments today should curtail profit shifting to the extent it leads to "double non-taxation" where no country raises revenue, profit shifting will normally arise — and be impossible to contain — when simple strategies are chosen, such as how much debt is raised by a multinational in each county. Thus, even if the G20 countries are able to remove those tax provisions that unduly result in multinationals paying little or no tax, there will be significant scope to shift profits from one jurisdiction to another through normal arbitrage opportunities.

Overall, the loss in corporate tax revenues is blunted by growth in the tax base due to profit shifting and investment growth over time. This is particularly important to countries with high statutory company tax rates, since the high-tax jurisdiction is likely to experience the most base erosion when it is on the top of the rate ladder.

Summary

We can draw three lessons from the above discussion. First, the corporate tax can be regressive, hurting most workers and low-income Canadians. Second, the corporate tax hurts growth by deterring investment decisions and the adoption of new technologies. Third, reductions in the corporate tax rate result in some loss in revenue, but not nearly as much as one would think given the willingness of companies to keep profits in Canada.

None of this implies that a corporate tax should be abolished. The role of the corporate income tax is to shore up the personal income tax to ensure that investors cannot avoid personal taxation by sheltering income in untaxed companies. As a "source-based" levy, the corporate tax also serves as a withholding tax on foreign investors who in some cases, such as that in China and the United States, credit company taxes against tax liabilities owing to their home governments. Further, the corporate tax often operates as a surrogate user fee for public services, such as infrastructure, that help businesses earn more profits. Thus, balance is needed between these objectives and the economic effects of corporate taxes on the economy.

TRANSFER TAXES

While governments have cut corporate income tax rates in the past decade and half, they have resorted to raising taxes on capital in other ways. Obviously, broadening the tax base by reducing tax incentives is one approach. Another is to impose other types of taxes on businesses such as capital taxes and sales taxes on capital purchases.

In our review of countries this year, we have been struck by the increasing use of transfer taxes to fund public spending. These include: stamp duties (taxes on financial and non-financial asset purchases), as in Australia, India and the United Kingdom; financial

[34] See L. Cao et al., "Understanding the Economy-wide Efficiency and Incidence of Major Australian Taxes," Treasury Working Paper, 2015-01 (Canberra, Australia: April 2015).

transaction taxes (on debt and equity transfers, especially in banking) now used in Belgium, Finland, France, Italy and certain Latin American countries; and real estate transfer taxes, as in China and South Korea (Canada has a land-transfer tax applied to the purchase of structures and land).

For 2015, we have incorporated transfer taxes in the METR measures to account for their impact on the METR. Of the 92 countries in our survey, 64 countries have transfer taxes of some sort, typically on fixed assets (land, structures and sometimes machinery) and securities (shares, bonds and money-market transactions). Forty-seven countries have transfer taxes on fixed assets, and 34 countries have taxes on financial transfers (17 have transfer taxes on both).

Many transfer taxes were introduced over a century ago as stamp duties, being an easy-to-administer source of revenue (such as in Australia, the U.K. and Canada). While financial-transaction taxes have been introduced in the past (with some since abolished, as Sweden did in 1990), financial-transaction taxes have recently been introduced in various countries, including France and Italy, as a source of revenue to offset the cost of bank bailouts arising from the financial crisis, or as a way to deter speculation. Some financial-transaction taxes have also been used as surrogate for value-added taxation or simply to raise revenue in a less politically contentious manner.

Transfer taxes on assets and securities distort capital markets in significant ways. Asset-transfer taxes are similar to sales taxes on capital purchases, increasing the cost of buying capital and deterring investment. They also affect the mobility of companies, since companies pay a penalty when they change locations for business purposes. Security-transfer taxes can hurt investors who rebalance their portfolios to improve investment returns, similar to the way that investors will avoid capital gains taxes by holding old assets producing inferior returns.

In Table 3 below, we provide an assessment of transfer taxes on METRs for all countries, illustrating the impact that these transfer taxes have when they are included in the METR calculation.[35] Once incorporating the land-transfer tax in Canada, averaged across provinces, the Canadian METR in 2015 rises by one percentage point from 20.0 to 21.0 per cent. Industrialized countries with the largest transfer taxes resulting in an increase of more than three percentage points in the METR include Australia (3.2 points), the Czech Republic (3.0 points), Finland (3.4 points), Germany (3.1 points), Luxembourg (5.4 points), the Netherlands (4.1 points) Portugal (4.3 points) and Sweden (3.2 points).

By and large, the largest impact tends to be related to asset-based transfer taxes (typically on real estate) with relatively high rates. Financial-transaction taxes tend to have a relatively small impact on the METR, by raising financing costs for firms.

[35] Just to reiterate, this is a new undertaking for the 2015 METR estimates, and applies only to the "alternate model" estimates for 2015, which are specifically noted to include transfer taxes.

TABLE 3 METR INCLUSIVE AND EXCLUSIVE OF TRANSFER TAXES FOR 2015

2015	Base Model	Alternate Model	Difference	Ranking Overall METR (Descending)	
				Base	Alt
Australia	25.7	28.9	3.2	17	16
Austria	23.5	26.3	2.8	23	24
Belgium	18.4	18.4	0.0	40	55
Canada	20.0	21.0	1.0	35	43
Chile	6.8	7.0	0.2	87	88
Czech Republic	12.1	15.1	3.0	69	67
Denmark	17.0	17.0	0.0	46	60
Estonia	10.6	10.6	0.0	74	80
Finland	12.6	16.0	3.4	67	62
France	36.1	36.6	0.5	5	6
Germany	23.8	26.9	3.1	22	21
Greece	11.3	11.6	0.3	72	78
Hungary	15.1	15.1	0.0	53	68
Iceland	12.7	13.9	1.2	64	70
Ireland	10.4	13.0	2.6	75	74
Israel	15.5	15.5	0.0	51	65
Italy	8.3	8.3	0.0	84	84
Japan	42.1	42.1	0.0	4	4
Korea S.	24.1	24.4	0.3	20	30
Luxembourg	12.5	17.9	5.4	68	58
Mexico	17.3	19.7	2.4	43	48
Netherlands	17.1	21.2	4.1	45	41
New Zealand	20.9	20.9	0.0	33	44
Norway	23.0	24.6	1.6	26	28
Poland	11.5	11.6	0.1	71	77
Portugal	20.9	25.2	4.3	32	27
Slovak Republic	15.6	15.6	0.0	50	64
Slovenia	5.4	5.4	0.0	89	90
Spain	22.2	23.2	1.0	29	33
Sweden	15.2	18.2	3.0	52	56
Switzerland	10.0	10.3	0.3	79	81
Turkey	5.7	7.1	1.4	88	87
United Kingdom	22.9	25.6	2.7	27	25
United States	34.6	34.6	0.0	6	9
Brazil	45.5	46.9	1.4	3	3
China	24.1	28.9	4.8	21	17
India	57.1	61.9	4.8	1	1
Russia	29.0	29.0	0.0	11	15
Argentina	33.9	37.8	3.9	8	5
Bolivia	24.3	27.2	2.9	18	19
Botswana	13.4	26.9	13.5	61	23

Bulgaria	6.8	8.3	1.5	86	85
Chad	27.2	36.2	9.0	14	7
Colombia	16.7	20.3	3.6	47	46
Costa Rica	26.0	26.9	0.9	16	20
Croatia	13.2	17.1	3.9	62	59
Dominican Republic	22.9	24.4	1.5	28	29
Ecuador	33.8	35.9	2.1	9	8
Egypt	7.9	7.9	0.0	85	86
Ethiopia	14.0	15.8	1.8	56	63
Fiji	13.0	13.0	0.0	63	73
Georgia	23.2	23.2	0.0	25	34
Ghana	10.2	10.7	0.5	76	79
Guyana	34.5	34.5	0.0	7	10
Hong Kong	0.9	5.6	4.7	92	89
Indonesia	19.7	23.3	3.6	36	32
Iran	10.1	18.1	8.0	77	57
Jamaica	28.7	32.0	3.3	12	12
Jordan	10.1	10.1	0.0	78	82
Kazakhstan	26.9	26.9	0.0	15	22
Kenya	15.0	19.2	4.2	54	52
Kuwait	9.8	9.8	0.0	80	83
Latvia	17.8	19.4	1.6	41	50
Lesotho	24.1	24.1	0.0	19	31
Madagascar	12.7	21.8	9.1	65	37
Malaysia	17.2	23.0	5.8	44	35
Morocco	13.7	33.1	19.4	58	11
Nigeria	12.7	13.1	0.4	66	72
Pakistan	30.3	31.6	1.3	10	13
Panama	21.3	21.3	0.0	31	40
Paraguay	13.6	13.6	0.0	59	71
Peru	21.3	21.3	0.0	30	39
Philippines	28.0	28.3	0.3	13	18
Qatar	5.2	5.2	0.0	90	91
Romania	3.4	3.4	0.0	91	92
Rwanda	18.8	18.8	0.0	39	54
Saudi Arabia	19.0	19.0	0.0	38	53
Serbia	10.6	12.4	1.8	73	75
Sierra Leone	16.6	16.6	0.0	48	61
Singapore	9.3	21.8	12.5	82	36
South Africa	14.2	14.3	0.1	55	69
Tanzania	20.3	21.7	1.4	34	38
Thailand	9.8	30.8	21.0	81	14
Trinidad and Tobago	13.4	19.9	6.5	60	47
Tunisia	16.0	19.6	3.6	49	49
Uganda	19.6	21.1	1.5	37	42
Ukraine	13.8	15.4	1.6	57	66

Uruguay	23.4	25.4	2.0	24	26
Uzbekistan	49.0	49.0	0.0	2	2
Venezuela	17.6	19.3	1.7	42	51
Vietnam	11.8	12.2	0.4	70	76
Zambia	8.5	20.4	11.9	83	45

G7*	26.8	27.9	1.1
G20*	26.5	28.2	1.7
OECD*	17.7	19.1	1.4

*Simple average. *Source:* Authors' calculations.

