The Future of the Progressive Personal Income Tax: How High Can It Go?

Kevin Milligan
Vancouver School of Economics
kevin.milligan@ubc.ca
February, 2019

Draft / Comments Welcome / Not for citation

Introduction

The progressive personal income tax provides the most important counterweight to regressive elements in the rest of the tax system and in market-determined pre-tax incomes. While the case can be made that other taxes may have progressive impact in some circumstances, the sheer scale of the income tax makes its impact on progressivity dominant.[1] For those who have strong redistributive tastes, the income tax is thus a natural tool. But even for those with more laissez-faire attitudes toward the distribution of income, the progressive income tax is vital. To those not predisposed to redistribute, a more modest goal of fiscal proportionality—everyone paying an equal share of their income—might be more readily entertained. But to meet this goal of overall proportionality, a progressive personal income tax is necessary in the face of other regressive fiscal elements.

But, how progressive should the income tax be? While the answer to that question is best left to each citizen's own social philosophy, economists can offer useful advice to inform citizens on the likely impact of strong progressivity. In particular, the theoretical and empirical model of Diamond and Saez (2011) provides an attractive way to frame the debate over the progressivity of the Canadian income tax. In the Diamond-Saez framework, the tax rate on top earners is pushed as high as it can go to maximize tax revenues. With this high point as the anchor, the progressivity of the rest of the income tax then follows. The framework delivers a clear upper bound on the top personal income tax rate which can help guide public debate.

---

[1] For example, Bird and Smart make the case that Canada's GST is not regressive when considered against a base of consumption rather than income. However, because of the regressivity of excise taxes, consumption taxes as a category remain regressive.

In this paper, I apply the Diamond-Saez framework to the case of Canada, covering recent theoretical developments, empirical findings, and policy actions. I then discuss how the responsiveness to taxation may vary across circumstances, with particular attention to recent developments in Canada. I conclude with policy advice for those seeking either to enhance or attenuate high-income tax rates.

Before engaging this plan, however, I begin with an empirical overview of the history and current manifestation of income tax progressivity in Canada.

Empirical context of income tax progressivity in Canada

To provide context for the discussion, I present four graphs describing the history and present state of the progressivity of the income tax in Canada. The tax rates are generated using the CTaCS tax simulator on percentiles of the income distribution drawn from the 2015 Canadian Income Survey, adjusted for inflation for each year shown.[2] I focus on the case of a single British Columbia resident, age 40, in order to abstract from the complexities of spousal and retirement tax and benefits. I show the combined federal and provincial rates.

The first chart presented in Figure 1 displays the marginal tax rate on employment income at each income level from zero to $225,000 in 2019 for the cases of someone without kids and

---

[2] See Milligan (2019). The simulations use market income plus taxable government transfers as the income measure. I take individuals between the ages of 18-59 to avoid the special circumstances of the taxation of pensions and retirement income.

someone with two kids. For the case without kids, the core bracket and rate structure can be seen clearly at incomes above $50,000. At lower income levels, the phase-in and phase-out of refundable tax credits drive the marginal tax rate. For example, the initial dip and peak is driven by the Canada Workers Benefit which is phased in and then out at low earnings levels. Subsequent phase-outs of the Goods and Services Tax Credit and the Climate Action Tax Credit also shape the curve at lower income levels. For the case with children, the phase-outs of refundable credits with respect to children (such as the Canada Child Benefit) dominate the statutory brackets.

Two main lessons can be taken from this chart. First, much of the variation in rates at lower- and middle-income levels is driven by refundable tax credits rather than statutory rates. Second, while there is some increase in rates at income levels above $100,000, the progressivity is modest.

I next turn to the history of income tax progressivity from 1962 to 2019, again for the case of a British Columbia resident single person. It is important to emphasize that the definition of taxable income changes substantially over this period, particularly in the tax reforms of 1972 and 1988, which affected both the ability to avoid taxes and the average effective tax rate paid as a percentage of total income. However, with that caveat it is still informative to consider how income has been taxed over this 58-year period.

Figure 2 shows the marginal tax rate on earnings at different percentiles of the income distribution, ranging from the 10th percentile at the bottom to the 99.99[th] percentile at the top.

There were substantial changes in the tax base in 1972 and 1988 which broadened the base and allowed for lower rates for most earners. For top earners, the rate fell from a peak of 82 percent in 1970 to under 50 by 1988. Through most of the 1990s, there was no difference between those at the highest percentiles and those at the 95th. Since 2016, higher rates on the top 1 percent at both the federal and British Columbia levels has pushed the top rate back to just under 50 percent. Interestingly, the rate for the median earner has stayed relatively constant at between 24 and 29 percent since 1967.

The previous graphs showed British Columbia only. In Figure 3, I display the evolution of the top rate from 1988 to 2019 in five select provinces. The broad trend was to higher top rates in the 1990s, lower in the 2000s, and a return to higher rates over the past few years. The magnitudes vary and the timing is slightly different, but the broad trends are fairly common.

Finally, I provide international context in Figure 4 by drawing on data from the OECD showing the top income tax rate in OECD countries prevailing in 2017. The 'Canadian' rate used here is the rate from Ontario, 53.53 percent. In several OECD countries, social security contributions and VAT rates can each exceed 20 percent, so income tax rates may not be indicative of total marginal financial burden. Nevertheless, using this measure Canada has the sixth highest top marginal income tax rate of the 34 countries shown, exceeded by Sweden, Denmark, Japan, Greece, and France.

So, top income tax rates in Canada are lower than prevailed in earlier decades but have risen slightly in recent years. Provincial trends have largely reinforced federal rate changes. In the

international context, Canadian top income tax rates are in the top half of OECD countries, but fall short of the top five. A move to higher top income tax rates would neither defy historical Canadian nor contemporary international fiscal practice. Of course, the same could be said for a move in the opposite direction as well.

