
Provincial Taxation of High Incomes: The Effects on Progressivity and Tax Revenue

Kevin Milligan and Michael Smart

WHEN PUBLIC FINANCE ECONOMISTS CONSIDER TAXATION IN A FEDERATION, THEY traditionally advise locating redistributive taxes such as the personal income tax at the federal level, rather than with local — in Canada's case, provincial — governments. The reason is that local-level taxes might lead to competition for labour and capital that are mobile across jurisdictions, which constrains the redistributive ability of local governments.¹ Recent Canadian experience, however, contrasts with traditional advice. Over the past five years, seven provinces have implemented new top tax brackets and increased tax rates on upper incomes. At the federal level, in contrast, the top marginal tax rate has not changed since surtaxes were removed in 2000. This tax-rate freeze might just be an idiosyncrasy of the parties in power over the period, but until recently there were no indications that any major federal party was inclined to change the status quo.² Meanwhile, over the past quarter-century, there has been a strong trend toward the concentration of income at the top of the income distribution,³ and increasing income inequality as a result. This, in turn, has created political pressure to use the income tax system to push back against the trend.

In this chapter, we explore the consequences of this pressure expressing itself provincially. To consider the effects of increased provincial taxation of high incomes, we examine what would happen if each province were to add a new income tax bracket that begins at the threshold of entry into the top 1 percent of income earners and whose rate is 5 percentage points higher than the prevailing top marginal rate. We postulate such a tax change not to advocate higher tax rates, but to gauge its effect on progressivity and provincial tax revenue and its potential as a policy response to inequality. Our tax revenue estimates depend critically on how taxfilers respond to higher taxes. A growing literature studies this response by estimating the elasticity of

reported income,⁴ in contrast to the more traditional focus on “real” responses such as changes in the labour supply. The advantage of the former approach is that it not only incorporates changes in labour earnings, it also takes into account financial or timing adjustments in reported income through tax planning or other types of tax avoidance. Thus, if taxfilers respond to higher tax rates by stepping up their use of tax shelters or by shifting income out of the jurisdiction, the reported-income elasticity will pick that up.

Our counterfactual tax change yields several interesting results. First, our estimate of reported income elasticity (0.664) is quite large (see also Milligan and Smart 2014): it implies that a 10 percent increase in the marginal tax rate applied to the top 1 percent of income earners would shrink the base of taxable income for this group by 6.64 percent. This suggests that the provinces have only limited scope to raise taxes on top earners while still gaining tax revenue.

Second, we find that applying a new higher-rate tax bracket on top incomes would not have a large impact on average tax rates. Because high earners would pay the new rate only on the portion of their income that exceeded the bracket threshold, the average tax rate of the top 1 percent of earners would not change by the full 5 percentage point increase in their marginal tax rate. For example, an individual who earned a dollar more than the top-1-percent income threshold would see only an infinitesimally small increase in his or her average tax rate, since most of that individual’s income would be taxed at the pre-existing marginal tax rates. This suggests that provinces’ ability to push back against the concentration of income at the top of the distribution is also limited.

Third, there are large disparities across the provinces in terms of potential revenue to be gained per taxfiler from imposing a higher marginal tax rate on top incomes. For example, a rate increase of 5 percentage points on top-1-percent incomes would raise only \$2 per taxfiler in Prince Edward Island (or \$200 per member of the top 1 percent), but \$61 per taxfiler in British Columbia and \$131 per taxfiler in Alberta. Importantly, this disparity is driven in large part by differences across provinces in the distribution of income, as some provinces have substantially higher average income and higher top-1-percent income shares than others, resulting in considerable differences in potential revenue gains across provinces.

Finally, we show that provinces increasing their marginal tax rate on top incomes could have a negative effect on federal tax revenue by shrinking the

reported-income tax base that the federal government also uses to calculate tax owing — although this side effect likely would not factor into provincial governments' decision to increase taxes on top-income earners since it would not affect the provinces directly. The changes in tax rates and structure implemented in most provinces in recent years attest to that.

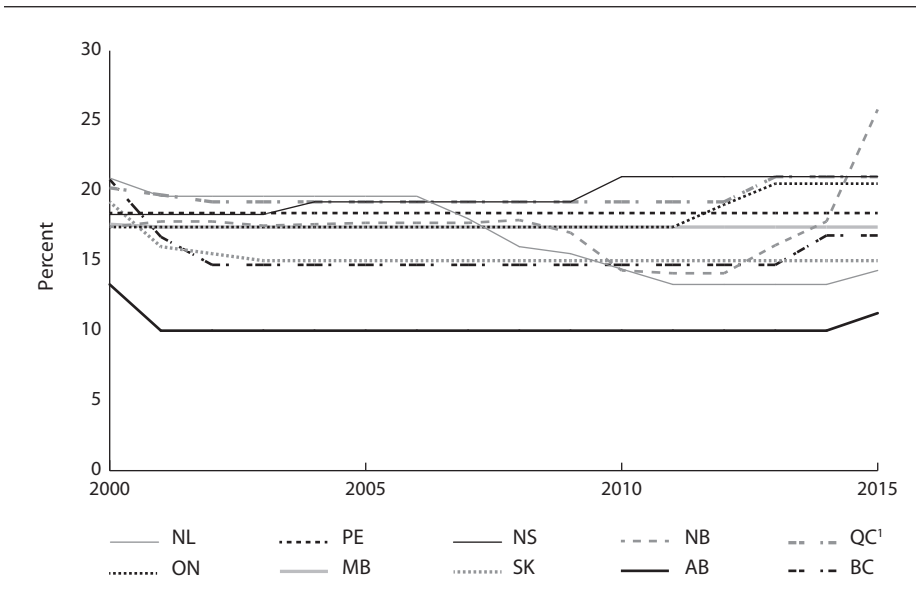
High-Income Taxation in the Provinces

IN CANADA, BOTH THE FEDERAL AND PROVINCIAL GOVERNMENTS HAVE THE CONSTITUTIONAL authority to tax income — in the language of public finance, the income tax base is “co-occupied.” From 1962 to 2000, the federal government collected income tax on behalf of the provinces (except Quebec, which collects its own income tax) under a system called “tax on tax,”⁵ under which each province's income tax rate was set at some proportion of the basic federal tax liability.⁶ This had two important tax policy consequences for the provinces. First, they had limited ability to adjust the progressivity of their tax system beyond that in effect under the federal rate structure. Second, the provinces were obliged to use the federal definition of taxable income for their tax calculations. Starting in 2000, however, changes to the tax collection agreements between the federal government and the provinces removed the first limitation but retained the second. Under the new system, known as “tax on income,” the provinces still must use the federal definition of taxable income but may apply their own tax bracket and rate structure to calculate income tax liability. This change has greatly enhanced their ability to adjust the degree of progressivity in their tax systems.

Figure 1 illustrates how provincial top marginal tax rates have evolved from 2000 to 2015. (We report Quebec's top rate net of the federal tax abatement, to make it comparable with those of other provinces.⁷) From 2001 to 2010, top marginal tax rates remained nearly unchanged in most provinces, although Newfoundland and Labrador and New Brunswick lowered their top rates significantly in the second half of that decade. Since 2010, however, seven provinces have introduced new tax brackets and increased tax rates on upper incomes (see table 1). Nova Scotia was first off the mark in 2010 when it added a new tax bracket and marginal tax rate of 21 percent for those with income over \$150,000. In 2012, Ontario also added a new tax bracket on income over \$500,000 and increased its top marginal tax rate by 2 percentage points over two years to 13.16 percent (20.53 percent including the surtax).⁸ Ontario's non-indexed

income threshold for the top tax bracket was then lowered to \$220,000 in 2014. New Brunswick moved its top marginal tax rate up to 17.84 percent in two stages in 2013 and 2014. It then introduced two additional high-income tax brackets in 2015, bringing its top marginal rate to 25.75 percent on income over \$250,000 (the highest in the country). In 2013, Quebec also introduced a new top tax bracket and higher rate (by 1.75 percentage points) on taxable income over \$100,000. In 2014, British Columbia added a temporary tax bracket on income over \$150,000 and raised its top marginal rate from 14.7 to 16.8 percent. Two new high-income tax brackets were also introduced in Newfoundland and Labrador in 2015, increasing the province's top marginal rate from 13.3 percent to 15.3 percent and its top-tax-bracket income threshold from \$70,016 to \$175,001. Finally, in 2015, Alberta's newly elected government ended the province's long-standing 10-percent-flat-tax regime by introducing four new tax brackets, ranging from 12 percent to 15 percent, on incomes over \$125,000, to be fully implemented in 2016.