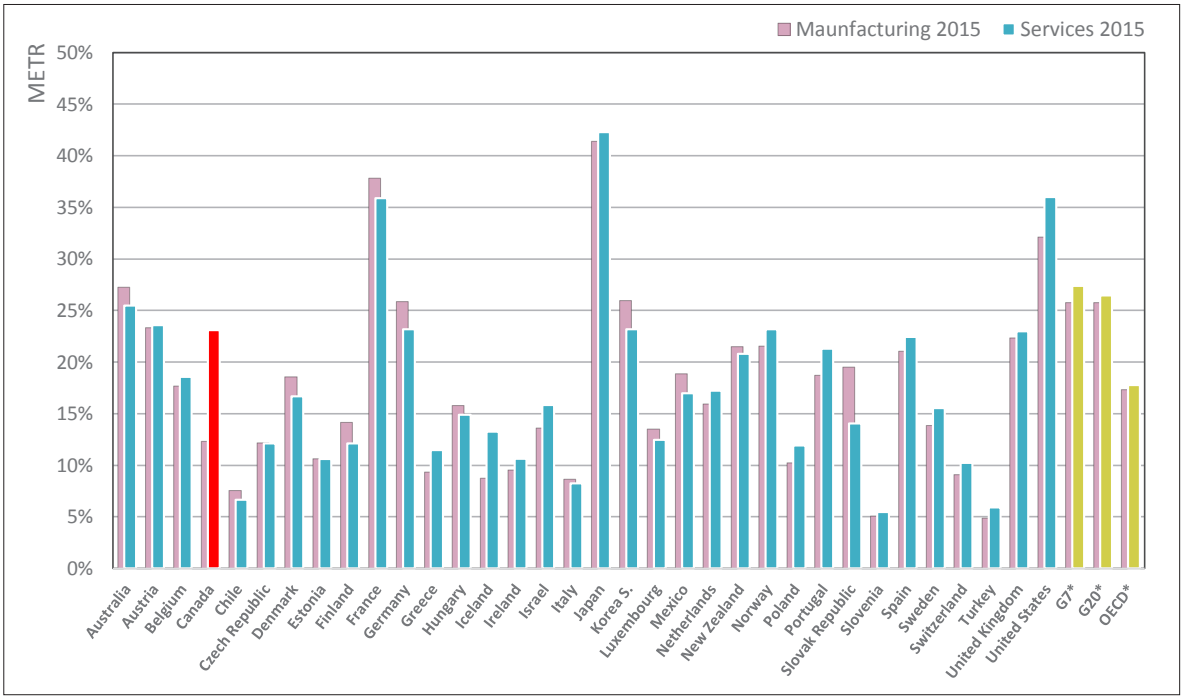
Notes: Base model excludes transfer taxes. Alternative ("alt") model includes transfer taxes.

FEDERAL-PROVINCIAL CORPORATE TAX POLICY

Unlike many countries, Canadian provinces (and local governments) levy significant taxes on businesses, including: corporate income taxes, capital taxes (primarily on financial institutions), property taxes, and sales taxes on capital purchases. Canadian provincial general corporate income tax rates, now averaging close to 12 per cent, are not far off the federal rate of 15 per cent.

Taking into account both federal and provincial tax burdens (except for local property taxes that cannot be measured by industry or time), Canada's corporate tax structure is highly favourable to manufacturing compared to services (i.e., construction, communications, transportation, utilities, trade and other services). The advantage given to manufacturing investment is much larger compared to that in most other countries, with the exceptions of Ethiopia, Iran, Kenya and Trinidad and Tobago (Figure 6; see also Table A.3 in the appendix). Among G7 countries, except for Canada, there is little difference in METRs between manufacturing and services (with the U.S. having the second-largest difference, after Canada, with 3.9 percentage points in the METR in favour of manufacturing). For the G20 as a whole, the difference in manufacturing and service-sector METRs is only 0.4 percentage points in favour of manufacturing and, for the OECD, 0.6 percentage points.

FIGURE 6 MANUFACTURING AND SERVICE METRS FOR OECD COUNTRIES



*Simple average. *Source:* Authors' calculations.

Canada is a clear outlier in terms of its support for the manufacturing sector (forestry also is treated favourably, as will be shown below). Despite this tax support, manufacturing's share of value added as share of GDP has fallen for four decades due to other factors, including the falling global cost competitiveness and the shift of production to non-OECD countries.[36]

As seen in Figure 6 (and in the appendix), Canada has one of the lowest METRs on manufacturing among industrialized economies. It also has one of the highest tax burdens on investment in service industries (the highest METRs on services are in Japan, France, the U.S., Australia and Austria). The service sector is important to competitiveness, playing a critical role in facilitating innovation, infrastructure and trade.

Canada's corporate tax system is non-neutral across business activities, resulting in a misallocation of capital resources towards tax-favoured sectors. As shown in tables 4 and 5 for 2016, METRs, excluding transfer taxes, vary substantially across sectors and assets (2015 METRs are provided as well in Table A.5 the appendix). Forestry and manufacturing are least taxed, due to the effect of accelerated depreciation for manufacturing equipment and some provincial investment tax credits. Other services (household and business services) are most heavily taxed, followed by construction and communications.[37]

[36] See M. Krzepkowski and J. Mintz, "Canadian Manufacturing Malaise: Three Hypotheses," University of Calgary School of Public Policy Research Paper 6, 12 (2013).

[37] Although financial and non-renewable resource industries are not included in this global analysis, we have estimated that the METR for the financial sector is highest in Canada, followed by oil and gas. Mining is one of the least-taxed sectors. See Mintz, Bazel and Chen, "Growing"; Crisan and Mintz "Alberta's"; and Mintz and Nikolakakis, "Tax Policy."

TABLE 4 METRS BY PROVINCE AND SECTOR FOR 2016 (LAND-TRANSFER TAX EXCLUDED)

2016	Agriculture	Forestry	Electrical Power, Gas & Water	Construction	Manufacturing	Wholesale Trade	Retail Trade	Transportation and Storage	Communications	Other services	Aggregate
Canada*	18.8%	9.0%	19.6%	25.0%	12.4%	23.4%	23.8%	20.1%	24.2%	25.2%	**20.1%**
Newfoundland	12.5%	-30.5%	0.0%	25.5%	-20.3%	24.5%	24.8%	20.3%	23.0%	22.6%	**14.1%**
Prince Edward Island	3.8%	-103.6%	0.0%	26.4%	-75.3%	25.6%	25.9%	23.2%	23.0%	26.9%	**12.0%**
Nova Scotia	13.8%	-13.9%	21.9%	26.4%	-7.4%	25.3%	25.7%	21.1%	23.9%	23.7%	**16.7%**
New Brunswick	4.8%	-30.8%	20.3%	24.6%	-21.7%	23.6%	23.9%	19.3%	22.2%	21.9%	**8.4%**
Quebec	18.2%	4.5%	18.7%	22.7%	8.5%	22.1%	22.4%	17.0%	20.4%	24.6%	**17.1%**
Ontario	17.8%	12.9%	18.2%	22.3%	14.6%	21.3%	21.8%	17.5%	20.0%	23.3%	**18.9%**
Manitoba	24.4%	6.3%	24.8%	36.8%	6.7%	31.1%	30.8%	28.6%	40.3%	37.3%	**28.4%**
Saskatchewan	22.2%	13.1%	22.8%	32.1%	15.0%	29.0%	28.2%	23.5%	35.4%	31.1%	**24.8%**
Alberta	18.1%	14.7%	18.7%	22.8%	17.6%	21.8%	22.2%	18.1%	20.5%	20.3%	**19.3%**
British Columbia	23.4%	17.9%	23.5%	34.6%	20.2%	29.4%	29.1%	24.4%	37.5%	33.1%	**27.9%**

Note: Cases with a zero per cent METR result from negligible capital weights.

TABLE 5 METRS BY ASSET AND PROVINCE FOR 2016

2016	Buildings	M&E	Land	Inventory	Aggregate
Canada*	22.7%	19.0%	10.8%	24.7%	**20.1%**
Newfoundland	20.7%	5.5%	12.5%	27.8%	**14.1%**
Prince Edward Island	21.8%	-7.2%	13.0%	28.7%	**12.0%**
Nova Scotia	22.5%	8.9%	13.0%	28.8%	**16.7%**
New Brunswick	17.8%	-9.1%	12.0%	27.0%	**8.4%**
Quebec	22.5%	11.3%	10.9%	25.0%	**17.1%**
Ontario	21.5%	17.4%	10.6%	24.1%	**18.9%**
Manitoba	24.0%	35.0%	11.0%	25.0%	**28.4%**
Saskatchewan	23.7%	28.3%	10.8%	24.3%	**24.8%**
Alberta	22.7%	17.4%	11.0%	25.0%	**19.3%**
British Columbia	26.6%	33.7%	10.5%	24.1%	**27.9%**

It can also be seen that the Atlantic provinces have the lowest METRs in aggregate (New Brunswick being lowest), largely driven by federal and provincial tax preferences in manufacturing and forestry. Manitoba, British Columbia and Saskatchewan have the highest METRs, reflecting the importance of retail sales taxes on capital purchases in these provinces. As shown in Table A.3 in the appendix, Manitoba has the fourth-highest METR among OECD countries in 2015; British Columbia is the fifth highest; and Saskatchewan is the seventh highest in ranking.

In general most provinces have been increasing taxes on capital. Of note,

- Newfoundland and Labrador has increased its corporate income tax rates to deal with its deficits.
- New Brunswick has almost doubled its tax on capital in the past three years, in large part by increasing the corporate income tax from 10 to 14 per cent in 2014 and 2016. While its low METR reflects preferential treatment of manufacturing and forestry, other sectors are taxed much more heavily, more so than Quebec and Ontario.

- Quebec has increased its tax burden on capital by scaling back some incentives. It is planning to reduce its corporate income tax rate from 11.9 to 11.5 per cent in the next few years.
- Manitoba's METR rose due to an increase in its retail sales tax from seven to eight per cent.
- Alberta raised its corporate income tax in 2015, pushing up its effective tax rate 2.3 percentage points to 19.3 per cent, above that of Ontario and Quebec.
- British Columbia's METR jumped up dramatically, almost 10 points, after 2012, due to it reinstituting the retail sales tax and its cancellation of the Harmonized Sales Tax, resulting in higher sales taxes on capital-goods purchases. This rise was also due to B.C. raising the corporate income tax rate by a point.