Theory and evidence on high-income taxation

To understand how high top tax rates can or should go, I employ the framework of Diamond and Saez (2011). The Diamond-Saez framework sets the top tax rate at the level that maximizes government revenues from high earners, exhausting all revenue potential. Then, the progressivity schedule works down from that point to determine tax rates at lower income levels. In this way, the revenue-maximizing tax rate for high earners is the anchor of the progressivity of the income tax system.

In this section, I review the development of theory and empirical evidence on top income taxation, especially over the last 20 years. I narrate the evolution of theory from James Mirrlees through to recent work by Emmanuel Saez and coauthors. Following that, I discuss empirical evidence on how top earners respond to taxation that informs the application of theory to practice.

The Theory of Top Income Taxation

The modern optimal income tax theoretical framework derives from the model in Mirrlees (1971). In that model, the tax authority needs to raise revenue for some public purpose and can tax the earnings of people with differing (but unobservable) abilities. Individuals choose how much to work, with an eye on ensuring their after-tax pay is sufficiently remunerative to compensate for foregone leisure. The tax authority puts a social weight on each individual's outcomes and decides whom to tax lightly and whom to tax heavily in order to maximize society's wellbeing.

In that model, it might seem natural to expect that a social weighting that put lighter emphasis on those with high ability than those with low ability would lead to tax rates being highest on those with high ability. However, the well-known result from the Mirrlees framework defies this expectation; the model implies the highest ability person should be in a tax bracket with a zero rate.

The logic is as easy to follow as the result is surprising. Imagine an equilibrium with a positive tax rate on the highest ability person and the government's revenue need being satisfied at current tax rates. If this equilibrium were perturbed by installing a new zero-rated tax bracket starting at the top-ability person's current income level, she might work a bit more while leaving the already-satisfied revenue requirement untouched. Assuming a positive social weighting on that person, the perturbation is preferred to the initial equilibrium because she is made better off without making anyone worse off; and the government's coffers remain unchanged.

An important advance in the theoretical understanding of high-income taxation came from Diamond (1998). Recognizing that the Mirrlees "zero at the top" result held only for the very highest ability person, Diamond considered a different technical assumption about how ability may be distributed around the population. Instead of a finite person with the highest ability, what happens if ability is not bounded, but continues to grow as the number of people goes to infinity?[3] With these seemingly innocuous change in mathematical assumption, the model now yields a U-shaped optimal tax schedule, with rising rates as one moves from middle to higher incomes. This presented an intriguing reversal of the "zero at the top" result and presented an exciting path forward for linking theory to practice.

Near the same time, Piketty (1997) and Saez (2001) realized that a framework similar to Diamond's can yield optimal income tax rates on high earners that are described fairly simply by the distribution of skills and an elasticity—the responsiveness of earnings to tax rates. Saez simulated tax schedules under differing assumptions about social weights and elasticities, finding U-shaped schedules, but with fairly flat rates over $150,000 of earnings. So, while firmly establishing the theoretical credibility of a progressive rate schedule, there was not much justification for strongly progressive rates through the ranks of the higher earners.

The last piece of the Diamond-Saez economic framework for progressive taxation comes into place through the concept of the elasticity of taxable income (ETI), which quantifies how much taxable income changes when tax rates go up or down. Previous economic modelling focused on labour supply responsiveness to taxes; the ETI framework is more general and captures other

---

[3] See Mankiw, Weinzierl, and Yagan (2009) for a critical discussion of the Pareto distribution assumption for top earnings that underlies the Diamond approach.

forms of real response (such as investment or mobility), as well as responses of income through avoidance or evasion. The theoretical development of the ETI concept starts at Feldstein (1999) and is refined further in Saez, Slemrod, and Giertz (2012).

The theoretical implication for taxes on top earners from this ETI framework is to emphasize there will be some tax rate above which the reduction of tax revenue through a response (be it avoidance, labour supply, or whatever action) will be greater than the extra tax revenue on income that is still declared. The precise value of that revenue-maximizing tax rate is of course an important policy question, but the noteworthy advance here is the theoretical grounding for a revenue-maximizing rate on high earners.

Diamond and Saez (2011) pick up from this point to lay out their framework. They note that if we put very small (or zero) social weight on the last few dollars of income received by the highest earners, then the government's task should be to push the tax rate so high as to maximize tax revenue from the highest earners. The rest of the progressive tax schedule then follows from that point, anchored in the theory and the empirics of the ETI. In this way, the Diamond Saez framework provides an ETI-determined top tax rate as an upper bound to the range of top tax rates that are relevant for policy consideration.

Of course, putting no social weight on high earners may be viewed as an unsavoury assumption. Feldstein (2012, p. 783) finds it "quite amazing" that high earners should be viewed as no more than "revenue producing property of the state," and suggests the assumption "repugnant." At its root, this is a return to the age-old debates about any kind of utilitarian social calculus that

involves interpersonal comparisons of wellbeing. I cannot resolve this debate, but I note that tastes and views do vary across the population.

On the other hand, there are at least three arguments for potentially pushing high-income taxation beyond the ETI-determined maximum. First, Lockwood, Nathanson, and Weyl (2017) argue that high-earning professions produce negative externalities and low-earning ones tend to produce positive externalities. High tax rates therefore act as a Pigouvian correction. Second, Saez and Zucman (2019) argue that there are negative democratic externalities of plutocratic income concentration, professing the view that leaving it unaddressed will "risk killing democracy." Again, the argument is Pigouvian. Finally, Piketty, Saez, and Stantcheva (2014) show that salary bargaining of top corporate executives may be driven by top tax rates, since the return to bargaining is low if tax rates are high. Their model suggests that the more bargaining matters, the higher the top tax rate should go. Any of these three reasons could justify top tax rates that exceed the ETI-determined maximum.

To summarize, the Diamond-Saez framework is supported by two main pillars. The first is an empirically determined top tax rate, derived from evidence on the ETI to maximize the revenue haul from top earners. The second is values-driven assumption about the social weighting placed on the marginal consumption of high earners. If this weight is very low, there is minimal social cost to taxing high earners with nothing but revenue maximization in mind.