Figure 1
Top marginal income tax rates by province, Canada, 2000-2015



Source: Authors' calculations using the Canadian Tax and Credit Simulator (see note 9).

¹ The Quebec rates are reported net of the federal tax abatement.

Table 1

Recent changes in provincial income tax brackets and marginal rates for income over \$100,000

	2015 tax brackets	2015 marginal tax rates (%)	Changes since 2010
NL	\$70,016 to \$125,000 \$125,001 to \$175,000 Over \$175,000	13.3 13.8 (14.3) 14.3 (15.3)	Two new top income tax brackets were introduced effective July 1, 2015. The rates for 2015 are prorated; the rates for 2016 are shown in parentheses.
PE	\$63,970 to \$98,144 Over \$98,144 ¹	16.7 18.4 ¹	No changes.
NS	\$93,001 to \$150,000 Over \$150,000	17.5 21.0	The top tax rate was 19.2% (including a surtax) on income over \$93,000 in 2009. The surtax was abolished and a higher top bracket added in 2010.
NB	\$79,953 to \$129,975 \$129,976 to \$149,999 \$150,000 to \$250,000 Over \$250,000	16.52 17.84 21.0 25.75	The rate on the top bracket (over \$126,662) was increased to 17.84% from 14.3% in 2013. The \$150,000 and \$250,000 brackets were introduced in 2015 and are in effect as of January 2015.
QC ²	\$83,865 to \$102,040 Over \$102,040	24.0 25.75	A new bracket on income of \$100,000 and over was introduced in 2013.
ON	\$81,848 to \$150,000 \$150,001 to \$220,000 Over \$220,000	11.16 12.16 (18.97) 13.16 (20.53)	The top tax rate in 2011 was 11.16% on income over \$75,551. In 2012, a new top bracket was introduced on income over \$500,000, at a rate of 12.16%. The top rate was increased to 13.16% in 2013. In 2014, the top-bracket threshold was lowered to \$220,000 and a new tax bracket and rate of 12.16% applied on income between \$150,001 and \$220,000. The new tax brackets are not indexed. The rates in parentheses include the surtax.
MB	Over \$67,000	17.4	No changes.
SK	\$44,029 to \$125,795 Over \$125,795	13.0 15.0	No changes.
AB	Less than \$125,000 \$125,001 to \$150,000 \$150,001 to \$200,000 \$200,001 to \$300,000 Over \$300,000	10.0 10.5 (12.0) 10.75 (13.0) 11 (14.0) 11.25 (15.0)	The new government has introduced four new tax brackets for upper incomes effective October 2015, bringing an end to the flat-tax regime. The rates for 2015 are prorated; the rates for 2016 are shown in parentheses.
BC	\$86,959 to \$105,592 \$105,593 to \$151,050 Over \$151,050	12.29 14.7 16.8	The 16.8% top bracket is a temporary measure for 2014 and 2015.

Sources: Canada Revenue Agency; Alberta budget 2015-16; New Brunswick budgets 2013-14 and 2015-16; Ontario budget 2014; KPMG; Taxtips.ca.

¹ This bracket is effectively a 10 percent surtax.

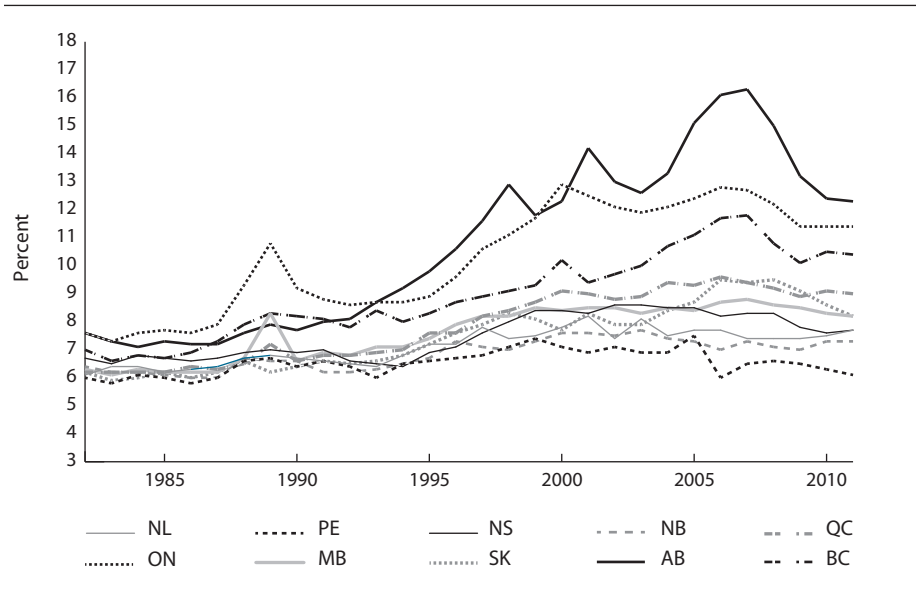
² The Quebec tax rates are not strictly comparable with those of the other provinces because Quebec taxpayers receive a 16.5 percent federal tax abatement as a federal transfer of "tax room." The top marginal rate net of the federal abatement (20.95 percent) should be used to compare Quebec's top rate with the top rates of the other provinces.

Taxes and the Income Share of the Top 1 Percent

THE MOST NOTABLE TREND IN INCOME DISTRIBUTION IN CANADA OVER THE PAST 25 years is the increasing concentration of income at the very top of the distribution. As figure 2 shows, three provinces — Alberta, followed by Ontario and British Columbia — stand out in terms of the increase in the share of income going to the top earners, while the increase in other provinces has been more muted (see also Veall 2012; and Lemieux and Riddell, in this volume).

It might be tempting to draw a conclusion about the relationship between taxes and the rise of high-income concentration by looking at Alberta, where the decoupling from the other provinces coincided with the lowering of the tax rate. For other provinces, however, the correspondence is less clear. In a more detailed empirical analysis (Milligan and Smart 2014), we find that high incomes are considerably responsive to provincial tax rates, with the responsiveness concentrated among the top 1 percent of earners (and especially among the top 0.1 percent).

Figure 2
Income share¹ of the top 1 percent of earners by province, Canada, 1982-2011



Source: Statistics Canada, CANSIM table 204-0002.