TABLE 6 METRS BY PROVINCES 2005-16

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Trend
Canada*	20.1%	20.0%	19.0%	18.6%	17.4%	18.7%	19.8%	27.3%	28.0%	30.9%	36.2%	38.8%	
Newfoundland	14.1%	11.4%	10.7%	10.7%	10.7%	12.1%	13.1%	14.7%	15.5%	18.4%	22.1%	21.1%	
Prince Edward Island	12.0%	12.0%	11.2%	11.4%	28.1%	29.2%	29.8%	30.7%	31.2%	33.4%	37.0%	37.5%	
Nova Scotia	16.7%	16.7%	13.4%	6.9%	6.9%	9.6%	11.6%	19.6%	21.0%	24.2%	29.3%	28.1%	
New Brunswick	8.4%	6.3%	4.8%	3.8%	2.8%	4.3%	6.3%	8.6%	16.9%	21.0%	27.1%	22.3%	
Quebec	17.1%	17.1%	15.9%	15.2%	15.2%	17.5%	18.5%	19.9%	21.1%	26.2%	33.7%	36.1%	
Ontario	18.9%	18.9%	18.2%	18.2%	18.2%	19.3%	20.3%	32.9%	33.2%	35.1%	40.7%	43.3%	
Manitoba	28.4%	28.4%	27.9%	26.2%	26.2%	27.2%	29.8%	31.1%	33.0%	36.3%	40.6%	39.6%	
Saskatchewan	24.8%	24.8%	24.3%	24.3%	24.3%	25.3%	26.0%	26.3%	26.8%	31.4%	38.3%	43.7%	
Alberta	19.3%	19.3%	17.0%	17.0%	17.0%	18.2%	19.0%	20.0%	20.6%	23.0%	26.6%	31.7%	
British Columbia	27.9%	27.9%	27.5%	27.5%	17.8%	19.0%	19.9%	29.1%	29.5%	32.2%	35.2%	39.2%	

CORPORATE TAX REFORM OPPORTUNITIES

Canada is beginning to lose its tax competitiveness by increasing the tax burden on investment as well as maintaining a distortionary tax system favouring some sectors over others. The federal government is reviewing tax expenditures for the next budget, while British Columbia has created a panel to recommend options to make its business tax structure more competitive.

We agree that Canada's corporate tax system could be further reformed to improve competitiveness and neutrality.[38] Some substantial reforms have been suggested, such as moving the corporate income tax to a rent-based tax,[39] although there are difficult challenges with this, especially from an international perspective as well as with regard to ensuring consistency with the personal income tax system. Other levies could be considered

[38] See J. Mintz, "An Agenda for Corporate Tax Reform" (Business Council of Canada, 2015); and J. Mintz and S. Richardson, "Directions for Corporate Tax Reform in Canada," manuscript (2016). These papers elaborate on the points provided in this paper's brief section.

[39] See, for example, R. Boadway and J.F. Tremblay, "Corporate Tax Reform: Issues and Prospects for Canada," Mowat Research Paper 88 (University of Toronto, 2014); and K. Milligan, "Tax Policy for a New Era: Promoting Economic Growth and Fairness," C. D. Howe Benefactors Lecture, C. D. Howe Institute, Toronto, Ontario, November 25, 2014.

to replace the corporate income tax, such as introducing transfer and capital taxes, but these would make the business tax system worse rather than better.

In our view, the Canadian corporate tax system can be improved but does not require major surgery. Today, it is a matter of addressing significant non-neutralities in the tax system and maintaining internationally competitive tax rates.

The most important non-neutralities in the corporate tax system include the following:

- Accelerated depreciation and investment tax credits that favour manufacturing and resource sectors, resulting in a misallocation of capital away from services, despite the latter sectors being just as important as other sectors to today's innovation and trading economy. These should be curtailed, as Quebec is doing, or even better, eliminated altogether to improve neutrality in the corporate tax system.
- Although not a focus in this paper, the significant difference in corporate income tax rates between small and large businesses has created a tax wall, hurting business growth and productivity by encouraging businesses to stay small.[40] The federal corporate income tax on small businesses is 4.5 percentage points less than the general rate. Provincial small business tax rates are substantially below the provincial general rate, the most egregious cases being Nova Scotia (13 points), Manitoba and Newfoundland (12 points), Prince Edward Island (11.5 points) and New Brunswick (10.5 points).
- Capital taxes on the financial sector are distortive and out of line with most other countries.
- Retail sales taxes on capital purchases in British Columbia, Manitoba and Saskatchewan result in these provinces having some of the highest tax burdens on investments among OECD countries.
- Provincial and municipal property taxes on non-residential property (net of municipal service benefits) are significantly higher than non-residential property, encouraging businesses to shift locations to lower-taxed neighbouring jurisdictions or away from business centres to reduce property tax costs.[41]

If governments were to curtail "tax expenditures" by reducing tax incentives, it would be best to use the revenue to reduce the general rate further. It would be specifically wise to move to a single corporate income tax rate on all businesses, which would also reduce the necessity of different tax credits for eligible and non-eligible dividends.

For example, the federal rate could be reduced from 15 to 13 per cent by scaling back accelerated depreciation and other tax preferences at the federal level on a revenue-neutral basis. Provinces could adopt a single corporate income tax rate on all businesses that would also be fiscally neutral.[42] This would simplify the business tax structure as well as make it more efficient and neutral.

---

[40] D. Chen and J. Mintz, "Small Business Taxation: Revamping Incentives to Encourage Growth," University of Calgary School of Public Policy Research Paper 4, 7 (2011). The difference between small and large METRs is 4.1 percentage points in 2014 for Canada on average (see Mintz, "An Agenda"). New results will be forthcoming.

[41] See A. Found, P. Tomlison and B. Dachis, "Business Tax Burdens in Canada's Major Cities: The 2015 Report Card" (Toronto: C. D. Howe Institute, November 24, 2015).

[42] Mintz, "An Agenda for Corporate Tax Reform."

THEORETICAL AND DATA APPENDIX

DESCRIPTION OF THEORY:

The marginal-effective-tax-rate analysis is based on a model of a firm maximizing its market value of cash flows discounted by a weighted average cost of finance, determined by an optimal financial policy. All values are in certainty-equivalent terms with the firm being able to use any marginal tax losses and tax credits to reduce tax liabilities. Capital decisions are determined at a point where the return on capital net of depreciation and income-risk premium is equal to the cost of finance. The cost of finance is the weighted average of the after-cost of debt and equity, trading-off the tax benefits of issuing debt with bankruptcy and agency costs. An optimal dividend-payout policy determining the cost of equity finance is based on information conveyed to the market.[43] The model incorporates corporate income tax provisions, capital taxes based on gross or net assets, sales taxes on capital purchases and transfer taxes.

Basic Model (excluding transfer taxes):

The METR includes the following taxes and their provisions:

- Corporate income tax:
  - Tax rate (u).
  - Present value of tax savings from tax depreciation: (uZ) discounted by Rf. If declining-balance depreciation: $Z=\alpha/(\alpha+Rf)$.
  - Initial allowance (IA) or investment tax credit: $IA=\phi/(1-u)$ to convert tax credits into initial allowances or vice versa.
  - Inventory deduction (FIFO, LIFO (replacement cost) or average cost).
  - Interest deduction (which can be limited, such as with indexation).
  - Nominal cost of finance is the weighted average of debt and equity finance, with the simplest form being: $Rf = Bi(1-u)+(1-B)\rho$ with $\rho/(1-\tau)$ with $\tau=atd + (1-a)c$ (weighted average of the cost of equity and debt finance paid under the personal income tax).
  - Real cost of finance (nominal cost less inflation): $rf= Rf-\pi$.
  - The capital-related income risk premium, which could vary by industry and asset, is reduced by the corporate income tax rate assuming the firm is "fully taxpaying": H(1-u).
- Capital taxes are treated in the model as the present value of capital tax (wealth tax, tax on fixed assets (excluding inventories), gross asset tax) at rate *tc*. Usually the capital tax is discounted by the nominal cost of finance, Rf, and declines as capital depreciates. Capital taxes are typically deductible from corporate income (we adjust for cases in which they are not deductible) and are paid *annually*, so the formula is:

[43] For further elaboration, see J. Mintz, "The Corporation Tax: A Survey," *Fiscal Studies* 16, 4 (1995): 23-68.

(1-ξB) tc/(Rf+δ), with ξ=1 being the case where the capital tax applies to net assets, and ξ=0 being the case when it is applied to gross assets.

Capital taxes apply to the book value of assets (where the economic depreciation rate is relevant) or the tax value of assets (based on economic depreciation). Unless provided, there is no indexation for inflation. If the tax value of assets is used, one depreciates by α instead of δ,and reduces the asset base by any investment allowances (or investment tax credits).

- Sales taxes on capital purchases raise the price of purchasing capital from q to q(1+t), t=sales tax rate. Treating q= 1, the increase in capital cost is (1+t).
- Gross-receipts taxes that do not allow for the deduction of capital costs are applied at the rate k (if they are deductible from the corporate income base the effective rate is k(1-u).
- Distribution taxes at rate z on dividends paid to all types of shareholders, whether resident or non-resident, increase the cost of financing. The share of profits paid out as dividends is equal to *a*.

The following equations are used to determine the METR for the **basic model:**

- F'/q = (1+t)(δ+rf)(1-A)/(1-u-k(1-ωu)) + H.
- rf =Bi(1-u)+ρ/(1-az) – π.
- A= u[IA +(1-IA)Z] – (1-ξB)tc(1-u)/(Rf+δ)].

As for inventories, this is a case where δ=0, but we add on the tax on inflation depending on FIFO, average cost, or LIFO.

Gross return on capital is Rg = F'/q – δ - H. The net return is the gross return with all corporate (not personal) tax parameters equal to zero: Rn =Bi+(1-B)ρ – π.

The METR is defined as T= (Rg-Rn)/Rg.

Augmented Model

Transaction taxes are defined as follows:

- **Transfer taxes on fixed assets:** Transfer taxes apply to real estate (land and buildings), land only (land taxes) and/or property (real estate and other fixed assets). Rarely do transfer taxes apply to inventories. The rate can be included in *t* for sales taxes on capital goods in the above formula. Transfer taxes are typically not deductible, but they increase the purchase cost of the asset and are therefore depreciated.
- Transfer taxes on securities raise the cost of purchasing financial assets, much like a sales tax. They include stamp duties and registration taxes for securities. They are deductible similar to other expenses when incurred. The nominal cost of finance Rf

is increased by (1+ϒϟ(1-u)), with ϒ being the transfer tax rate. They can be on bonds only (B), new equity issues (1-B)a or both (B+(1-B)a) implying that ϟ is the following:

ϟ= B for transfer taxes on debt.

ϟ= (1-B)a for new equity only.

ϟ= B + Ba for debt and new equity issues.