The value of this framework comes from the bounds it provides for public debate on the contentious issue of income tax progressivity. If there were an agreed-upon best estimate of the

appropriate ETI, then the Diamond-Saez top rate provides a starting place from which people can adjust the top tax rate according to their views on the proper social weight to put on high earners.

The Empirics of Top Income Taxation

The ETI is the centrepiece of the Diamond-Saez theoretical framework for top income taxation. Do we have good estimates of the ETI for Canada? The important starting place for this brief review of the empirical evidence comes from Slemrod and Kopczuk (2002) and Kopczuk (2005). They emphasize that the ETI is not some immutable constant but instead reflects in part the availability and ease of avoidance and evasion opportunities. For this reason, we should not expect the ETI to be the same across time, place, and fiscal institutions. These important caveats are taken up in detail in the next section. But, it is still useful to understand the range of potential values for the ETI to inform discussion.

Saez, Slemrod, and Giertz (2012) provide a thorough review of the methodologies and estimates found by researchers in the United States. They emphasize the importance of considering long-run responses and settle on a central estimate for the ETI of 0.25. This estimate means that a one percent increase in the top tax rate will lead to about a 0.25 percent decrease in taxable income. It is this estimate that forms the basis for the Diamond and Saez calculation of a top tax rate for the United States of 73 percent. We return to this calculation below.

For Canada, Milligan and Smart (2015) use aggregated taxfiler data to estimate the responsiveness of the shares of income received by high-income taxfilers to tax rates that vary by province and year in the time period 1988 to 2011. Their main estimate for the top one percent

income share is an elasticity of 0.69, meaning that a one percent increase in the top tax rate would lead to a 0.69 percent drop in the share of income received by those in the top one percent.

Several caveats should be considered when interpreting this result. First, this result is relevant from the point of view of provincial tax rates, as the estimated responsiveness may reflect inter-provincial income shifting, meaning that the federal elasticity may be much lower.[4] Second, the estimate reflects the tax avoidance (and real responsiveness) of that time period, which may or may not be relevant in other periods. Third, they estimate the elasticity of total income, not taxable income. The results of Kopczuk (2005) imply that the ETI would likely be higher than the Milligan-Smart estimate of the total income elasticity. Finally, the estimated elasticity of the more exclusive top 0.1 percent of the population is higher still, suggesting that higher tax rates aimed at very high earners may face steeper headwinds. There are of course other Canadian estimates of the ETI, as surveyed by Laurin (2015). The Milligan-Smart estimates are in the same range as others, although methodologies and time periods vary.

These estimates can be transformed into revenue-maximizing tax rates using a simple formula.[5] The formula depends on only two parameters. The first is the ETI, which reflects the responsiveness of reported income to the tax rate, so a higher ETI means a lower revenue-maximizing top tax rate. The second parameter is alpha, which depends on how concentrated income is among top earners. If income is concentrated, the yield from a higher top tax rate will

---

[4] This point is emphasized further in Milligan and Smart (2019), who build a model of inter-jurisdictional shifting and tax avoidance.

[5] See Milligan (2016) for the derivation of this formula. The revenue-maximizing tax rate τ^* is a function of the ETI (denoted by e) and the income distribution parameter alpha (α). These are combined as: $\tau^* = \frac{1}{1+e \cdot \alpha}$.

be greater. The higher is alpha, the less concentrated is income. So, with higher alpha comes a lower revenue-maximizing top tax rate.

Table 1 reports how these two parameters map into the revenue-maximizing tax rate. For the United States, the appropriate alpha derived from income statistics is around 1.5. Using the Saez, Slemrod, and Giertz (2012) preferred long-run estimate of 0.25 yields the top tax rate of 72.7 percent that is featured in the Diamond and Saez (2011) article. For Canada, the appropriate alpha is around 1.8. The Milligan-Smart elasticity estimate of 0.69 reflects provincial tax rate changes over short-run periods. But the table indicates that if the actual long-run ETI in Canada were 0.5, the revenue-maximizing tax rate would be 52.6 percent—not far from the prevailing top tax rate in most provinces.

Table 1: Revenue Maximizing Top Tax Rates

		alpha						
		1.4	1.5	1.6	1.7	1.8	1.9	2.0
ETI	0.10	87.7%	87.0%	86.2%	85.5%	84.7%	84.0%	83.3%
	0.25	74.1%	72.7%	71.4%	70.2%	69.0%	67.8%	66.7%
	0.50	58.8%	57.1%	55.6%	54.1%	52.6%	51.3%	50.0%
	0.75	48.8%	47.1%	45.5%	44.0%	42.6%	41.2%	40.0%

These calculations may not be greeted warmly by enthusiasts for higher top rates in Canada. However, the cautions and caveats discussed above must be taken seriously and figuring out the relevant elasticity to use for a contemporary policy change is not straightforward. In the next section, I take up this argument by unpacking the overall responsiveness of income to tax rates and considering evidence and policy developments on each mode of potential response and how it informs contemporary debate.

What influences the Diamond-Saez upper bound?

The responsiveness of incomes to tax rates is at the core of the Diamond-Saez framework. If the elasticity is relatively low, the progressivity of the tax system will be anchored at a high rate. In contrast, if the elasticity is high, the revenue-maximizing top rate will be pushed lower. While a range of empirical estimates are available, understanding the influences and context that drive the relevant elasticity is of critical importance. Some factors may push the revenue-maximizing rate higher; others lower. Some are under direct control of government to choose; others are not.

In this section I discuss empirical evidence and contemporary policy developments that affect the responsiveness of income to tax rates, with specific application to Canada. The section is organized into two parts, with the first discussing real economic responses and the second addressing avoidance responses.

Real responses to top tax rates

The responses to higher taxes that affect real underlying economics behaviour have the most direct impact on efficiency. Here, I consider labour supply along with mobility and residency.

The core choice in the Mirrlees model and much of the theoretical literature on optimal taxation is between labour and leisure. So, how top income tax rates affect the labour supply choices of high earners is clearly an important question. To the extent that high earners are engaged in positional competition—to be the best in one's field and vanquish others—taxes may have little impact on labour supply. Everyone may want the "trophy" no matter its size. However, other top professionals who are considering taking on a new client or new project may turn down work if it is insufficiently remunerative after taking taxes to account.