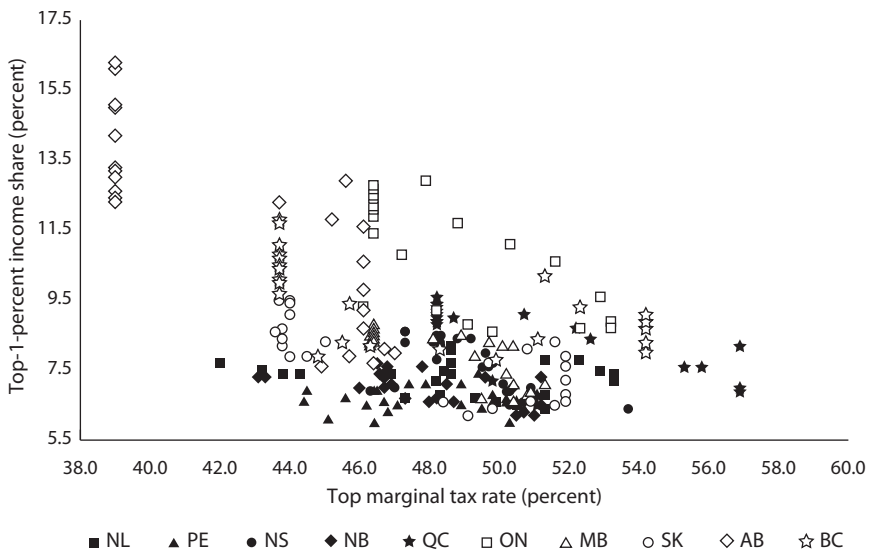
¹ Based on total income excluding capital gains.

Taxes in most provinces went up in the 1980s and 1990s, however, just when the high-income-concentration trend emerged, which is inconsistent with the idea that tax cuts were the main factor driving the rise in income share of the top 1 percent. This leads us to conclude that, despite the responsiveness of top incomes to tax rates, taxes alone explain very little of the emergence of high-income concentration in Canada.

Figure 3 plots the top provincial marginal tax rate by province and year against the top-1-percent income share for the years 1988 to 2011. The cloud shows a negative relationship between income shares and top marginal tax rates. The data points clustered along the y-axis are from Alberta in the 2000s, where the provincial marginal tax rate was 10 percent. Some provinces, such as Ontario and British Columbia, display a fairly consistent negative within-province relationship.

The empirical specification we employ explains the top-1-percent income share in each province using the province’s top marginal tax rate. For these regressions, we use the combined federal and provincial tax rate. We implement the

Figure 3
Top-1-percent income shares¹ and top marginal tax rates by province, Canada, 1988-2011



Sources: Statistics Canada, CANSIM table 204-0002. The tax rates are calculated using the Canadian Tax and Credit Simulator (see note 9).

¹ Based on total income excluding capital gains.

regression with a log specification, allowing the estimated coefficient on the tax rate to be interpreted as an elasticity. The exact estimation equation is

$$\ln\sigma_{pt} = \beta_0 + e \ln(1 - \tau_{pt}) + \beta_1 \ln TotIncome_{pt} + \delta_p + \lambda_t + v_{pt},$$

where p indexes provinces and t indexes years. The natural logarithm of the top-1-percent income share σ_{pt} is on the left-hand side. On the right-hand side we have a constant term, the natural logarithm of the net-of-tax top tax rate $(1 - \tau_{pt})$, the natural logarithm of total provincial income, a set of provincial-fixed effects, δ_p , and a set of time-period-fixed effects, λ_t . We include provincial income to capture any province-specific income trends that affect everyone in a province. The provincial-fixed effects control for any differences across provinces that do not change over time. Finally, the time-fixed effects pick up any national economic trends affecting the income share of the top 1 percent across the country.

This log-share specification is standard in the literature and has been used previously in Canada as well (see Atkinson and Leigh 2010; Finance Canada 2010; Saez 2004; and Saez and Veall 2007). Because we are using provincial-level variation, the elasticity estimates apply most directly to provincial tax-rate changes. If some taxpayers respond to higher provincial taxes by shifting income across provinces, our estimation would pick this up. In the case of a federal-rate change, however, interprovincial income shifting would not occur, since the same federal rate applies in all provinces. To the extent that interprovincial income shifting does occur, this means that our elasticity estimates are less applicable to federal income tax changes.

We implemented the regression equation using data from Statistics Canada's CANSIM high-income database (series 204-0002), which are drawn from tax records and are available for the 1982-2011 period. We selected a sample from 1988 to 2011 because the definition of the income tax base remained stable over that period following the major tax reform that took place in 1988. As a measure of income, we used total income without capital gains, since including them might incorporate transitory responses that would bias the elasticity estimate upward. Following the advice of Solon, Haider and Wooldridge (2015), we used the number of taxfilers as weights to account for the differing underlying sample sizes of the provincial variables. To calculate the top marginal tax rate for each province and year, we used the Canadian Tax and Credit Simulator.⁹

Table 2

Estimates of reported-income elasticity among top-income earners, by income fractile, Canada, 1988-2011

	(1)	(2)	(3)	(4)
Income fractile	99th +	99th +	95th-99th	99.9th +
Observations	240	240	240	190
R-squared	0.942	0.970	0.926	0.952
Reported-income elasticity	0.942* (0.454)	0.664** (0.270)	- 0.004 (0.111)	1.414* (0.615)
Log income		0.633*** (0.0785)	0.0986** (0.0336)	0.843*** (0.183)

Source: Authors' estimates.

Note: The table reports coefficients from regressions of the log share of reported income on the net-of-tax marginal rate with controls on provincial-level data. Each column shows the results of a different regression. All specifications include year-fixed and province-fixed effects.

* $p < .10$ ** $p < .05$ *** $p < .01$

Our regression results are presented in table 2. Column 1 shows the results for 240 observations (10 provinces for 24 years), including just the province and year effects. The estimated reported-income elasticity for the top 1 percent of income earners is 0.942, which is significant at the 10 percent level. In column 2, we add a control for total income in the province to capture any province-wide trends in income that are not specific to the top fractiles. Here, the elasticity estimate drops to 0.664, but it is now significant at the 5 percent level. This elasticity means that a 10 percent change in the (net-of-tax) top marginal rate is predicted to lower the income tax base by 6.64 percent. In columns 3 and 4, we try other fractiles of income to see if the elasticity changes. In column 3, we use the share of income between the 95th and 99th percentiles. The measured elasticity here is very close to zero.¹⁰ Finally, in column 4, we look at the share of income in the 99.9th percentile of income. Here, both Newfoundland and Labrador and Prince Edward Island fall out of the sample because the data were restricted for confidentiality reasons. In this sample, we estimate an elasticity of 1.414, significant at the 10 percent level.

These results suggest that the behavioural response to higher tax rates is much stronger among the top 1 percent of earners — and even more so among the top 10th of the top 1 percent — than among other earners. The response could manifest itself through either a real response (such as a lowering of the labour supply) or a financial response (such as tax planning, shifting or avoidance).¹¹

Given this pattern, it might seem optimal to increase taxes on earners in the 95th to 99th percentiles, where the response to higher tax rates is lower and there is substantial income to be taxed. Of course, moving the target for high-income taxation lower down the distribution would shift the focus away from the top 1 percent, who have seen the largest income gains, and might trigger stronger political resistance.

Our elasticity results are similar to those of Finance Canada (2010), which estimated an elasticity of 0.62 for the top 1 percent using a similar approach, although with different years of data.¹² At the same time, however, our estimated elasticity is outside the 0.12 to 0.40 range that Saez, Slemrod and Giertz (2012, 42) suggest as the range of the “best available estimates,” for which we offer three explanations. First, our estimates focus on provincial rather than federal taxes, and to the extent that individuals can shift income across provincial borders to avoid taxation, we would expect a higher elasticity at the provincial level than at the federal level. Second, as we argue in Milligan and Smart (2014), the province-year variation we exploit is arguably a better basis for inference than the variation used in much of the existing literature. Finally, an individual’s ability to avoid taxes depends on the array of tax measures in place in a particular time and jurisdiction and on the way those tax measures are enforced. An elasticity estimate is valid, therefore, only for the particular tax system in force at the time and in the place(s) covered by the data, and as a result they are not necessarily comparable across jurisdictions. This caveat applies equally for comparisons across countries with different tax systems, and within Canada across periods when material changes were made to the tax system.