- Financial transactions are annual payments on financial securities (they differ from capital taxes that apply to real assets). The tax rate paid *annually is* ϭ, which is applied to debt, equity or both. Financial-transaction taxes increase the cost of finance each year in Rf.

With these transaction taxes, the new formulas can be written as follows:

1. F'/q = (1+t)(δ+rf)(1-A)/(1-u-k(1-ωu)) +H.
2. Rf =[B{i+ϭ](1-u)+ρ/(1-az)](1+ϒϟ(1-u)).
3. rf= Rf – π.
4. A= u[IA +(1-IA)Z] – (1-ξB)tc(1-u)/(Rf+δ).

The METR is measured by calculating the gross and net rates of return to capital. The gross return on capital is Rg = F'/q – δ - H. The net return is the gross return with all corporate (not personal) tax parameters equal to zero: Rn =Bi+(1-B)ρ – π.

The METR is defined as T= (Rg-Rn)/Rg.

Primary Sources Include

- Parameters concerning an individual nation's tax regime are taken from a combination of the Worldwide Corporate Tax Guide published by Ernst & Young and PWC's Worldwide Tax Summaries.
- Corporate income tax rates are taken from KPMG's online "Corporate tax rates table."
- GDP data are taken from the UN's online database, unstats.un.org.
- Inflation data are taken from the World Bank's online "World Development Indicators."

TABLE A.1 **GENERAL CENTRAL-SUBNATIONAL CORPORATE INCOME TAX RATES BY YEAR**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Trend
Australia	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Austria	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
Belgium	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
Canada	34.2	33.9	34.0	31.4	31.0	29.4	27.6	26.1	26.3	26.3	26.6	
Chile	17.0	17.0	17.0	17.0	17.0	17.0	20.0	17.5	20.0	21.0	22.5	
Czech Republic	26.0	24.0	24.0	21.0	20.0	19.0	19.0	19.7	19.0	19.0	19.0	
Denmark	28.0	28.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	24.5	23.5	
Estonia	24.0	23.0	22.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	20.0	
Finland	26.0	26.0	26.0	26.0	26.0	26.0	26.0	25.7	24.5	20.0	20.0	
France	35.0	34.4	34.4	34.4	34.4	34.4	36.1	34.7	36.1	36.9	38.0	
Germany	38.9	38.9	38.9	30.2	30.2	30.2	30.2	30.2	30.2	30.2	29.7	
Greece	32.0	29.0	25.0	25.0	25.0	24.0	20.0	24.6	26.0	26.0	29.0	
Hungary	16.0	17.3	20.0	20.0	20.0	19.0	19.0	19.8	19.0	19.0	19.0	
Iceland	18.0	18.0	18.0	15.0	15.0	18.0	20.0	15.6	20.0	20.0	20.0	
Ireland	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
Israel	31.0	31.0	29.0	27.0	26.0	25.0	24.0	25.8	25.0	26.5	26.5	
Italy	37.3	37.3	37.3	31.4	31.3	31.3	31.3	31.3	31.4	31.4	31.4	
Japan	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	37.0	37.0	33.1	
Korea S.	27.5	27.5	27.5	27.5	24.2	24.2	24.2	24.2	24.2	24.2	24.2	
Luxembourg	30.4	29.6	29.6	29.6	28.6	28.6	28.8	28.6	29.2	29.2	30.0	
Mexico	30.0	29.0	28.0	28.0	28.0	30.0	30.0	28.4	30.0	30.0	30.0	
Netherlands	31.5	29.6	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.0	25.0	
New Zealand	33.0	33.0	33.0	30.0	30.0	30.0	28.0	29.7	28.0	28.0	28.0	
Norway	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	27.0	27.0	
Poland	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	
Portugal	27.5	27.5	26.5	26.5	26.5	29.0	29.0	27.2	31.5	31.5	29.5	
Slovak Republic	20.4	21.0	21.0	21.0	21.0	21.0	21.0	21.0	23.0	24.0	24.0	
Slovenia	25.0	24.0	23.0	22.0	21.0	20.0	20.0	20.3	17.0	17.0	17.0	
Spain	35.0	35.0	32.5	30.0	30.0	30.0	30.0	30.0	30.0	30.0	28.0	
Sweden	28.0	28.0	28.0	28.0	26.3	26.3	26.3	26.3	22.0	22.0	22.0	
Switzerland	21.3	21.3	21.3	21.2	21.2	21.2	21.2	21.2	21.2	21.1	17.9	
Turkey	30.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
United Kingdom	30.0	30.0	30.0	28.0	28.0	28.0	26.0	27.5	23.0	21.0	20.0	
United States	39.3	39.3	39.3	39.3	39.1	39.2	39.2	39.1	39.1	39.1	39.1	
Brazil	27.8	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
China	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
India	36.6	33.7	34.0	34.0	34.0	33.2	32.4	33.7	34.0	34.0	34.6	
Russia	22.0	22.0	22.0	22.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Argentina	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
Bolivia	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
Botswana	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	21.4	21.4	21.4	
Bulgaria	15.0	15.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	

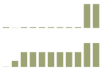
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Trend
Chad	45.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	
Colombia	35.0	35.0	34.0	33.0	33.0	33.0	33.0	33.0	34.0	34.0	34.5	
Costa Rica	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Croatia	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	30.0	
Dominican Republic	25.0	30.0	25.0	25.0	25.0	25.0	29.0	25.8	29.0	28.0	27.0	
Ecuador	15.0	15.0	15.0	15.0	15.0	15.0	14.0	14.6	12.0	12.0	12.0	
Egypt	34.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	25.0	25.0	23.1	
Ethiopia	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Fiji	31.0	31.0	31.0	31.0	29.0	28.0	28.0	27.5	20.0	20.0	20.0	
Georgia	20.0	20.0	20.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Ghana	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
Guyana	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	
Hong Kong	17.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	
Indonesia	30.0	30.0	30.0	30.0	28.0	25.0	25.0	27.0	25.0	25.0	25.0	
Iran	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	28.0	
Jamaica	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	30.0	25.0	27.9	
Jordan	21.7	21.7	21.7	21.7	21.7	14.9	14.9	21.5	14.9	14.9	19.0	
Kazakhstan	40.5	40.5	40.5	40.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0	
Kenya	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Kuwait	55.0	55.0	55.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	17.0	
Latvia	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
Lesotho	31.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Madagascar	30.0	30.0	30.0	25.0	24.0	23.0	22.0	23.4	20.0	20.0	20.0	
Malaysia	28.0	28.0	27.0	26.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
Morocco	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	31.4	
Nigeria	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	
Pakistan	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	34.0	33.0	
Panama	30.0	30.0	30.0	30.0	30.0	27.5	25.0	29.7	25.0	25.0	25.0	
Paraguay	30.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Peru	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	28.0	
Philippines	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Qatar	35.0	35.0	35.0	35.0	35.0	10.0	10.0	31.3	10.0	10.0	10.0	
Romania	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Rwanda	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Saudi Arabia	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Serbia	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	15.0	15.0	15.0	
Sierra Leone	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	
Singapore	20.0	18.0	18.0	18.0	18.0	17.0	17.0	17.7	17.0	17.0	17.0	
South Africa	30.0	29.0	29.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	
Tanzania	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Thailand	30.0	30.0	30.0	30.0	30.0	30.0	30.0	27.6	20.0	20.0	20.0	
Trinidad and Tobago	30.0	30.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
Tunisia	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	25.0	26.2	
Uganda	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
Ukraine	25.0	25.0	25.0	25.0	25.0	25.0	23.0	24.1	19.0	19.0	18.0	

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Trend
Uruguay	30.0	30.0	30.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
Uzbekistan	19.0	19.0	17.2	17.2	17.2	16.3	16.3	17.0	16.3	15.4	14.9	
Venezuela	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.5	
Vietnam	28.0	28.0	28.0	28.0	25.0	25.0	25.0	25.0	25.0	22.0	22.0	
Zambia	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
G7*	36.3	36.2	36.2	33.5	33.4	33.1	32.8	32.6	31.9	31.7	31.1	
G7 w	37.9	37.9	37.9	36.4	36.3	36.3	36.2	36.1	35.4	35.3	34.6	
G20*	31.5	31.0	30.9	29.9	29.5	29.3	29.1	29.1	28.9	28.8	28.6	
G20 w	35.2	35.0	35.0	33.9	33.7	33.7	33.6	33.6	33.1	33.0	32.5	
OECD*	28.2	27.7	27.2	26.1	25.9	25.9	25.8	25.7	25.7	25.5	25.3	
OECD w	35.7	35.4	35.2	34.0	33.8	33.8	33.7	33.6	33.1	33.0	32.4	
92 Country*	28.6	27.9	27.4	26.4	26.0	25.6	25.5	25.8	25.2	25.0	25.0	

* = Simple average, w= GDP-weighted average.