The evidence looking directly at the labour supply of top earners is thin. Moffitt and Wilhelm (2000) look at high earning men before and after the US Tax Reform Act of 1986 which substantially lowered their tax rates. They find no evidence of a boost in hours worked.

Another potential dimension of real response is mobility and residency. When taxes rise, news reports and anecdotes fill with stories of people considering leaving the country because of the fiscal affront.[6] Of course, mobility depends not just on the overall tax burden but also on public services and overall life amenities in different jurisdictions. So, taxes are but one consideration.

---

[6] See, for example, Libin (2016) who tells of a Canadian billionaire decamping for London from Calgary reportedly because of new higher taxes at the provincial and federal levels. Similar tales arose in France in 2013-14 in response to a temporary 75 percent top tax rate, with actor Gerard Depardieu famously taking up residence in Russia. However, Murphy and John (2014) report that there was in fact no large exodus of people from France.

The evidence is mixed. Kleven, Landais, and Saez (2013) find that European football stars are affected by tax when choosing to migrate—although it is seems quite likely that profession is more mobile and tax sensitive than most. Young et al. (2016) find only weak evidence for millionaire migration between US states in response to tax differences. When it comes to innovators, however, the evidence is stronger. Moretti and Wilson (2017) and Akcigit et al. (2018) show that state taxes affect the mobility of star scientists and inventors in the United States, while Akcigit et al. (2016) show international mobility of inventors depends on taxes as well. On the other hand, Bell et al. (2019) show that top inventors are more influenced by childhood exposure to innovation and that tax incentives are unlikely to matter.

For Canada, two additional factors might be considered when weighing this international evidence on migration and taxes. Both relate to Canada's proximity to the United States. First, in the market for executive talent, it may be necessary to match US salaries in US dollars, if potential talent cares about the price of consumption in US dollars. Gordon (2016) presents evidence that Canadian top income shares line up very closely with US top income shares when exchange rates are taken into account. This suggests that higher Canadian taxes may lead to higher pre-tax incomes if matching US offers is important. Second, the recent trajectory of immigration policy in Canada and the United States has gone in opposite directions. In particular, initiatives such as the Global Skills Strategy offering a two-week window for visa processing has led to a surge in high-skill immigration.[7] These stark differences in the openness to immigration may temper the tax-sensitivity of migration decisions that would otherwise have mattered more.

---

[7] See Wong et al. (2019) for stories and data on the wave of technology sector and student migration into Canada.

Avoidance responses to top tax rates

Beyond responses through real economic choices, higher tax rates on top earners can elicit increased propensity to explore avoidance and evasion opportunities. One type of avoidance is tax shifting, meaning that income is shifted to a lower-tax channel through accounting or financial transactions having minimal bearing on the underlying real economic nature of the activity generating the income. I begin here by discussing tax shifting with reference to international evidence and recent Canadian policy changes.

One such path is shifting of income across provincial borders. Milligan and Smart (2019) develop a theoretical and empirical framework to study such income shifting, finding that higher inter-provincial shifting increases the desirability of federal government control of income taxation. One method used to realize such shifting is through trusts, which can be set up to be resident of a low tax province. Importantly, both court rulings and government action have tightened the residency requirements for trusts in recent years making this possibility less easily accessible than the past.[8]

Another way to shift income is to shift across tax bases within a given jurisdiction. This is most easily seen by evidence of shifting between the individual and corporate tax bases. For Canada, Wolfson et al. (2016) and Wolfson and Legree (2015) provide evidence of substantial shifting into private corporations from the personal income tax base. This concurs with evidence from Norway, where Alstadsæter et al. (2017) find that accounting for income accruing within

---

[8] [Add details about court rulings and CRA actions on trusts.]

closely-held firms has substantial impact on the measured incomes of high earners. Going the other direction, Clarke and Kopczuk (2017) find that some part of the surge in US individual top incomes can be attributed to 'flow-through' business income shifting from corporate to personal tax returns as the tax incentives to do so change through time.

The Canadian government's private corporation tax proposals in 2017 aimed at lowering the attractiveness of such shifting by limiting access to income splitting to family members (through curtailing the availability of 'income sprinkling') and by decreasing access to tax-favoured retained earnings inside private corporations. However, by further lowering the small business tax rate, the incentive to find new ways to shift income from individual to private corporation tax forms may have increased.

A third form of shifting is international. Zucman (2014) documents the extent of global personal and corporate income and wealth held through tax havens. Using data from leaked banking records, Altstadsaeter, Johannesen, and Zucman (2018a) estimate that those in the top 0.01 percent of Scandinavian households evade 25 percent of their tax bill through tax havens. Canadian evidence on offshore tax shifting is scarce, however.

For any of these three forms of avoidance through tax shifting, Slemrod and Kopczuk (2002) emphasize that governments have some scope to control and influence the extent of shifting. To some extent, the elasticity of avoidance is a choice variable of the tax authority. This can happen through changes in legislation along with improvements in how those tax laws are enforced.

As an example, the Canadian government announced in the 2016 budget an increase of $444 million over five years in funding for the Canada Revenue Agency with the aim of cracking down on tax avoidance and evasion, with an additional $524 million announced in the 2017 budget. Extra revenue of from the 2016 spending was booked at $2.6 billion, and from the 2017 spending at $2.5 billion.[9] If these revenue projections hold up, this suggests that for the Canadian case there was scope for government to increase enforcement with respect to high earners.

Is this likely? Altstadsaeter, Johannesen, and Zucman (2018b) report evidence from Norway suggesting that anti-evasion efforts raised extra revenue and did not result in substitution toward legal forms of tax avoidance. This is consistent with the Slemrod (forthcoming) argument that increased enforcement provides information to delinquent taxpayers that they are on the tax authority's "radar" and leads to increased compliance in all channels.