Tax incidence is important to keep in mind as well. In response to higher tax rates, it is possible that firms might pay higher pre-tax wages as an incentive to keep employees from moving out of the jurisdiction. In this case, the incidence of a tax increase would be on the employer, rather than on the employee, and any such response would bias our elasticity estimates downward and have important implications for considering the progressivity consequences of a high-income tax increase.

Tax Policy Simulations

OUR SIMULATIONS ARE BASED ON A COUNTERFACTUAL TAX POLICY SCENARIO, WHEREBY each province adds a new tax bracket directed at the top 1 percent of

income earners. The marginal tax rate for the new bracket is 5 percentage points higher than the existing top rate in the province as of 2011, the last year of our data.¹³ The new bracket starts at the total-income threshold — rather than the taxable-income threshold, which our data do not provide — for membership in the top 1 percent, which varies by province. This counterfactual tax scenario is quite salient given that most provinces have added new tax brackets and increased top marginal tax rates on high-income earners in recent years. For ease of reference, we refer to the two tax systems as the “base” and “+5” tax systems.

We report the parameters of the base and +5 tax systems in table 3. The two left-side columns show the 2011 income threshold and marginal rate for the top tax bracket in each province (the base system), along with the top federal tax bracket and rate. The two right-side columns show the bracket thresholds and marginal rates for the counterfactual +5 tax system applied to the top 1 percent of income earners in each province. It is interesting to note that, although the US tax system differs in many ways from Canada’s, in 2011 it featured top brackets

Table 3

Simulated base and +5 tax systems, by province, Canada, 2011

	Base tax system (2011)		+5 tax system	
	Income threshold of top tax bracket (\$)	Marginal tax rate (%)	Income threshold of top-1-percent tax bracket (\$)	Marginal tax rate (%)
NL	63,807	13.3	168,904	18.3
PE	98,145	18.4	139,722	23.4
NS	150,000	21.0	154,588	26.0
NB	120,796	14.3	147,010	19.3
QC ¹	78,120	19.2	169,649	24.2
ON	78,361	17.4	215,316	22.4
MB	67,000	17.4	161,098	22.4
SK	116,911	15.0	180,240	20.0
AB	NA	10.0	281,096	15.0
BC	100,787	14.7	190,151	19.7
<i>Federal</i>	<i>128,800</i>	<i>29.0</i>	<i>128,800</i>	<i>29.0</i>

Source: Authors’ calculations using the Canadian Tax and Credit Simulator (see note 9).

Note: The +5 tax system adds a new tax bracket at the top-1-percent income threshold and adds 5 percentage points to the existing top marginal rate.

¹ The Quebec rate is shown net of the 16.5 percent federal tax abatement.

NA = not applicable

starting at US\$174,400 (for single filers) and US\$379,150 (for joint filers). These higher brackets allowed for more progressivity over high-income ranges of taxable income than was the case at the time in Canada, where there was no further increase in the marginal tax rate in any province for those with incomes above \$150,000. As table 1 indicates, however, the situation in many provinces has changed somewhat since then.

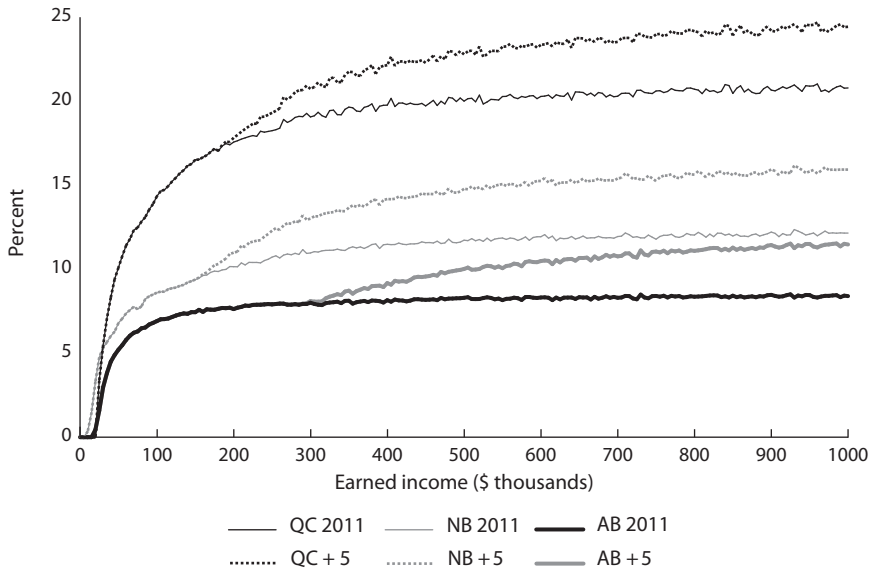
We examine two implications of our counterfactual tax policy for each province. First, we look at the effect of the +5 tax bracket and rate on the progressivity of the province's tax system. To do so, we calculate the average tax rate for the top 1 percent of earners before and after the implementation of the tax change. (Other potential measures, such as a Gini coefficient or log percentile ratios, are not as useful in assessing changes in the top tail of the income distribution.) Second, we look at the effect of the tax increase on provincial tax revenue. In doing so, we show the impact of the behavioural response to the higher tax rate using our reported-income elasticity estimates from table 2.

Progressivity implications

To assess the progressivity implications of our tax policy change, we calculated the average provincial tax rate — defined as total provincial income tax divided by total income — at each income level from zero to \$1,000,000 in increments of \$5,000 under both the base and +5 tax systems. For these progressivity simulations, we assumed no change in reported incomes in response to the higher tax rate. Because our interest here is in the average tax burden, we included an additional simulation that imputes amounts for the most-used deduction and credit lines on the tax form in order to get a better measure of the actual tax liability.¹⁴ Since higher-income earners may make greater use of deduction items than lower-income earners, our estimates of average tax rates are improved if we take these tax items into account.

Figure 4 presents the progressivity implications of our +5 tax scenario for Quebec, New Brunswick and Alberta. Because the new tax rate would not apply to any income below the top-1-percent threshold in each province, the average tax rate at lower income levels would not be affected. At \$250,000, the average tax rate in Quebec moves up only slightly, from 18.2 percent in the base tax system to 19.3 percent in the +5 tax system. In New Brunswick, the gain is similarly small. In Alberta, there is no difference at \$250,000 because the top-1-percent threshold in

Figure 4
Average provincial income tax rates by income level under the base and + 5 tax systems, Quebec, New Brunswick and Alberta,¹ 2011



Source: Authors' calculations using the Canadian Tax and Credit Simulator (see note 9).

Note: The + 5 tax system adds a new tax bracket at the top-1-percent income threshold and adds 5 percentage points to the existing top marginal rate.

¹ The average income tax rates for Quebec are not adjusted to take account of the federal tax abatement.

2011 was \$281,096. For earners with income above \$250,000, however, the higher marginal tax rate under the + 5 system begins to raise the average tax rate. By the time an income level of \$1,000,000 is reached, the increase in the average tax rate is 3.6 percentage points for Quebec, 3.8 for New Brunswick and 3.1 for Alberta.