TABLE A.2 **MARGINAL EFFECTIVE RATES BY COUNTRY AND YEAR**

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Trend
Australia	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	
Austria	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	
Belgium	18.4	15.3	15.3	15.3	15.3	15.3	15.3	15.3	14.6	14.6	22.9	
Canada	20.0	19.0	18.8	17.5	18.8	19.9	27.3	28.0	30.9	36.2	38.8	
Chile	6.8	6.2	5.9	5.0	5.9	4.8	4.8	4.8	4.8	4.8	4.8	
Czech Republic	12.1	12.1	12.1	12.6	12.1	12.1	12.8	13.5	15.7	15.7	17.2	
Denmark	17.0	17.7	18.2	18.2	18.2	18.2	18.2	18.2	18.2	20.6	20.6	
Estonia	10.6	11.3	11.3	11.3	11.3	11.3	11.3	11.3	12.0	12.7	13.4	
Finland	12.6	12.6	15.9	16.7	17.0	17.0	17.0	17.0	17.0	17.0	17.0	
France	36.1	35.4	34.8	34.8	34.8	33.7	34.8	34.8	34.8	33.8	35.1	
Germany	23.8	24.3	24.3	24.3	24.3	24.3	24.3	24.3	33.8	33.8	33.8	
Greece	11.3	14.0	14.1	13.4	11.2	13.1	13.6	13.6	13.6	15.6	17.3	
Hungary	15.1	14.3	14.3	14.6	14.3	14.3	14.7	14.7	14.7	14.3	13.2	
Iceland	12.7	12.7	12.7	9.7	12.7	11.3	9.4	9.4	11.3	11.3	11.3	
Ireland	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	
Israel	15.5	15.5	14.5	15.0	13.8	14.5	15.1	15.8	17.3	18.7	18.7	
Italy	8.3	12.9	21.2	26.8	27.2	27.2	27.2	27.3	32.5	32.5	32.5	
Japan	42.1	44.3	44.3	45.8	45.8	45.8	45.8	45.8	45.8	45.8	45.8	
Korea S.	24.1	24.1	24.1	24.1	24.1	24.1	24.1	26.9	26.9	26.9	26.9	
Luxembourg	12.5	12.0	12.0	11.5	11.7	11.5	11.5	13.3	14.4	14.4	14.9	
Mexico	17.3	17.3	17.4	16.3	17.4	17.4	16.0	16.0	16.0	16.7	17.4	
Netherlands	17.1	17.1	17.5	17.5	17.5	17.5	17.5	17.5	17.5	20.7	22.2	
New Zealand	20.9	20.9	20.9	18.7	20.9	17.9	17.9	17.9	20.1	20.1	20.1	
Norway	23.0	23.0	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	
Poland	11.5	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	
Portugal	20.9	22.5	22.6	19.1	20.5	20.5	18.6	18.6	18.6	19.3	19.3	
Slovak Republic	15.6	15.6	14.9	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.0	
Slovenia	5.4	5.4	5.4	6.8	6.6	6.6	7.1	7.5	13.3	14.0	14.7	
Spain	22.2	24.0	24.0	24.0	24.0	24.0	24.0	24.0	26.2	28.4	28.4	
Sweden	15.2	15.2	15.2	18.5	18.5	18.5	18.5	19.8	19.8	19.8	19.8	
Switzerland	10.0	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.9	15.9	15.9	
Turkey	5.7	5.7	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	11.0	
United Kingdom	22.9	23.4	25.5	28.4	26.8	28.7	28.6	28.4	29.7	29.7	29.7	
United States	34.6	34.6	34.6	34.6	34.6	34.6	34.9	34.9	34.9	35.2	35.2	
Brazil	45.5	41.7	42.9	42.1	42.0	41.5	41.4	40.1	42.3	42.3	42.3	
China	24.1	24.1	24.1	24.1	24.1	24.1	24.1	48.3	48.3	48.3	48.3	
India	57.1	57.5	59.2	59.0	58.4	58.8	59.2	59.2	59.2	56.0	57.7	
Russia	29.0	29.0	28.9	28.9	28.9	28.9	28.9	32.6	32.6	32.6	34.8	
Argentina	33.9	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	36.8	
Bolivia	24.3	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.4	
Botswana	13.4	12.8	12.9	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	
Bulgaria	6.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	7.7	7.7	

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Trend
Chad	27.2	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	39.0	
Colombia	16.7	34.2	36.8	32.8	36.1	31.6	32.0	33.1	34.6	26.5	26.5	
Costa Rica	26.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
Croatia	13.2	8.8	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	
Dominican Republic	22.9	23.8	24.8	23.6	26.6	22.8	22.8	22.8	22.8	27.5	22.8	
Ecuador	33.8	30.0	35.9	37.9	37.4	38.1	38.1	38.1	38.1	38.1	38.1	
Egypt	7.9	5.5	5.6	3.7	3.7	3.7	3.7	3.7	3.7	3.7	10.4	
Ethiopia	14.0	14.0	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	
Fiji	13.0	13.0	13.0	18.6	19.1	19.1	19.9	21.6	21.6	21.6	21.6	
Georgia	23.2	19.3	19.3	19.3	19.3	19.3	19.3	19.3	22.6	22.6	22.6	
Ghana	10.2	10.2	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	
Guyana	34.5	34.8	34.8	34.8	38.0	34.8	34.8	38.0	38.0	38.0	38.0	
Hong Kong	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.1	
Indonesia	19.7	19.7	19.8	21.5	19.8	19.8	22.4	24.2	24.2	24.2	24.2	
Iran	10.1	8.7	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	9.2	
Jamaica	28.7	13.8	17.7	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	
Jordan	10.1	9.1	9.1	17.5	9.1	9.1	17.9	17.9	17.9	17.9	17.9	
Kazakhstan	26.9	21.7	21.8	21.8	21.8	21.8	21.8	29.4	29.4	29.4	29.4	
Kenya	15.0	15.0	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	
Kuwait	9.8	8.5	8.5	8.5	8.5	8.5	8.5	8.5	44.9	44.9	44.9	
Latvia	17.8	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	
Lesotho	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	33.7	
Madagascar	12.7	12.7	12.7	15.2	14.2	15.0	15.7	16.5	20.5	20.5	20.5	
Malaysia	17.2	17.2	17.2	17.2	17.2	17.2	17.2	18.0	18.8	19.6	19.6	
Morocco	13.7	12.8	12.9	12.9	12.9	12.9	12.9	12.9	15.9	15.9	15.9	
Nigeria	12.7	12.7	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	
Pakistan	30.3	26.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.0	27.0	
Panama	21.3	17.4	17.4	21.2	17.4	19.4	21.5	21.5	21.5	21.5	21.5	
Paraguay	13.6	7.8	7.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	25.0	
Peru	21.3	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.2	
Philippines	28.0	24.0	24.1	24.1	24.1	24.1	24.1	28.6	28.6	28.6	29.0	
Qatar	5.2	5.2	5.2	18.7	5.2	5.2	21.6	21.6	21.6	21.6	21.6	
Romania	3.4	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Rwanda	18.8	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	
Saudi Arabia	19.0	19.0	19.0	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3	
Serbia	10.6	10.6	10.6	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	
Sierra Leone	16.6	16.6	16.7	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	
Singapore	9.3	9.3	9.3	9.8	9.3	9.3	9.9	9.9	9.9	9.9	11.2	
South Africa	14.2	14.2	14.3	14.3	14.3	14.3	14.3	14.3	14.9	14.9	15.6	
Tanzania	20.3	18.8	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	
Thailand	9.8	9.8	9.8	14.3	16.1	16.1	16.1	16.1	16.1	16.1	16.1	
Trinidad and Tobago	13.4	13.3	13.4	13.4	13.4	13.4	13.4	13.4	13.4	16.9	16.9	
Tunisia	16.0	18.4	22.0	22.0	22.0	22.0	22.0	22.0	22.0	25.7	25.7	
Uganda	19.6	14.8	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9	
Ukraine	13.8	9.3	9.3	12.4	11.8	13.1	13.1	13.1	13.1	13.1	13.1	

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Trend
Uruguay	23.4	24.9	24.9	24.9	24.9	24.9	24.9	24.9	28.5	28.5	28.5	
Uzbekistan	49.0	38.0	38.2	38.4	38.2	38.2	38.5	38.5	38.5	39.1	39.1	
Venezuela	17.6	18.7	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	30.2	
Vietnam	11.8	11.2	13.3	13.3	13.3	13.3	13.3	15.4	15.4	15.4	15.4	
Zambia	8.5	8.5	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
G7*	26.8	27.7	29.1	30.3	30.3	30.6	31.8	31.9	34.6	35.3	35.8	
G7 w	31.8	32.5	33.1	33.8	33.8	33.9	34.4	34.4	35.9	36.1	36.3	
G20*	26.5	26.6	27.3	27.8	27.7	27.8	28.3	30.0	31.1	31.3	32.2	
G20 w	30.8	31.1	31.6	32.2	32.1	32.2	32.6	35.0	36.2	36.3	36.6	
OECD*	17.7	18.1	18.5	18.6	18.7	18.7	18.9	19.1	20.2	20.7	21.4	
OECD w	28.5	29.1	29.6	30.2	30.2	30.3	30.6	30.7	31.9	32.3	32.7	
92 Country*	18.6	18.0	18.6	19.1	19.0	18.9	19.3	19.9	20.9	21.2	21.9	

* = Simple average, w= GDP-weighted average.

TABLE A.3 MARGINAL EFFECTIVE TAX RATES BY COUNTRY: MANUFACTURING AND SERVICES (2005 AND 2015)

	Overall	Manufacturing	Service	Difference	Overall	Manufacturing	Service	Difference	Effective CIT Rate		Ranking Overall METR (Descending)	
	2015				2005				2015	2005	2015	2005
Australia	25.7	27.2	25.5	1.7	25.7	27.3	25.5	1.8	30.0	30.0	17	28
Austria	23.5	23.3	23.6	0.3	23.5	23.3	23.6	0.3	25.0	25.0	23	34
Belgium	18.4	17.7	18.6	0.9	22.9	22.0	23.1	1.1	34.0	34.0	40	35
Canada	20.0	12.3	23.1	10.8	38.8	35.4	41.8	6.4	26.6	34.2	35	8
Chile	6.8	7.5	6.7	0.8	4.8	5.3	4.7	0.6	22.5	17.0	87	90
Czech Republic	12.1	12.1	12.1	0.0	17.2	17.3	17.2	0.1	19.0	26.0	69	58
Denmark	17.0	18.6	16.7	1.9	20.6	22.4	20.3	2.1	23.5	28.0	46	44
Estonia	10.6	10.6	10.6	0.0	13.4	13.4	13.4	0.0	20.0	24.0	74	72
Finland	12.6	14.1	12.1	2.0	17.0	18.9	16.4	2.5	20.0	26.0	67	59
France	36.1	37.8	35.9	1.9	35.1	36.7	34.9	1.8	38.0	35.0	5	13
Germany	23.8	25.9	23.2	2.7	33.8	36.2	33.1	3.1	29.7	38.9	22	15
Greece	11.3	9.3	11.5	2.2	17.3	16.0	17.4	1.4	29.0	32.0	72	57
Hungary	15.1	15.8	14.9	0.9	13.2	13.8	13.0	0.8	19.0	16.0	53	74
Iceland	12.7	8.7	13.3	4.6	11.3	7.8	11.9	4.1	20.0	18.0	64	78
Ireland	10.4	9.6	10.6	1.0	10.4	9.6	10.6	1.0	12.5	12.5	75	81
Israel	15.5	13.6	15.8	2.2	18.7	16.6	19.1	2.5	26.5	31.0	51	53
Italy	8.3	8.6	8.3	0.3	32.5	30.5	33.0	2.5	31.4	37.3	84	17
Japan	42.1	41.4	42.3	0.9	45.8	45.3	46.0	0.7	33.1	39.5	4	3
Korea S.	24.1	26.0	23.2	2.8	26.9	29.0	25.9	3.1	24.2	27.5	20	25
Luxembourg	12.5	13.5	12.5	1.0	14.9	16.0	14.8	1.2	30.0	30.4	68	67
Mexico	17.3	18.9	17.0	1.9	17.4	18.9	17.0	1.9	30.0	30.0	43	56
Netherlands	17.1	16.0	17.3	1.3	22.2	20.9	22.4	1.5	25.0	31.5	45	38
New Zealand	20.9	21.5	20.8	0.7	20.1	17.9	20.5	2.6	28.0	33.0	33	48
Norway	23.0	21.6	23.2	1.6	23.9	22.4	24.1	1.7	27.0	28.0	26	33
Poland	11.5	10.2	11.9	1.7	13.3	12.2	13.7	1.5	19.0	19.0	71	73
Portugal	20.9	18.7	21.3	2.6	19.3	17.2	19.7	2.5	29.5	27.5	32	51
Slovak Republic	15.6	19.5	14.1	5.4	13.0	15.3	12.1	3.2	24.0	20.4	50	76
Slovenia	5.4	5.1	5.5	0.4	14.7	14.7	14.7	0.0	17.0	25.0	89	70
Spain	22.2	21.1	22.4	1.3	28.4	27.1	28.6	1.5	28.0	35.0	29	23
Sweden	15.2	13.9	15.5	1.6	19.8	18.3	20.2	1.9	22.0	28.0	52	49
Switzerland	10.0	9.1	10.2	1.1	15.9	14.9	16.1	1.2	17.9	21.3	79	63
Turkey	5.7	4.9	5.9	1.0	11.0	9.9	11.3	1.4	20.0	30.0	88	80
United Kingdom	22.9	22.4	23.0	0.6	29.7	27.1	30.0	2.9	20.0	30.0	27	19
United States	34.6	32.1	36.0	3.9	35.2	33.7	36.1	2.4	39.1	39.3	6	12
Brazil	45.5	45.3	45.6	0.3	42.3	19.8	47.3	27.5	34.0	27.8	3	5
China	24.1	27.1	21.9	5.2	48.3	50.5	46.7	3.8	25.0	25.0	21	2
India	57.1	36.6	62.1	25.5	57.7	47.4	60.3	12.9	34.6	36.6	1	1
Russia	29.0	31.7	28.3	3.4	34.8	37.7	34.2	3.5	20.0	22.0	11	14
Argentina	33.9	39.4	32.0	7.4	36.8	50.7	32.0	18.7	35.0	35.0	8	11
Bolivia	24.3	30.7	22.8	7.9	21.4	28.6	19.7	8.9	25.0	25.0	18	42