Conclusion

This paper makes the case for thinking of the progressivity of the personal income tax in the Diamond-Saez framework. I review the path to the development of the theory, and how empirical evidence on the elasticity of taxable income is fed into the model to deliver an upper bound on the high-earner tax rate. I then discuss empirical evidence on the ETI from the United States and Canada and show the range of estimates.

---

[9] See Canada (2016,2017).

The paper closes by unpacking the potential channels of response to higher tax rates, ranging from labour supply and migration to tax avoidance through income shifting. An important conclusion arising from this analysis is that the ETI—and thus the top marginal tax rate delivered by the Diamond-Saez framework—is not an immutable parameter, but changes with circumstance and can be affected by a government's choices in tax legislation and enforcement.

There are lessons here for those who favour more progressivity of income taxes for high earners. For the advocates, any proposal to further increase high-income progressivity should be accompanied by a credible and serious plan to improve tax policy legislation and enforcement with an eye to lowering the effective ETI. Equally, it is important for the high-income taxation skeptics to reasonably acknowledge the impact of efforts to shut down tax shelters, increase enforcement, and facilitate more effective high-income taxation.

References

Akcigit, Ufuk, Salomé Baslandze, and Stefanie Stantcheva (2016), "Taxation and the international mobility of inventors," *American Economic Review*, Vol. 106, No. 10, pp. 2930-2981.

Akcigit, Ufuk, John Grigsby, Tom Nicholas, and Stefanie Stantcheva (2018), "Taxation and innovation in the 20th century," NBER Working Paper No. 24982.

Alstadsæter, Annette, Martin Jacob, Wojciech Kopczuk, and Kjetil Telle (2017), "Accounting for business income in measuring top income shares: Integrated accrual approach using individual and firm data from Norway," NBER Working Paper No. 22888.

Altstadsaeter, Annette, Niels Johannesen, and Gabriel Zucman (2018a), "Tax evasion and inequality," forthcoming, *American Economic Review*.

Altstadsaeter, Annette, Niels Johannesen, and Gabriel Zucman (2018b), "Tax evasion and tax avoidance," working paper, UC Berkeley.

Bell, Alexander M., Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen (2019), Do tax cuts produce more Einsteins? The impacts of financial incentives vs. exposure to innovation on the supply of inventors," NBER Working Paper No. 25493.

Bird, Richard M. and Michael Smart (2016), "Taxing Consumption in Canada: Rates, Revenues, and Redistribution," *Canadian Tax Journal*, Vol. 64, No. 2, pp. 417-442.

Canada (2016), "Growing the middle class," Department of Finance.

Canada (2017), "Building a strong middle class," Department of Finance.

Clarke, Conor and Wojciech Kopczuk (2017), "Business Income and Business Taxation in the United States since the 1950s," in Robert A. Moffitt (ed.) *Tax Policy and the Economy*, Volume 31.

Diamond, Peter A. (1998), "Optimal income taxation: An example with U-shaped pattern of marginal tax rates," American Economic Review, Vol. 88, No. 1, pp. 83-95.

Diamond, Peter and Emmanuel Saez (2011), "The Case for a Progressive Tax: From Basic Research to Policy Recommendations," *Journal of Economic Perspectives*, Vol. 25, No. 4, pp. 165-190.

Feldstein, Martin (1999), "Tax Avoidance and the Deadweight Loss of the Income Tax," *Review of Economics and Statistics*, Vol. 81, No 4, pp. 674-680.

Feldstein, Martin (2012), "The Mirrlees Review," *Journal of Economic Literature*, Vol. 50, No. 3, pp. 781-790.

Gordon. Stephen (2016), "Bargaining power and the incidence of income taxes on high earners in Canada," CRREP working paper 2016-02.

Kleven, Henrik Jacobsen, Camille Landais, and Emmanuel Saez (2013), "Taxation and the international migration of superstars: Evidence from the European football market," *American Economic Review*, Vol. 103, No. 5, pp. 1892-1924.

Kopczuk, Wojciech (2005), "Tax Bases, Tax Rates and the Elasticity of Reported Income," *Journal of Public Economics*, Volume 89, No. 11-12, pp. 2093-2119.

Laurin, Alexandre (2015), "Shifting the federal tax burden to one-percenters: A losing proposition," *C. D. Howe Institute e-brief*.

Libin Kevin (2016), "How high-tax Canada is driving away billionaire entrepreneurs like Murray Edwards," *Financial Post*, March 28, 2016. https://business.financialpost.com/opinion/the-tax-climate-refugee-murray-edwards

Lockwood, Benjamin B., Charles G. Nathanson, and E. Glen Weyl (2017), "Taxation and the Allocation of Talent," *Journal of Political Economy*, Vol. 125, No. 5, pp. 1635-1682

Mankiw, N. Gregory, Matthew Weinzierl, and Danny Yagan (2009), "Optimal taxation in theory and practice," *Journal of Economic Perspectives*, Vol. 23, No. 4, pp. 147-174.

Milligan, Kevin (2016), "The Progressivity of the Canadian Personal Income Tax," in Dahlby, Bev (ed.) *Reform of the Personal Income Tax in Canada*. Toronto: Canadian Tax Foundation.

Milligan, Kevin (2019), Canadian Tax and Credit Simulator. Database, software and documentation, Version 2019-1.

Milligan, Kevin and Michael Smart (2015), "Taxation and Top Incomes in Canada," *Canadian Journal of Economics*, Vol. 48, No. 2, pp. 655-681.

Milligan and Smart (2019) "An Estimable Model of Income Redistribution in a Federation: Musgrave meets Oates," *American Economic Journal: Economic Policy*, Vol. 11, No. 1, pp. 406-434.

Mirrlees, J.A. (1971), "An Exploration in the Theory of Optimum Income Taxation," *Review of Economic Studies*, Vol. 38, No. 2, pp. 175-208.

Moffitt, Robert A. and Mark Wilhelm (2000), "Taxation and the labor supply decisions of the affluent," in Joel Slemrod (ed.) *Does Atlas Shrug? Economic Consequences of Taxing the Rich*. Cambridge: Harvard University Press.