Why would a 5 percent tax increase on top-1-percent incomes not have a stronger and more immediate impact on average tax rates? There are two reasons. First, the higher marginal tax rate would apply only to income over the top-1-percent income threshold, so a substantial portion of income would not be affected. In Alberta, at a threshold of \$281,096, more than a quarter of a million-dollar earner's income would not be affected by the new rate, while in New Brunswick, at a threshold of \$147,010, more like one-seventh of such an income would be unaffected. Second, our imputation of tax deductions and credits excludes more of the million-dollar earner's total income from taxable income.¹⁵

What impact would implementing our +5 tax measure have on top-income shares? In Alberta, the average income of those in the top 1 percent was \$648,475 in 2011. At that income level, the new tax system would have boosted the average tax rate by only 2.3 percentage points. Since, in 2011, the pre-tax share of total income for the top 1 percent was 12.3 percent, up from 7.6 percent in 1982 (see figure 2), adding 2.3 percentage points to the average tax rate would reduce the top-income share by only 0.28 of a percentage point (12.3×0.023). Since the top-income share grew by 4.7 percentage points from 1982 to 2011, taking back 0.28 of a percentage point through extra taxation would represent only 6 percent of the growth in the top-income share over that period. Our calculations thus suggest that, although the tax system could be used to push back in a modest way against the trend toward income concentration, it would be difficult to use the tax system to reverse this trend completely.

Revenue implications

How much additional revenue could the provinces raise by imposing a +5 marginal tax rate on top earners? To undertake this simulation, we used the elasticity estimate of 0.664 in table 2 and, following Saez, Slemrod and Giertz (2012), standard formulas for turning this elasticity into revenue estimates (see the appendix for details). The structure of our calculations decomposes the total response into a mechanical effect and a behavioural effect. The mechanical effect, which represents the revenue that would be collected under the new tax regime if no one changed his or her behaviour, is derived by simply multiplying the new tax rate by the original amount of income that would be subject to the new rate. The behavioural effect accounts for the expected change in taxable income generated by the behavioural response (in terms of changes in labour supply or tax planning) to the new tax rate, given the estimated elasticity. The difference between these two effects yields the expected net gain in provincial revenue.

The results of our simulations appear in table 4. The first two rows show the 2011 top marginal tax rate and the +5 top marginal tax rate in each province. The next row reports the amount of total income in each province that would be above the top-1-percent-tax-bracket threshold, an amount that varies from \$72 million in Prince Edward Island to \$25.8 billion in Ontario. We calculated the potential revenue to be gained under the +5 tax system by applying the 5 percentage point rate increase to the total amount of income falling under the

Table 4
Estimated revenue under the + 5 tax policy scenario, by province, Canada, 2011 (\$ millions)

	NL	PE	NS	NB	QC ¹	ON	MB	SK	AB	BC
2011 top marginal tax rate (%)	13.3	18.4	21.0	14.3	19.2	17.4	17.4	15.0	10.0	14.7
+ 5 system top marginal tax rate (%)	18.3	23.4	26.0	19.3	24.2	22.4	22.4	20.0	15.0	19.7
Total income over top-1-percent threshold	482	72	862	606	9,802	25,754	1,274	1,287	10,114	7,405
Mechanical revenue effect ²	24.1	3.6	43.1	30.3	490.1	1,287.7	63.7	64.3	505.7	370.2
Behavioural revenue effect ³	-12.4	-3.4	-34.2	-16.8	-379.4	-650.7	-38.1	-32.0	-145.7	-161.5
Net revenue gain	11.6	0.2	8.9	13.5	110.7	637.0	25.6	32.3	359.9	208.7
Number of taxfilers (thousands)	417	112	724	597	6,251	9,806	914	785	2,753	3,419
Net revenue gain per taxfiler (\$)	27.9	2.0	12.3	22.7	17.7	65.0	28.0	41.2	130.7	61.0

Source: Authors' estimates.

Notes: The table reports for each province the simulated revenue impact of adding a new tax bracket starting at each province's top-1-percent income threshold with a marginal tax rate 5 percentage points higher than the existing top marginal rate. The number of taxfilers is derived by multiplying the number in the top 1 percent by 100.

¹ The Quebec tax rate is shown net of the 16.5 percent federal tax abatement, but the simulations account for the behavioural and mechanical revenue effects of the full Quebec provincial tax rates.

² The potential revenue gain from applying the + 5 tax rate to top-1-percent income, assuming no change in behaviour.

³ Estimated reduction in reported income due to the behavioural response to the tax increase under the + 5 tax policy scenario.

new tax bracket. This is the mechanical revenue effect reported in the fourth row of the table. Since this mechanical effect is a constant 5 percent proportion of the observed income over each threshold, it varies by province in a way similar to that shown in the third row. The behavioural effect, which represents the reduction in reported income in response to the higher tax rate, appears in the next row. The size of this effect is a function of the elasticity estimate, which is common to all provinces, but it also depends on the pre-existing top marginal tax rate in each province. If a dollar of taxable income disappears from the tax base, the province would lose all the tax revenue that would have been applied to that dollar. Thus, the higher the current rate, the greater would be the revenue impact of the behavioural response to a rate increase. Comparing the size of the behavioural response and the mechanical revenue effect, we find that the proportion of the mechanical effect that would disappear because of behavioural response would be less than 40 percent in Alberta, but almost 80 percent in Nova Scotia.

The net gain in provincial revenue is obtained by subtracting the behavioural effect from the mechanical revenue effect. Table 4 reports the net revenue gain both in total and per taxfiler. For ease of comparison across provinces, we calculated the revenue gain per taxfiler using the total number of taxfilers in the province, not just the number of taxfilers in the top 1 percent. Doing so also conveys more clearly the magnitude of extra revenue available for public spending or tax-based redistribution. The overall net revenue gain expected varies from \$200,000 in Prince Edward Island to \$637 million in Ontario. In per-taxfiler revenue terms, the disparity across provinces is sharp, ranging from \$2 per taxfiler in Prince Edward Island to \$131 in Alberta.

The additional information on each province presented in table 5 helps illustrate the reasons for this disparity across provinces. The first row shows the average income of those in the top 1 percent in 2011, and the second row indicates the income threshold for being in the top 1 percent, and in both cases considerable differences across provinces are apparent. In Prince Edward Island, the average income was \$203,948 and the income threshold was \$139,722; in British Columbia, the average income was nearly twice as high, at \$406,730, and the threshold was \$190,151. The ratio of these two numbers (third row), which is a measure of the skew at the top end of the income distribution, can also be used to derive the Pareto coefficient for the distribution, as shown in the appendix. Indeed, the Pareto coefficient is an important part of the calculation of the

Table 5
Factors explaining differences in revenue gains across provinces under the + 5 tax policy scenario, Canada, 2011

	NL	PE	NS	NB	QC ¹	ON	MB	SK	AB	BC
Average income of top-1-percent earners (\$)	283,720	203,948	273,712	248,546	326,472	477,951	300,529	344,253	648,475	406,730
Income threshold to be in the top 1 percent (\$)	168,094	139,722	154,588	147,010	169,649	215,316	161,098	180,240	281,096	190,151
Ratio (inverted Pareto)	1.69	1.46	1.77	1.69	1.92	2.22	1.87	1.91	2.31	2.14
Mechanical revenue effect ² per taxfiler (\$)	57.8	32.1	59.6	50.8	78.4	131.3	69.7	82.0	183.7	108.3
Revenue maximizing tax rate ³ (%)	27.0	22.8	28.1	27.0	27.0	32.2	29.2	29.7	32.7	31.6
+ 5 system top marginal tax rate (%)	18.3	23.4	26.0	19.3	24.2	22.4	22.4	20.0	15.0	19.7
Net revenue gain per taxfiler (\$)	27.9	2.0	12.3	22.7	17.7	65.0	28.0	41.2	130.7	61.0
Net revenue as share of mechanical effect (%)	48.3	6.4	20.7	44.7	22.6	49.5	40.2	50.2	71.2	56.4

Source: Authors' estimates.

¹ The Quebec tax rates are shown net of the 16.5 percent federal tax abatement, but the simulations account for the behavioural and mechanical revenue effects of the full Quebec provincial tax rates.

² The potential revenue gain from applying the +5 tax rate to top-1-percent income, assuming no change in behaviour.