Botswana	13.4	8.8	13.9	5.1	14.8	8.8	15.5	6.7	21.4	24.1	61	69
Bulgaria	6.8	6.6	6.9	0.3	7.7	7.9	7.7	0.2	10.0	15.0	86	88
Chad	27.2	31.5	26.3	5.2	39.0	43.0	38.2	4.8	40.0	45.0	14	7
Colombia	16.7	20.0	16.0	4.0	26.5	29.1	26.0	3.1	34.5	35.0	47	26
Costa Rica	26.0	31.1	24.6	6.5	25.0	30.4	23.6	6.8	30.0	30.0	16	29
Croatia	13.2	16.2	12.7	3.5	8.9	11.1	8.4	2.7	30.0	22.0	62	85
Dominican Republic	22.9	25.7	22.2	3.5	22.8	23.8	22.5	1.3	27.0	25.0	28	36
Ecuador	33.8	35.1	33.5	1.6	38.1	39.8	37.8	2.0	12.0	15.0	9	9
Egypt	7.9	17.4	5.0	12.4	10.4	20.8	7.2	13.6	23.1	34.0	85	83
Ethiopia	14.0	27.7	12.7	15.0	14.3	27.6	13.0	14.6	30.0	30.0	56	71
Fiji	13.0	16.2	12.4	3.8	21.6	26.1	20.7	5.4	20.0	31.0	63	40
Georgia	23.2	24.2	22.9	1.3	22.6	24.7	22.2	2.5	15.0	20.0	25	37
Ghana	10.2	14.7	9.6	5.1	10.4	14.8	9.7	5.1	25.0	25.0	76	82
Guyana	34.5	28.3	35.1	6.8	38.0	28.6	39.0	10.4	39.0	39.0	7	10
Hong Kong	0.9	-2.1	1.0	3.1	1.1	-2.1	1.2	3.3	16.5	17.5	92	92
Indonesia	19.7	22.8	18.3	4.5	24.2	27.6	22.5	5.1	25.0	30.0	36	32
Iran	10.1	25.4	6.1	19.3	9.2	22.6	5.7	16.9	28.0	25.0	77	84
Jamaica	28.7	33.0	28.3	4.7	20.3	15.0	20.9	5.9	27.9	33.3	12	46
Jordan	10.1	8.9	10.3	1.4	17.9	12.9	19.0	6.1	19.0	21.7	78	55
Kazakhstan	26.9	29.9	26.4	3.5	29.4	34.0	28.6	5.4	32.0	40.5	15	20
Kenya	15.0	-8.0	19.8	27.8	15.1	-7.7	19.8	27.5	30.0	30.0	54	66
Kuwait	9.8	10.6	9.7	0.9	44.9	50.1	44.1	6.0	17.0	55.0	80	4
Latvia	17.8	16.1	18.0	1.9	6.2	6.9	6.1	0.8	15.0	15.0	41	89
Lesotho	24.1	12.4	27.1	14.7	33.7	18.3	37.5	19.2	22.0	31.0	19	16
Madagascar	12.7	16.5	11.8	4.7	20.5	25.7	19.3	6.4	20.0	30.0	65	45
Malaysia	17.2	19.0	16.3	2.7	19.6	21.5	18.7	2.8	25.0	28.0	44	50
Morocco	13.7	17.8	12.8	5.0	15.9	20.4	15.0	5.4	31.4	35.0	58	62
Nigeria	12.7	20.3	11.8	8.5	12.8	20.3	11.9	8.4	32.0	32.0	66	77
Pakistan	30.3	29.3	30.6	1.3	27.0	29.7	26.4	3.3	33.0	35.0	10	24
Panama	21.3	22.1	21.2	0.9	21.5	22.2	21.4	0.8	25.0	30.0	31	41
Paraguay	13.6	17.1	12.8	4.3	25.0	30.8	23.8	7.0	10.0	30.0	59	30
Peru	21.3	21.7	21.2	0.5	24.2	29.8	22.8	7.0	28.0	30.0	30	31
Philippines	28.0	29.1	27.6	1.5	29.0	31.2	28.2	3.0	30.0	35.0	13	21
Qatar	5.2	7.3	4.9	2.4	21.6	27.5	20.6	6.9	10.0	35.0	90	39
Romania	3.4	4.4	3.0	1.4	3.5	4.5	3.1	1.4	16.0	16.0	91	91
Rwanda	18.8	25.7	18.1	7.6	18.3	25.4	17.7	7.7	30.0	30.0	39	54
Saudi Arabia	19.0	17.7	19.4	1.7	20.3	17.7	20.9	3.2	20.0	20.0	38	47
Serbia	10.6	11.9	10.3	1.6	7.8	8.6	7.6	1.0	15.0	10.0	73	87
Sierra Leone	16.6	11.4	16.9	5.5	20.9	15.3	21.3	6.0	30.0	35.0	48	43
Singapore	9.3	7.0	10.1	3.1	11.2	8.6	12.1	3.5	17.0	20.0	82	79
South Africa	14.2	15.5	13.9	1.6	15.6	17.0	15.3	1.7	28.0	30.0	55	64
Tanzania	20.3	15.8	20.9	5.1	18.9	14.3	19.6	5.3	30.0	30.0	34	52
Thailand	9.8	12.5	8.3	4.2	16.1	20.0	14.1	5.9	20.0	30.0	81	61
Trinidad and Tobago	13.4	5.7	17.4	11.7	16.9	7.9	21.4	13.5	25.0	30.0	60	60
Tunisia	16.0	17.4	15.7	1.7	25.7	28.6	25.1	3.5	26.2	35.0	49	27
Uganda	19.6	25.3	18.9	6.4	14.9	10.1	15.5	5.4	30.0	30.0	37	68

Ukraine	13.8	15.6	13.3	2.3	13.1	16.8	12.1	4.7	18.0	25.0	57	75
Uruguay	23.4	21.2	23.8	2.6	28.5	30.2	28.1	2.1	25.0	30.0	24	22
Uzbekistan	49.0	50.0	48.7	1.3	39.1	41.7	38.3	3.4	14.9	19.0	2	6
Venezuela	17.6	17.5	17.6	0.1	30.2	30.8	30.0	0.8	34.5	34.0	42	18
Vietnam	11.8	17.6	8.8	8.8	15.4	22.6	11.7	10.9	22.0	28.0	70	65
Zambia	8.5	13.2	7.8	5.4	8.7	13.3	8.0	5.3	35.0	35.0	83	86
G7*	26.8	25.8	27.4	1.6	35.8	35.0	36.4	1.4	34.6	37.9		
G20*	26.5	25.8	26.5	0.7	32.2	31.3	32.2	0.9	32.5	35.2		
OECD*	17.7	17.3	17.8	0.5	21.4	21.0	21.5	0.5	25.3	28.2		
92 Country*	18.6	19.1	18.5	0.6	21.9	22.3	21.7	0.6	25.0	28.6		

* = Simple average, w=GDP- weighted average.