Moretti, Enrico and Daniel Wilson (2017), "The Effect of State Taxes on the Geographical Location of Top Earners: Evidence from Star Scientists," *American Economic Review*, Vol. 107, No. 7, pp. 1858-1903.

Murphy, Hannah and Mark John (2014), "France waves discreet goodbye to 75 percent super-tax," *Reuters Business News*, December 23. https://www.reuters.com/article/us-france-supertax-idUSKBN0K11CC20141223

OECD (2019), *OECD Tax Database.* http://www.oecd.org/tax/tax-policy/tax-database.htm

Piketty, Thomas (1997), "La redistribution fiscale face au chômage," *Revue française d'économie*. Vol. 12, No. 1, pp. 157-201.

Piketty, Thomas, Emmanuel Saez, and Stefanie Stantcheva (2014), "Optimal taxation of top labor incomes: A tale of three elasticities," *American Economic Journal: Economic Policy*, Vol. 6, No. 1, pp. 230-271.

Saez, Emmanuel (2001), "Using Elasticities to Derive Optimal Income Tax Rates," *Review of Economic Studies*, Vol. 68, No. 1, pp. 205-229.

Saez, Emmanuel, Joel Slemrod, and Seth H. Giertz (2012), "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review," *Journal of Economic Literature*, Vol. 50, No. 1, pp. 3–50.

Saez, Emmanuel and Gabriel Zucman (2019), "Alexandria Ocasio-Cortez's tax hike idea is not about soaking the rich," *New York Times*, January 22. https://www.nytimes.com/2019/01/22/opinion/ocasio-cortez-taxes.html

Slemrod, Joel (forthcoming), "Tax compliance and enforcement," *Journal of Economic Literature*.

Slemrod, Joel, and Wojciech Kopczuk (2002), "The Optimal Elasticity of Taxable Income." *Journal of Public Economics*, Vol. 84, No. 1, pp. 91–112.

Wolfson, Michael and Scott Legree (2015), "Private Companies, Professionals, and Income Splitting — Recent Canadian Experience," *Canadian Tax Journal*, Vol. 63, No. 3, pp. 717-738.

Wolfson, Michael, Mike Veall, Neil Brooks, and Brian Murphy (2016), "Piercing the Veil: Private Corporations and the Income of the Affluent," *Canadian Tax Journal*, Vol. 64, No. 1, pp. 1-30.

Wong, Natalie, Theophilos Argitis, Natalie Obiko Pearson, and Erik Hertzberg (2019), "Canada says 'Give me your MBAs, your entrepreneurs," *Bloomberg Businessweek*, January 2.

Young, Cristobal, Charles Varner, Ithai Z. Lurie, and Richard Prisinzano (2016), "Millionaire migration and taxation of the elite: Evidence from administrative data," *American Sociological Review*, Vol. 81, No. 3, pp. 421-446.

Zucman, Gabriel (2014), "Taxing across borders: Tracking personal wealth and corporate profits," *Journal of Economic Perspectives*, Vol. 28, No. 4, pp. 121-148.

**Figure 1: Marginal Tax Rate on Earned Income, British Columbia 2019**
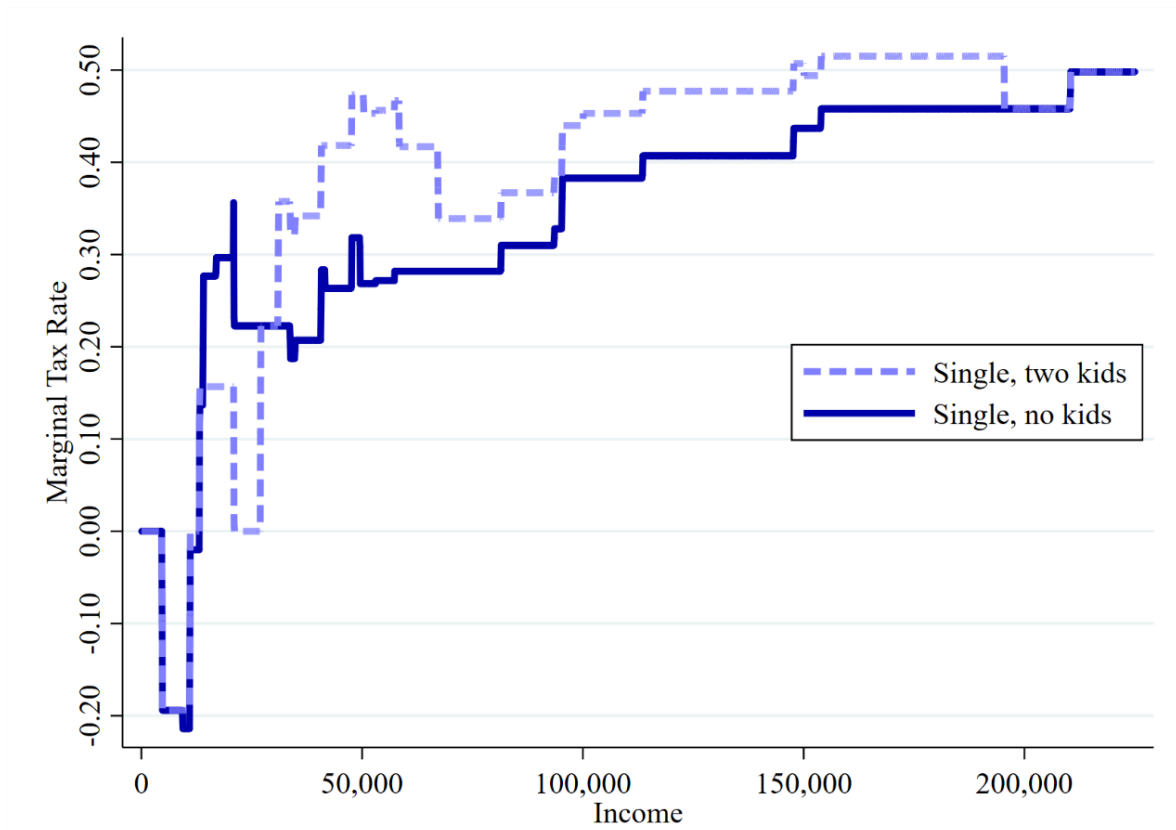
Note: Calculations using CTaCS 2019-1. The children are assumed to be ages 5 and 8.