³ This is the rate at which the mechanical revenue effect and the estimated reduction in reported revenue due to the behavioural response to the tax increase are of equal size and exactly offset each other.

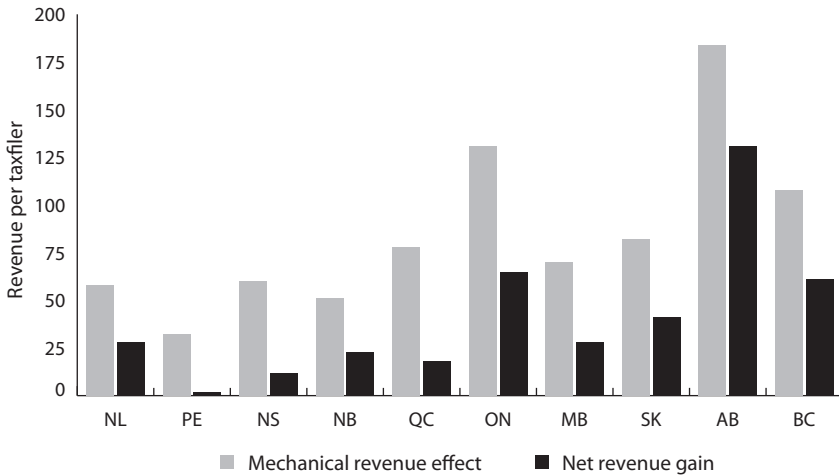
behavioural responses: the higher the ratio, the more revenue would be raised from a tax-rate increase on top earners, since there would be more income to be taxed above the top-1-percent threshold. The ratio varies substantially across provinces, ranging from 1.46 in Prince Edward Island to 2.31 in Alberta, reflecting the large disparities in the available tax base to which a higher tax rate would be applied. We then show the mechanical revenue effect again, but this time on a per-taxfiler basis. The additional 5 percent tax on the top-1-percent income group would generate only \$32 of extra revenue per taxfiler in Prince Edward Island, but \$184 in Alberta — the result not of any assumptions about behavioural responses, but of the relatively skewed income distribution in some provinces.

Next, we calculated the revenue-maximizing tax rate in each province given our assumed elasticity and the prevailing tax rate in each province. Any increase in the top tax rate would generate more revenue, assuming that the amount of taxable income is held constant (the mechanical effect), but it also potentially would shrink the income tax base, which would lead to a revenue loss (the behavioural effect). The revenue-maximizing tax rate is the rate at which these two effects are of equal size and exactly offsetting. Any further increase in the tax rate past this point would generate a larger revenue loss through tax base shrinkage than revenue gain from the mechanical effect. The details of this calculation are provided in the appendix. The next row in table 5 displays the tax rate under the +5 tax system. In some provinces, the new rate would be close to the revenue-maximizing tax rate, but in Prince Edward Island the new rate of 23.4 percent actually would exceed the estimated revenue-maximizing rate of 22.8 percent.

Finally, we show the net revenue gain as a share of the mechanical revenue effect, which is a measure of how much of the potential revenue gain would remain after accounting for the behavioural effect (last row). In Prince Edward Island, the potential net revenue gain from the mechanical effect would be only 6 percent, meaning that most of the potential new revenue in that province would fail to materialize because of the behavioural response. In contrast, in Saskatchewan, the revenue-maximizing tax rate is far enough above the +5 tax rate that only 50 percent of potential new revenue from the mechanical effect would disappear because of the behavioural response, while in Alberta only 29 percent would disappear.

Figure 5 shows the potential revenue per taxfiler (the mechanical effect) and the net revenue gain under our +5 tax scenario, in order to illustrate the

Figure 5

Mechanical revenue effect¹ and net revenue gain per taxfiler under the +5 tax system, by province, Canada, 2011 (dollars)

Source: Authors' calculations.

Note: The +5 tax system adds a new tax bracket at the top-1-percent income threshold and adds 5 percentage points to the existing top marginal rate.

¹ The potential revenue gain from applying the +5 tax rate to top-1-percent income, assuming no change in behaviour.

size and source of the disparities across provinces. In Nova Scotia, the modest concentration of income among the top 1 percent of income earners allows for a mechanical revenue effect of only \$60 per taxfiler; moreover, because of the high marginal tax rate in effect in 2011, most of this amount would disappear as a result of the behavioural response, leaving a revenue gain of only \$12 per taxfiler. In Ontario, Alberta and British Columbia, in contrast, not only would the mechanical revenue effects be larger because of more skewed income distributions in these provinces, but also, because of the lower tax rates in effect in 2011, less potential revenue would disappear as a result of behavioural response. Quebec and Saskatchewan would have comparable mechanical revenue effects (\$78 and \$82 per taxfiler, respectively), but Saskatchewan's net revenue gain per taxfiler would be \$41, while Quebec's would be only \$18 because of the higher marginal tax rate that applied there in 2011.

In table 6 we compare the simulated revenue results obtained from our estimated elasticity (0.664) with those from a value half the size (0.332) in order to

Table 6
Sensitivity of revenue estimates to elasticity assumptions, by province (\$ millions)

	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC
Elasticity (0.664)										
Net revenue gain as a % of mechanical revenue effect ¹	48.3	6.4	20.7	44.7	22.6	49.5	40.2	50.2	71.2	56.4
Net revenue gain per taxfiler	27.9	2.0	12.3	22.7	17.7	65.0	28.0	41.2	130.7	61.0
Elasticity (0.332)										
Net revenue gain as a % of mechanical revenue effect ¹	74.2	53.2	60.3	72.3	61.3	74.7	70.1	75.1	85.6	78.2
Net revenue gain per taxfiler	42.9	17.1	35.9	36.7	48.1	98.1	48.9	61.6	157.2	84.7

Source: Authors' estimates.

¹ The percentage of the potential revenue gain that is realized after taking into account changes in behaviour.

Table 7
Assessing the impact of the + 5 tax policy scenario on federal revenue,¹ by province (\$ millions)

	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC
Mechanical revenue effect	24.1	3.6	43.1	30.3	490.1	1287.7	63.7	64.3	505.7	370.2
Behavioural effect	-12.4	-3.4	-34.2	-16.8	-379.4	-650.7	-38.1	-32.0	-145.7	-161.5
Net provincial own-revenue gain	11.6	0.2	8.9	13.5	110.7	637.0	25.6	32.3	359.9	208.7
Impact on federal revenue	-19.7	-4.2	-38.2	-25.2	-316.8	-842.0	-49.3	-46.4	-281.8	-237.8

Source: Authors' estimates.

¹ The impact on federal revenue assumes there is no income shifting across provincial boundaries.

check the sensitivity of our results to the elasticity measure. We find that, although the net revenue gain as a share of potential revenue would increase with a lower elasticity, the large disparity across provinces would remain, with net revenue per taxfiler only \$17 in Prince Edward Island but \$157 in Alberta. Again, this demonstrates that the provincial differences in the underlying income concentration among the top 1 percent are largely responsible for the differences in our estimates of revenue gains from a tax increase on that income group across provinces.

Federalism and Other Policy Implications

TAXATION OF HIGH INCOMES HAS DIFFERENT IMPLICATIONS AT THE FEDERAL AND provincial levels. If the federal government were to increase its tax rates on high incomes — or if the provinces coordinated their own actions — there might be less scope for a behavioural response, depending on the extent to which inter-provincial income shifting is a factor. Our simulations, however, suggest both potential advantages and limitations of provincial-level high-income taxation.

In the public finance literature (see, for example, Pauly 1973), subnational redistributive taxation can be motivated by assuming differing tastes for redistribution across jurisdictions. Redistribution is like a local public good, with citizens in some jurisdictions preferring more and others less. Our work adds a novel explanation to that traditional story by showing that differing subnational income distributions contribute significantly to the degree of effectiveness of subnational taxation in raising revenue. This represents an argument in favour of provincial-level high-income taxation. Even with similar preferences in all provinces, it would simply pay some provinces more than others to engage in high-income taxation, and provincial income taxation allows for these differences in payoff from high-income taxation to be expressed.