TABLE A.4 MARGINAL-EFFECTIVE-TAX-RATE INPUTS

2015	Inflation	Tax Depreciation Range			Inventory Acounting
Australia	2.6%	2.6%	-	22.1%	Optional
Austria	2.2%	3.1%	-	10.6%	Optional
Belgium	2.0%	7.0%	-	32.9%	LIFO
Canada	2.0%	0.0%	-	0.0%	0.0%
Chile	2.8%	7.5%	-	39.7%	LIFO
Czech Republic	1.7%	3.1%	-	20.8%	Optional
Denmark	1.8%	5.1%	-	22.7%	FIFO
Estonia	2.9%	0.0%	-	0.0%	LIFO
Finland	2.0%	8.2%	-	28.7%	FIFO
France	1.4%	3.1%	-	26.5%	Optional
Germany	1.5%	3.1%	-	14.4%	LIFO
Greece	1.5%	5.3%	-	39.2%	LIFO
Hungary	3.2%	3.3%	-	48.1%	Optional
Iceland	4.1%	3.3%	-	30.5%	FIFO
Ireland	0.8%	2.0%	-	12.4%	FIFO
Israel	2.0%	4.2%	-	29.8%	Optional
Italy	1.8%	5.1%	-	15.3%	LIFO
Japan	0.4%	2.0%	-	21.3%	Optional
Korea S.	2.4%	2.6%	-	20.1%	LIFO
Luxembourg	2.1%	4.1%	-	21.0%	Optional
Mexico	3.9%	5.1%	-	15.4%	LIFO
Netherlands	1.9%	2.9%	-	20.9%	Optional
New Zealand	2.0%	6.5%	-	22.1%	Optional
Norway	1.7%	3.6%	-	24.5%	FIFO
Poland	2.3%	2.6%	-	25.8%	LIFO
Portugal	1.6%	2.2%	-	19.8%	Optional
Slovak Republic	2.0%	5.0%	-	17.3%	Optional
Slovenia	1.6%	3.5%	-	21.6%	Optional
Spain	1.7%	2.1%	-	29.2%	Optional
Sweden	1.0%	3.2%	-	19.5%	FIFO
Switzerland	0.0%	5.7%	-	31.9%	LIFO
Turkey	8.1%	12.5%	-	48.8%	Optional
United Kingdom	2.9%	1.4%	-	17.7%	FIFO
United States	2.0%	0.0%	-	0.0%	0.0%
Brazil	5.9%	4.1%	-	11.7%	Optional
China	3.2%	7.0%	-	14.6%	Optional
India	9.5%	5.1%	-	35.0%	Optional
Russia	7.0%	3.1%	-	20.8%	Optional
Argentina	12.6%	4.1%	-	11.7%	LIFO
Bolivia	5.7%	2.6%	-	16.9%	FIFO
Botswana	6.7%	2.5%	-	24.5%	Optional
Bulgaria	1.8%	4.0%	-	30.2%	Optional

Chad	2.2%	5.1%	-	16.2%	Optional
Colombia	2.8%	5.0%	-	19.4%	LIFO
Costa Rica	5.0%	2.1%	-	14.0%	LIFO
Croatia	1.7%	5.0%	-	29.8%	Optional
Dominican Republic	5.3%	6.8%	-	17.7%	LIFO
Ecuador	3.9%	5.0%	-	15.0%	LIFO
Egypt	9.6%	5.1%	-	26.8%	Optional
Ethiopia	16.6%	5.0%	-	21.0%	Optional
Fiji	3.6%	5.0%	-	17.8%	FIFO
Georgia	3.5%	7.0%	-	21.8%	Optional
Ghana	11.2%	10.0%	-	29.6%	Optional
Guyana	2.3%	2.8%	-	35.1%	Optional
Hong Kong	4.1%	3.6%	-	92.9%	Optional
Indonesia	5.5%	5.1%	-	14.0%	Optional
Iran	23.6%	5.0%	-	10.4%	Optional
Jamaica	9.0%	3.8%	-	12.8%	Optional
Jordan	4.5%	4.0%	-	23.9%	Optional
Kazakhstan	6.6%	10.0%	-	26.0%	Optional
Kenya	8.1%	2.5%	-	28.5%	Optional
Kuwait	3.6%	4.2%	-	20.4%	Optional
Latvia	1.2%	10.0%	-	40.8%	Optional
Lesotho	5.0%	5.0%	-	20.0%	FIFO
Madagascar	7.4%	5.0%	-	16.5%	Optional
Malaysia	2.4%	2.8%	-	16.7%	FIFO
Morocco	1.1%	7.6%	-	33.1%	Optional
Nigeria	10.7%	10.0%	-	24.8%	FIFO
Pakistan	10.1%	10.0%	-	25.2%	Optional
Panama	4.4%	6.5%	-	22.1%	LIFO
Paraguay	4.9%	3.3%	-	15.9%	Optional
Peru	2.9%	4.6%	-	20.0%	Optional
Philippines	3.7%	6.5%	-	22.1%	Optional
Qatar	1.5%	5.0%	-	19.4%	Optional
Romania	4.1%	3.4%	-	24.7%	LIFO
Rwanda	4.7%	4.1%	-	19.7%	Optional
Saudi Arabia	4.1%	5.0%	-	24.3%	Optional
Serbia	6.9%	2.5%	-	14.8%	Optional
Sierra Leone	12.7%	11.0%	-	37.1%	Optional
Singapore	3.2%	3.1%	-	24.6%	FIFO
South Africa	5.3%	5.0%	-	25.0%	Optional
Tanzania	9.9%	5.0%	-	25.3%	Optional
Thailand	2.8%	5.0%	-	21.0%	Optional
Trinidad and Tobago	7.2%	10.0%	-	24.9%	Optional
Tunisia	4.8%	5.0%	-	20.3%	Optional
Uganda	9.5%	5.0%	-	29.7%	Optional
Ukraine	6.1%	8.0%	-	37.2%	Optional
Uruguay	8.1%	2.8%	-	10.0%	LIFO

Uzbekistan	4.5%	5.0%	-	18.7%	Optional
Venezuela	37.7%	6.5%	-	22.1%	LIFO
Vietnam	9.6%	3.4%	-	25.1%	Optional
Zambia	7.3%	5.1%	-	47.3%	Optional

TABLE A.5 PROVINCIAL AND OECD METRS BY YEAR (2005 TO 2015)

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2015 Rank (Descending)
Japan	42.1%	44.3%	44.3%	45.8%	45.8%	45.8%	45.8%	45.8%	45.8%	45.8%	45.8%	1
France	36.1%	35.4%	34.8%	34.8%	34.8%	33.7%	34.8%	34.8%	34.8%	33.8%	35.1%	2
United States	34.6%	34.6%	34.6%	34.6%	34.6%	34.6%	34.9%	34.9%	34.9%	35.2%	35.2%	3
Manitoba	28.4%	27.9%	26.2%	26.2%	27.2%	29.8%	31.1%	33.0%	36.3%	40.6%	39.6%	4
British Columbia	27.9%	27.5%	27.5%	17.8%	19.0%	19.9%	29.1%	29.5%	32.2%	35.2%	39.2%	5
Australia	25.7%	25.7%	25.7%	25.7%	25.7%	25.7%	25.7%	25.7%	25.7%	25.7%	25.7%	6
Saskatchewan	24.8%	24.3%	24.3%	24.3%	25.3%	26.0%	26.3%	26.8%	31.4%	38.3%	43.7%	7
Korea S.	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	26.9%	26.9%	26.9%	26.9%	8
Germany	23.8%	24.3%	24.3%	24.3%	24.3%	24.3%	24.3%	24.3%	33.8%	33.8%	33.8%	9
Austria	23.5%	23.5%	23.5%	23.5%	23.5%	23.5%	23.5%	23.5%	23.5%	23.5%	23.5%	10
Norway	23.0%	23.0%	23.9%	23.9%	23.9%	23.9%	23.9%	23.9%	23.9%	23.9%	23.9%	11
United Kingdom	22.9%	23.4%	25.5%	28.4%	26.8%	28.7%	28.6%	28.4%	29.7%	29.7%	29.7%	12
Spain	22.2%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	26.2%	28.4%	28.4%	13
New Zealand	20.9%	20.9%	20.9%	18.7%	20.9%	17.9%	17.9%	17.9%	20.1%	20.1%	20.1%	14
Portugal	20.9%	22.5%	22.6%	19.1%	20.5%	20.5%	18.6%	18.6%	18.6%	19.3%	19.3%	14
Canada	20.0%	19.0%	18.8%	17.5%	18.8%	19.9%	27.3%	28.0%	30.9%	36.2%	38.8%	16
Alberta	19.3%	17.0%	17.0%	17.0%	18.2%	19.0%	20.0%	20.6%	23.0%	26.6%	31.7%	17
Ontario	18.9%	18.2%	18.2%	18.2%	19.3%	20.3%	32.9%	33.2%	35.1%	40.7%	43.3%	18
Belgium	18.4%	15.3%	15.3%	15.3%	15.3%	15.3%	15.3%	15.3%	14.6%	14.6%	22.9%	19
Mexico	17.3%	17.3%	17.4%	16.3%	17.4%	17.4%	16.0%	16.0%	16.0%	16.7%	17.4%	20
Netherlands	17.1%	17.1%	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%	20.7%	22.2%	21
Quebec	17.1%	15.9%	15.2%	15.2%	17.5%	18.5%	19.9%	21.1%	26.2%	33.7%	36.1%	22
Denmark	17.0%	17.7%	18.2%	18.2%	18.2%	18.2%	18.2%	18.2%	18.2%	20.6%	20.6%	23
Nova Scotia	16.7%	13.4%	6.9%	6.9%	9.6%	11.6%	19.6%	21.0%	24.2%	29.3%	28.1%	24
Slovak Republic	15.6%	15.6%	14.9%	13.4%	13.4%	13.4%	13.4%	13.4%	13.4%	13.4%	13.0%	25
Israel	15.5%	15.5%	14.5%	15.0%	13.8%	14.5%	15.1%	15.8%	17.3%	18.7%	18.7%	26
Sweden	15.2%	15.2%	15.2%	18.5%	18.5%	18.5%	18.5%	19.8%	19.8%	19.8%	19.8%	27
Hungary	15.1%	14.3%	14.3%	14.6%	14.3%	14.3%	14.7%	14.7%	14.7%	14.3%	13.2%	28
Iceland	12.7%	12.7%	12.7%	9.7%	12.7%	11.3%	9.4%	9.4%	11.3%	11.3%	11.3%	29
Finland	12.6%	12.6%	15.9%	16.7%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	30
Luxembourg	12.5%	12.0%	12.0%	11.5%	11.7%	11.5%	11.5%	13.3%	14.4%	14.4%	14.9%	31
Czech Republic	12.1%	12.1%	12.1%	12.6%	12.1%	12.1%	12.8%	13.5%	15.7%	15.7%	17.2%	32
Prince Edward Island	12.0%	11.2%	11.4%	28.1%	29.2%	29.8%	30.7%	31.2%	33.4%	37.0%	37.5%	33
Poland	11.5%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	34
Newfoundland	11.4%	10.7%	10.7%	10.7%	12.1%	13.1%	14.7%	15.5%	18.4%	22.1%	21.1%	35
Greece	11.3%	14.0%	14.1%	13.4%	11.2%	13.1%	13.6%	13.6%	13.6%	15.6%	17.3%	36
Estonia	10.6%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	12.0%	12.7%	13.4%	37
Ireland	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	10.4%	38
Switzerland	10.0%	15.3%	15.3%	15.3%	15.3%	15.3%	15.3%	15.3%	15.9%	15.9%	15.9%	39
Italy	8.3%	12.9%	21.2%	26.8%	27.2%	27.2%	27.2%	27.3%	32.5%	32.5%	32.5%	40
Chile	6.8%	6.2%	5.9%	5.0%	5.9%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	41
New Brunswick	6.3%	4.8%	3.8%	2.8%	4.3%	6.3%	8.6%	16.9%	21.0%	27.1%	22.3%	42
Turkey	5.7%	5.7%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	11.0%	43
Slovenia	5.4%	5.4%	5.4%	6.8%	6.6%	6.6%	7.1%	7.5%	13.3%	14.0%	14.7%	44