Figure 2: Marginal Tax Rates between 1962 and 2019 for British Columbia
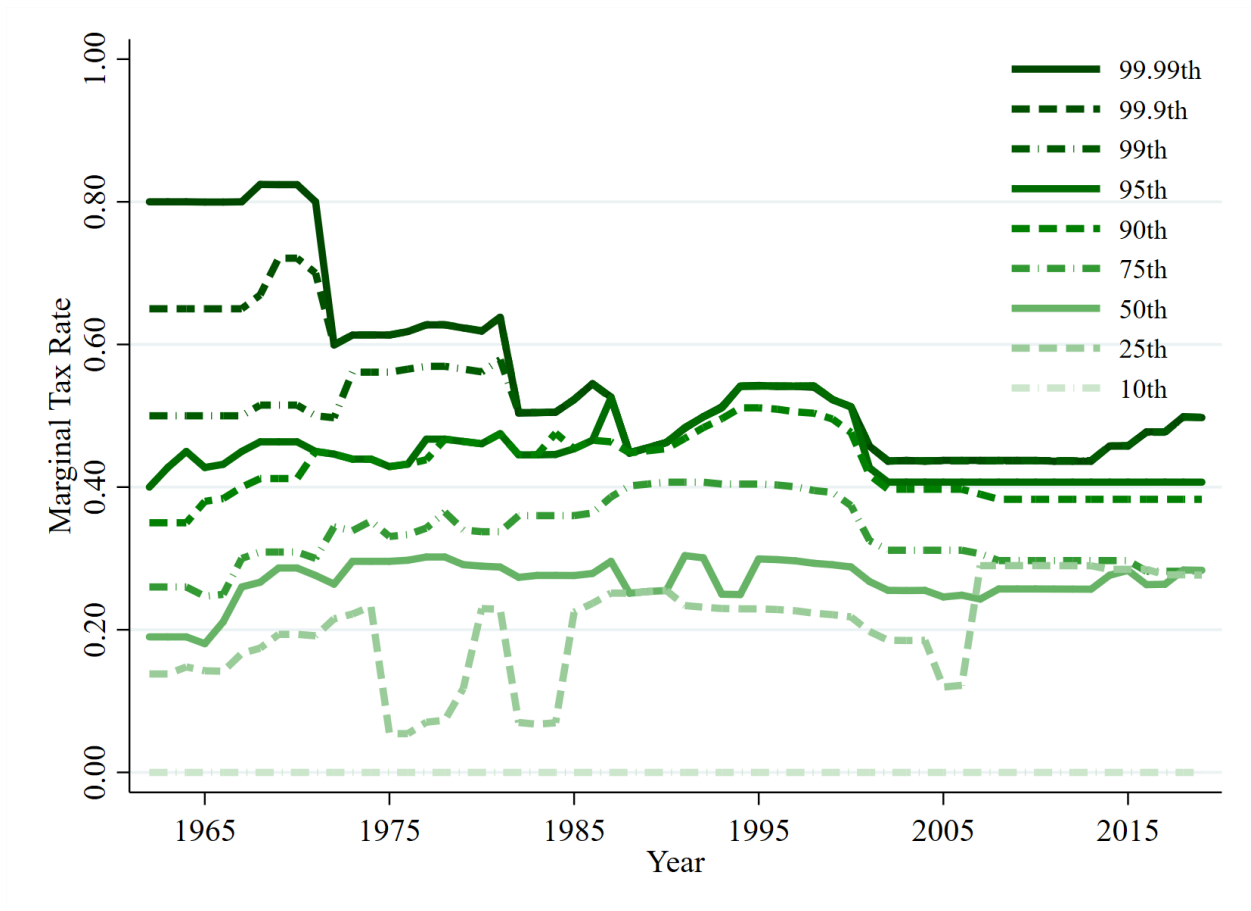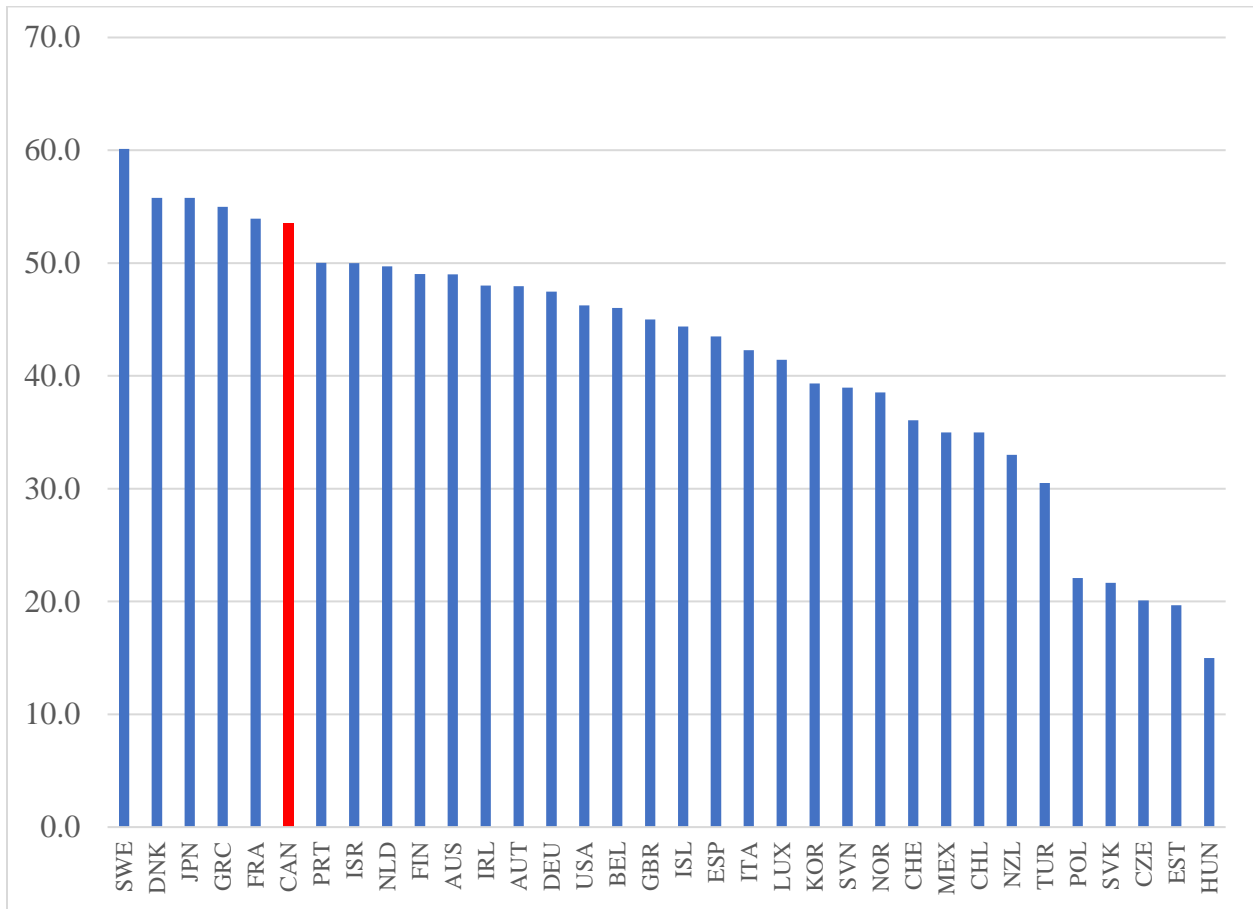