Other factors, however, still need to be considered. In a final simulation exercise, we looked not only at behavioural response at the provincial level, but also at the effect of this response on federal revenues — or what economists call the “vertical externality.” If taxpayers responded to higher provincial tax rates by reporting lower income, this would affect not just provincial revenues, but also federal revenues that co-occupy the same tax base. If taxable income decreased in response to an increase in the provincial income tax rate, that taxable income would also disappear from federal tax returns. Although the provincial

government would reap the revenue benefit of the higher tax rate on the taxable income that remained, the federal government would not. In other words, the federal government would see only a loss of revenue from a provincial rate increase, and the amount of the loss would depend on the extent to which the behavioural response to the higher provincial tax rate would be to shift taxable income to other provinces. Vertical externality would not come into play if the income that disappeared from one province reappeared in another, since the federal government would get its tax revenue either way.

We report our simulation results of the implications for federal revenue of the behavioural response to higher provincial tax rates in the fourth row of table 7. Here, we assume that none of the income shifted through behavioural response shows up in another province, which means the estimated impact of the response on federal revenues is maximized. Comparing the third and fourth rows, under these conditions only Alberta would raise more revenue than the federal government potentially would lose; elsewhere, the potential negative effect on federal revenue would be larger than the province's own gain. These calculations suggest that the negative impact on federal revenue (the vertical fiscal externality) could be fairly large if shifted income did not reappear in other provinces. This could cause a net reduction in tax revenue overall as well as a change in how this revenue is distributed between the federal and provincial governments country-wide. On the other hand, if most of the income shifting did occur across provincial borders, the vertical fiscal externality might be small but the horizontal fiscal externalities across provinces could be substantial. These negative fiscal externalities could be relieved by having the federal government assuming responsibility for progressive taxation.

It is important to emphasize that the analysis in table 7 does not provide a complete picture of the potential impact of the behavioural response on federal and provincial revenues. Some of that response might entail shifting some personal income to other forms of income that also yield tax revenue to governments — for example, shifting income subject to personal taxation to a corporation could lead to present or future corporate tax revenue increases. As well, if an individual shifted income from one province to another in search of a lower tax rate, the receiving province would see a revenue increase. We cannot present estimates of these indirect revenue effects in this chapter, but we continue to investigate them in ongoing research.

Finally, interaction with other federal programs could also affect transfer payments to the provinces. For example, our calculations do not account for the impact on provincial revenue from the federal equalization system. Under the current equalization formula, the decline in a receiving province's income tax base due to behavioural response to a tax increase could increase its equalization entitlements by a comparable magnitude three to five years later.¹⁶ This tends to insulate equalization-receiving provinces from the revenue effects of behavioural responses and, as Smart (1998) notes, might contribute to the relatively high levels of provincial taxation in these provinces.

Taken together, this analysis suggests that federal-provincial tax and transfer interactions are an important element in tax policy, but it does not lead to a clear conclusion about the optimal assignment of taxing power to the provinces or the federal government. In ongoing work, we are building a theoretical and empirical framework that incorporates not just the provinces' own-revenue response and vertical externality effects seen here, but also the horizontal revenue effects on other provinces that might receive shifted income. In that enriched environment, we hope to characterize more precisely the tradeoffs involved in the assignment of redistributive taxation.

Conclusion

WE BEGAN THIS CHAPTER BY OBSERVING THAT THE SOCIAL RESPONSE TO HIGH-income concentration in Canada appears to be manifesting itself in provincial, rather than federal, income tax rates. By documenting the trends in both taxes and high incomes across provinces, we have begun to understand the sources and consequences of these fiscal trends.

Our most striking finding is the large disparity across provinces in potential revenue that an additional 5 percent tax on top-1-percent incomes would raise — ranging, according to our simulations, from \$2 per taxfiler in Prince Edward Island to \$131 in Alberta for the 2011 tax year. This variance is driven by the large differences in income concentration across provinces, meaning that provinces where the income distribution is skewed more toward the top end are better positioned to capture larger revenue gains from taxing top incomes. The behavioural response of high-income taxpayers to a tax increase, as expressed through a decline in reported income — and hence in net revenue gains — would also differ

across provinces. The response would be larger in provinces, such as Nova Scotia, where the existing top marginal tax rate is already relatively high, and smaller in provinces, such as Alberta, where it is comparatively low. Since most provinces have introduced new tax brackets and higher marginal rates on upper incomes in recent years, the implications of these results are even more salient.

Our simulations also uncovered limits to the degree to which increasing top marginal tax rates could reverse the strong trend toward income concentration at the top of the distribution observed over the past 30 years. In Alberta, for example, an additional 5 percent tax on the top 1 percent of incomes, as is currently being implemented, would reverse only about 6 percent of the long-run increase in the income share of the top 1 percent in that province. As a tool to push back on this trend, therefore, provincial income taxation does not seem to be highly promising.

Finally, in exploring federal-provincial tax issues ranging from impact on federal revenue to the potential effects on equalization payments of changes to high-income taxation at the provincial level, our findings suggest that the role interprovincial income shifting plays is key to understanding the fiscal impact of choices provinces make on the revenue positions of other provinces and the federal government.

Appendix: Revenue Formulas

The development of the formulas presented below follows those of Saez, Slemrod and Giertz (2012, 6-9), with the main difference being that we distinguish between the federal and provincial tax rates.

Elasticity is defined as

$$e \equiv \frac{1-\tau}{z} \cdot \frac{\partial z}{\partial (1-\tau)},$$

where τ is the combined federal and provincial marginal tax rate, and z is taxable income. This same elasticity formula holds when calculated at the average income of those in the top 1 percent, z^m . The threshold to be in the top 1 percent is \bar{z} . The total number of taxfilers in the top 1 percent is N . The provincial top tax rate is τ^P , and the federal top rate is τ^F , with $\tau^P + \tau^F = \tau$.

The mechanical effect for each taxfiler is the change in the tax rate multiplied by the amount of income over the top-bracket threshold. This is then multiplied by N to get total revenue:

$$dM \equiv N \cdot (z^m - \bar{z}) \cdot \partial\tau.$$

The behavioural effect can be found by first rearranging the elasticity formula to solve for the change in reported income:

$$dz^m = -e \cdot z^m \cdot d\tau / (1-\tau).$$

The change in provincial revenue from the behavioural effect is the change in the tax base multiplied by the provincial tax base, and multiplied again by the number of taxfilers. For the federal change, it is the same, but multiplied by the federal tax rate:

$$dB^P \equiv -N \cdot e \cdot z^m \cdot \frac{\tau^P}{(1-\tau)} \cdot \partial\tau, \text{ and}$$

$$dB^F \equiv -N \cdot e \cdot z^m \cdot \frac{\tau^F}{(1-\tau)} \cdot \partial\tau.$$

The provincial revenue-maximizing rate, τ^{P*} , comes from setting the mechanical effect equal to the provincial behavioural effect, and solving for τ^P :

$$\tau^{P*} = \frac{(1-\tau^F)}{1+e \cdot \left(\frac{z^m}{z^m-\bar{z}}\right)}.$$

This can be manipulated further by noticing that the ratio of the mean, z^m , to the threshold, \bar{z} , can be manipulated to recover the Pareto coefficient, α , in the following way. Define the ratio of the threshold to the mean as

$$\beta = \frac{z^m}{\bar{z}}.$$

This coefficient, β , is called the inverted Pareto coefficient. It can be shown that the Pareto coefficient, α , can be expressed as

$$\alpha = \frac{\beta}{\beta - 1}.$$

It follows with some basic manipulation that

$$\alpha = \left(\frac{z^m}{z^m - \bar{z}} \right),$$

which implies that the provincial revenue-maximizing tax rate can be rewritten as a function of the Pareto coefficient:

$$\tau^p = \frac{(1 - \tau^F)}{1 + e \cdot \alpha}.$$

Notes

This chapter is based on a paper prepared for the CLSRN-IRPP conference “Inequality in Canada: Driving Forces, Outcomes and Policy,” Ottawa, February 24-25, 2014. We thank discussants Rhys Kesselman and John Lester, editors David Green and France St-Hilaire, and participants at the conference for comments that helped improve the chapter.