TABLE A.6 MARGINAL EFFECTIVE TAX RATES BY INDUSTRY AND PROVINCE, 2015

2015	Agriculture	Forestry	Electrical Power, Gas & Water	Construction	Manufacturing	Wholesale Trade	Retail Trade	Transportation and Storage	Communications	Other services	Aggregate
Canada*	18.7%	8.8%	19.5%	25.0%	12.3%	23.3%	23.7%	20.0%	24.1%	25.1%	**20.0%**
Newfoundland	11.4%	-43.7%	0.0%	24.3%	-33.6%	21.8%	23.5%	19.4%	22.0%	21.7%	**11.4%**
Prince Edward Island	3.8%	-103.6%	0.0%	26.4%	-75.3%	25.6%	25.9%	23.2%	23.0%	26.9%	**12.0%**
Nova Scotia	13.8%	-13.9%	21.9%	26.4%	-7.4%	25.3%	25.7%	21.1%	23.9%	23.7%	**16.7%**
New Brunswick	2.7%	-33.9%	18.7%	22.8%	-25.1%	21.8%	22.2%	17.8%	20.5%	20.3%	**6.3%**
Quebec	18.2%	4.5%	18.7%	22.7%	8.5%	22.1%	22.4%	17.0%	20.4%	24.6%	**17.1%**
Ontario	17.8%	12.9%	18.2%	22.3%	14.6%	21.3%	21.8%	17.5%	20.0%	23.3%	**18.9%**
Manitoba	24.4%	6.3%	24.8%	36.8%	6.7%	31.1%	30.8%	28.6%	40.3%	37.3%	**28.4%**
Saskatchewan	22.2%	13.1%	22.8%	32.1%	15.0%	29.0%	28.2%	23.5%	35.4%	31.1%	**24.8%**
Alberta	18.1%	14.7%	18.7%	22.8%	17.6%	21.8%	22.2%	18.1%	20.5%	20.3%	**19.3%**
British Columbia	23.4%	17.9%	23.5%	34.6%	20.2%	29.4%	29.1%	24.4%	37.5%	33.1%	**27.9%**

About the Authors

Philip Bazel is a Research Associate at The School of Public Policy at the University of Calgary. In addition to publishing through The School of Public Policy, Philip has also played a role in a number of projects consulting for both governments and private organisations in the area of taxation and public finance.

Jack M. Mintz became the President's Fellow of The School of Public Policy at the University of Calgary on July 1, 2015, after serving as the Director and Palmer Chair in Public Policy since January 2008. He serves on the boards of Imperial Oil Limited and Morneau Shepell, and is Chair and Vice-President of the Social Sciences and Humanities Research Council of Canada. He also serves as an Associate Editor of *International Tax and Public Finance* and the *Canadian Tax Journal*, and is a Research Fellow of CESifo, Munich, Germany, and the Centre for Business Taxation Institute, Oxford University.

Dr. Mintz has consulted widely with the World Bank, the International Monetary Fund, the Organization for Economic Co-operation and Development, federal and provincial governments in Canada, and various businesses and non-profit organizations. Dr. Mintz became a member of the Order of Canada in 2015 in addition to receiving the Queen Elizabeth Diamond Jubilee Medal in 2012. Widely published in the field of public economics, he was touted in a 2004 U.K. magazine publication as one of the world's most influential tax experts. The *Financial Post* named him one of the five most influential Canadians in regulation in 2012. In the 2015 Who's Who Legal, he was named one of the top experts in the world and the Public Policy Forum honored him for his contribution to public policy in 2015 at its annual dinner.

ABOUT THE SCHOOL OF PUBLIC POLICY

The School of Public Policy has become the flagship school of its kind in Canada by providing a practical, global and focused perspective on public policy analysis and practice in areas of energy and environmental policy, international policy and economic and social policy that is unique in Canada.

The mission of The School of Public Policy is to strengthen Canada's public service, institutions and economic performance for the betterment of our families, communities and country. We do this by:

- *Building capacity in Government* through the formal training of public servants in degree and non-degree programs, giving the people charged with making public policy work for Canada the hands-on expertise to represent our vital interests both here and abroad;
- *Improving Public Policy Discourse outside Government* through executive and strategic assessment programs, building a stronger understanding of what makes public policy work for those outside of the public sector and helps everyday Canadians make informed decisions on the politics that will shape their futures;
- *Providing a Global Perspective on Public Policy Research* through international collaborations, education, and community outreach programs, bringing global best practices to bear on Canadian public policy, resulting in decisions that benefit all people for the long term, not a few people for the short term.

Our research is conducted to the highest standards of scholarship and objectivity. The decision to pursue research is made by a Research Committee chaired by the Research Director and made up of Area and Program Directors. All research is subject to blind peer-review and the final decision whether or not to publish is made by an independent Director.

The School of Public Policy
University of Calgary, Downtown Campus
906 8th Avenue S.W., 5th Floor
Calgary, Alberta T2P 1H9
Phone: 403 210 3802

DISTRIBUTION
Our publications are available online at www.policyschool.ca.

DISCLAIMER
The opinions expressed in these publications are the authors' alone and therefore do not necessarily reflect the opinions of the supporters, staff, or boards of The School of Public Policy.

COPYRIGHT
Copyright © 2016 by The School of Public Policy.
All rights reserved. No part of this publication may be reproduced in any manner whatsoever without written permission except in the case of brief passages quoted in critical articles and reviews.

ISSN
1919-112x SPP Research Papers (Print)
1919-1138 SPP Research Papers (Online)

DATE OF ISSUE
November 2016

MEDIA INQUIRIES AND INFORMATION
For media inquiries, please contact Morten Paulsen at 403-220-2540. Our web site, www.policyschool.ca, contains more information about The School's events, publications, and staff.

DEVELOPMENT
For information about contributing to The School of Public Policy, please contact Paul Beaudry by telephone at 403-220-4624 or by e-mail at paul.beaudry1@ucalgary.ca.

RECENT PUBLICATIONS BY THE SCHOOL OF PUBLIC POLICY

IF IT MATTERS, MEASURE IT: UNPACKING DIVERSIFICATION IN CANADA
http://www.policyschool.ca/wp-content/uploads/2016/11/Diversification-in-Canada-Tombe-Mansell.pdf
Trevor Tombe and Robert Mansell | November 2016

ALBERTA'S NEW ROYALTY REGIME IS A STEP TOWARDS COMPETITIVENESS: A 2016 UPDATE
http://www.policyschool.ca/wp-content/uploads/2016/10/AB-New-Royalty-Regime-Crisan-Mintz-final.pdf
Daria Crisan and Jack Mintz | October 2016

A RULE OF REASON FOR INWARD FDI: INTEGRATING CANADIAN FOREIGN INVESTMENT REVIEW AND COMPETITION POLICY
http://www.policyschool.ca/wp-content/uploads/2016/10/Foreign-Investment-Bishop-Final.pdf
Grant Bishop | October 2016

FROM IMPACT ASSESSMENT TO THE POLICY CYCLE: DRAWING LESSONS FROM THE EU'S BETTER-REGULATION AGENDA
http://www.policyschool.ca/wp-content/uploads/2016/10/Financial-Regulation-Renda.pdf
Andrea Renda | October 2016

GETTING FINANCIAL REGULATIONS RIGHT: AVOIDING UNINTENDED EFFECTS
http://www.policyschool.ca/wp-content/uploads/2016/10/Financial-Regulations-Coolidge-Mintz.pdf
Jacqueline Coolidge and Jack Mintz | October 2016

ON THE ROLE & FUTURE OF CALGARY'S COMMUNITY ASSOCIATIONS
http://www.policyschool.ca/wp-content/uploads/2016/10/Community-Associations-Conger-Goodbrand-GondekFINAL-1.pdf
Brian Conger, Jyoti Gondek and Pernille Goodbrand | October 2016

DO INSIDERS COMPLY WITH DISCLOSURE RULES? EVIDENCE FROM CANADA, 1996-2011
http://www.policyschool.ca/wp-content/uploads/2016/10/Insider-Trading-TeddsFINAL.pdf
Lindsay M. Tedds | October 2016

WHAT STATISTICS CANADA SURVEY DATA SOURCES ARE AVAILABLE TO STUDY NEURODEVELOPMENTAL CONDITIONS AND DISABILITIES IN CHILDREN AND YOUTH?
http://www.policyschool.ca/wp-content/uploads/2016/09/Neurodevelopmental-Arim-Findlay-Kohen.pdf
Rubab G. Arim, Leanne C. Findlay and Dafna E. Kohen | September 2016

A PRACTICAL GUIDE TO THE ECONOMICS OF CARBON PRICING
http://www.policyschool.ca/wp-content/uploads/2016/09/Carbon-Pricing-McKitrickFINAL.pdf
Ross McKitrick | September 2016

THE VERY POOR AND THE AFFORDABILITY OF HOUSING
http://www.policyschool.ca/wp-content/uploads/2016/09/Affordability-of-Housing-Kneebone-Wilkins.pdf
Ron Kneebone and Margarita Gres Wilkins | September 2016

CHALLENGES FOR DEMOCRACIES IN RESPONDING TO TERRORISM: A VIEW FROM CANADA AND ISREAL
http://www.policyschool.ca/wp-content/uploads/2016/09/Challenges-for-Democracy-Rioux-Shields.pdf
Jean-Sébastien Rioux and Maureen Shields | September 2016

THE CHALLENGE OF INTEGRATING RENEWABLE GENERATION IN THE ALBERTA ELECTRICITY MARKET
http://www.policyschool.ca/wp-content/uploads/2016/09/Renewables-AB-Electricity-Market-Fellows-Moore-Shaffer.pdf
G. Kent Fellows, Michal Moore and Blake Shaffer | September 2016