Note: Calculations using CTaCS 2019-1. The percentiles of the income distribution are drawn from the 2015 Canadian Income Survey and adjusted for inflation to each year.

Figure 3: High-Earner Marginal Tax Rates, 1988-2019
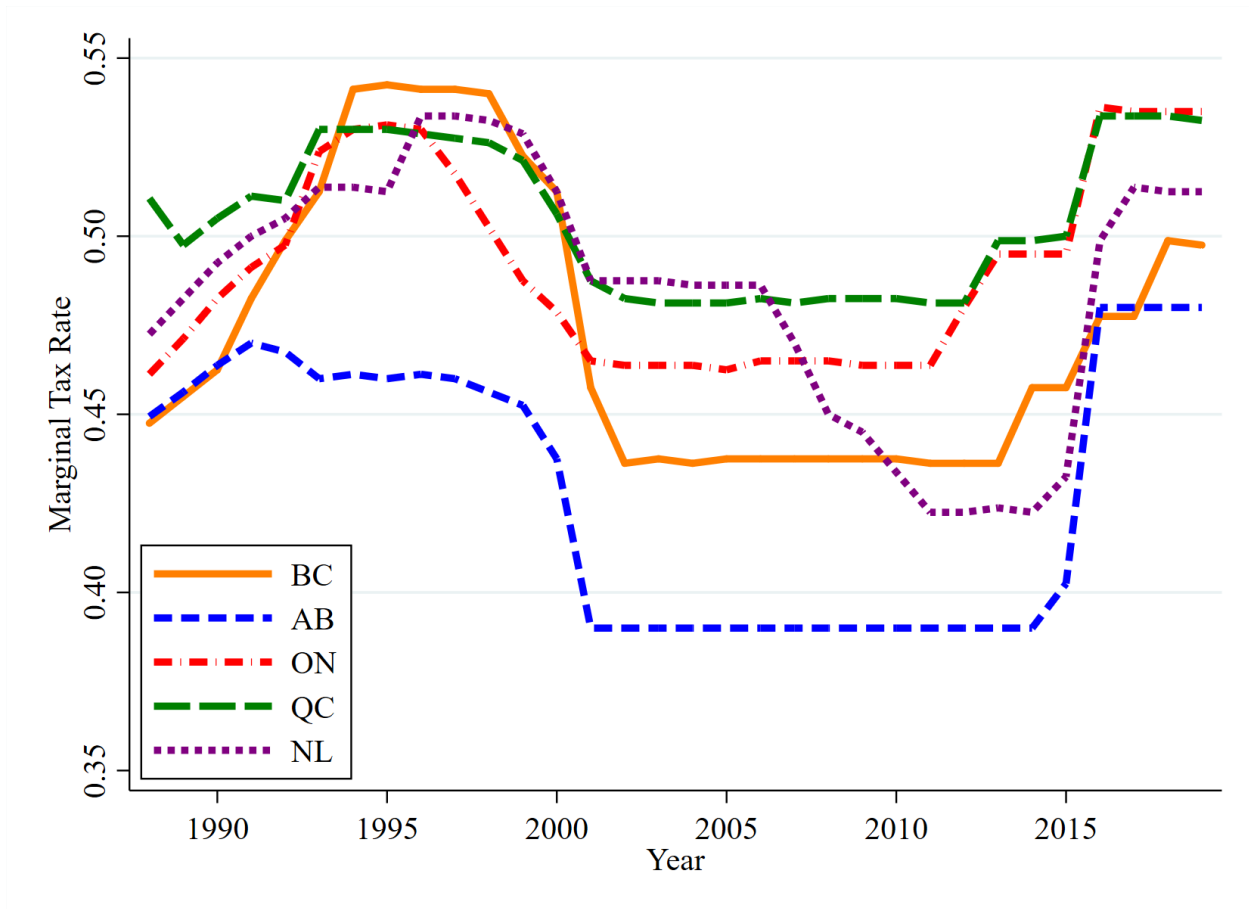
Note: Calculations using CTaCS 2019-1.

Figure 4: Top Income Tax Rates in OECD Countries, 2017

Note: Source is OECD Tax Database, Table I.7.