1. The traditional case is stated and developed in, for example, Oates (1968) and Musgrave (1971).
2. In the 2015 federal election the Liberal Party was the only party to propose a tax increase for top earners. They promised to introduce a new tax bracket of 33 percent for individuals earning more than \$200,000, an increase of 4 percentage points over the existing top federal rate. The Liberals won the election and now have a majority government.
3. The Canadian trends are documented in Lemieux and Riddell (in this volume), Milligan (2013), Saez and Veall (2005, 2007), and Veall (2012). The international context for the trend to high-income concentration is presented in Atkinson, Piketty and Saez (2011).
4. See Saez, Slemrod and Giertz (2012) for a comprehensive recent review. The Canadian evidence is reviewed in Finance Canada (2010) and Milligan and Smart (2014).
5. See LeBlanc (2004) for a summary of tax collection arrangements between the provinces and the federal government over time.
6. Provinces also could add a surtax to their basic tax liability over some tax threshold, if they wished. They could also offer low-income credits and tax reductions.
7. Quebec taxpayers receive a 16.5 percent refundable federal tax abatement. For those in the top tax bracket, this is worth 4.8 percentage points (29 percent top federal rate times the 16.5 percent abatement). We deducted this from Quebec’s own top marginal tax rate, since the first 4.8 percent of Quebec income tax just brings the province’s taxpayers in line with those in the rest of Canada.
8. This change over 2012-13 was actually announced as a 2 percent surtax as of July 1, 2012. However, half of the increase was implemented in 2012 and the balance in 2013. This is normal for tax-rate changes that occur mid-year, since the tax system does not report the timing of income within the year, so it is not easy to tax dollars arriving in different months within a calendar year at different rates.
9. The Canadian Tax and Credit Simulator is a software package developed by Kevin Milligan in 2013. To calculate the marginal tax rate for a particular fractile, we used the average income of taxpayers in that fractile. To avoid endogeneity, we used a common income in the calculation of the marginal tax rate for all years and provinces — namely, the national average Canadian income in 2000 for the fractile in question. In Milligan and Smart (2014), we provide an extensive discussion of the measurement of the marginal tax rate, and implement a more complex instrumental variables approach.
10. This “internal” elasticity for the 95th to 99th percentiles is tricky to interpret. The regression compares the response to the tax rate of taxpayers in this range with those in the complement group — which includes both the 0 to 95th percentiles and the 99th to 100th percentiles. This is a heterogeneous control group, since we expect those in the top 1 percent to have a strong response and

those below the 95th percentile to have a weak response. We include this specification here to help interpret the difference between the specifications on the 99th and 99.9th percentiles in columns 2 and 4.

11. Those in the highest income fractiles have more ready access to skilled tax planning and financial advice that facilitates a response to higher tax rates.
12. Our results are consistent with the evidence in Milligan and Smart (2014), which uses the same sample and a slightly more involved estimation specification. In that paper, sensitivity of the results to different time periods, income measures, weighting schemes and other issues is presented. As a whole, the results are quite robust.
13. Using 2011 as the base means that our new tax bracket would have been implemented before the onset of the actual tax increases in Newfoundland and Labrador, New Brunswick, Quebec, Ontario, Alberta and British Columbia. For Nova Scotia, however, the new tax bracket would be on top of the increase implemented in 2010.
14. We made these imputations using information from *Individual Tax Statistics* published online by the Canada Revenue Agency. We defined cells by province, year and narrow income groups. For each cell, we imputed an amount and the probability of having any amount based on the CRA data. The tax items we considered in these imputations are for donations and gifts, contributions to Registered Retirement Savings Plans and Registered Pension Plans, union dues, child care expenses, other deductions and additional deductions from net income. For the 2010 and 2011 cells, we used data from 2009 and updated them using the Consumer Price Index.
15. In 2009, there was \$104 billion of assessed income for those with \$250,000 or more of total income. Of this amount, \$94 billion (90 percent) was assessed as taxable income.
16. The smaller tax base would have some impact on the “national standard” tax base

used in the equalization formula, but this effect would be smaller than the shrinkage of a province’s own base in the equalization entitlement. Also, with total payments capped at GDP growth, the impact of tax changes on the ultimate equalization payment becomes less clear.

References

- Atkinson, A.B., and A. Leigh. 2010. "The Distribution of Top Incomes in Five Anglo-Saxon Countries over the Twentieth Century." Centre for Economic Policy Research Discussion Paper 640. Canberra: Australian National University.
- Atkinson, A.B., T. Piketty, and E. Saez. 2011. "Top Incomes in the Long Run of History." *Journal of Economic Literature* 49 (1): 3-71.
- Finance Canada. 2010. "The Response of Individuals to Changes in Marginal Income Tax Rates." In *Tax Expenditures and Evaluations 2010*. Ottawa: Finance Canada.
- LeBlanc, M. 2004. *Tax Collection Agreements and Tax Competition among Provinces*. Parliamentary Research Branch document PRB 03-44E. Ottawa: Library of Parliament.
- Milligan, K. 2013. *Income Inequality and Income Taxation in Canada: Trends in the Census 1980-2005*. School of Public Policy Research Papers 6 (24). Calgary: University of Calgary.
- Milligan, K., and M. Smart. 2014. "Taxation and Top Incomes in Canada." NBER Working Paper 20489. Cambridge, MA: National Bureau of Economic Research.
- Musgrave, R.A. 1971. "Economics of Fiscal Federalism." *Nebraska Journal of Economics and Business* 10 (4): 3-13.
- Oates, W.E. 1968. "The Theory of Public Finance in a Federal System." *Canadian Journal of Economics* 1 (1): 37-54.
- Pauly, M.V. 1973. "Income Redistribution as a Local Public Good." *Journal of Public Economics* 2 (1): 35-58.
- Saez, E. 2004. "Reported Incomes and Marginal Tax Rates, 1960-2000: Evidence and Policy Implications." In *Tax Policy and the Economy* 18, edited by J.M. Poterba. Cambridge, MA: MIT Press.
- Saez, E., J. Slemrod, and S.H. Giertz. 2012. "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review." *Journal of Economic Literature* 50 (1): 3-50.
- Saez, E., and M.R. Veall. 2005. "The Evolution of High Incomes in Northern America: Lessons from Canadian Evidence." *American Economic Review* 95 (3): 831-49.
- _____. 2007. "The Evolution of High Incomes in Canada, 1920-2000." In *Top Incomes over the 20th Century*, edited by A.B. Atkinson and T. Piketty. Oxford: Oxford University Press.
- Smart, M. 1998. "Taxation and Deadweight Loss in a System of Intergovernmental Transfers." *Canadian Journal of Economics* 31 (1): 189-206.
- Solon, G., S.J. Haider, and J. Wooldridge. 2015. "What Are We Weighting For?" *Journal of Human Resources* 50 (2): 301-16.
- Veall, M. 2012. "Top Income Shares in Canada: Recent Trends and Policy Implications." *Canadian Journal of Economics* 45 (4): 1247-72.

