How Much Income Tax Could Canada's Top 1% Pay?

Lars Osberg

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ABOUT THE AUTHORS

CCPA Research Associate Dr. Lars Osberg is McCulloch Professor of Economics at Dalhousie University. He received his Ph.D in Economics from Yale University in 1975. After teaching at the University of Western Ontario he moved to Dalhousie University where he has published numerous articles in academic journals and seven books, including *Unnecessary Debts*, co-edited with Pierre Fortin (James Lorimer Publishers, Toronto, 1996). He is a past President of the Canadian Economics Association.

Executive Summary

HOW MUCH MORE could Canada's richest 1% be paying in income tax? This paper documents trends in the top marginal income tax rate going back to the 1920s, itemizes provincial top marginal income tax rates in 2015, and compares the top marginal income tax rate on wage income in Canadian provinces and U.S. states. That comparison shows that Canada in 2013 was a relatively low tax rate jurisdiction for the very affluent — adding together federal and provincial/state and municipal income tax, the highest top marginal tax rates were found in the U.S. (51.9% in California, 50.5% in Hawaii and 50.3% in New York State — 51.7% in New York City). The Canadian average top marginal income tax rate of 45.7% was lower than the American average of 47.9%.

The paper then examines four reasons why the labour supply response of high earners to changes in top marginal tax rates in Canada is actually fairly small: 1] limited possible time available; 2] the role of luck in determining high earnings; 3] the importance of relative income to motivation and 4] North American compensation norms.

Summarizing the literature on possible migration responses to top end tax differentials, the paper finds scant evidence that higher top tax rates prompt a rush by "job creators" or "the best and brightest" to emigrate. In, for example, metropolitan areas in the U.S. which span state boundaries (e.g. New York CIty) it would only take a short move to escape increases in state top marginal tax rates — but very few people in fact move to another jurisdiction in response to tax increases. The practical implication is that

provincial and territorial governments have significant policy room available for tax rate changes.

The paper also addresses the quiet side of tax policy: the facilitation (or not) of tax avoidance and tax evasion. The federal government, through the Canada Revenue Agency, is responsible for the regulations and enforcement which could do more to ensure Canada is getting the taxes owed by potential tax avoiders and evaders. The U.S., for example, has a reward system for tax fraud whistle-blowers, which Canada could emulate.

The bottom line: there is room to maneuver for a significant increase in the top marginal income tax rate in Canada — federally and provincially.

For most of the time that Canada has had an income tax system, the top marginal tax rate has been well over 50%. In fact, during Canada's high growth years between 1940 and 1980, the top marginal income tax rate was well over 70%. However, in recent years the federal government's top marginal income tax rate (on labour income over $138,586) has been stuck at 29%. Provincially, Alberta has had the lowest combined top marginal income tax rate on earnings at 39%. Top tax rates on income from capital gains or dividends are considerably lower.

The federal Liberal party included in its 2015 platform a promise to raise the top federal marginal income tax rate to 33%. This analysis shows there is more than enough scope to implement such a promise.

Between 2008–12, Canada's one percenters paid an average $147,000 in federal and provincial income tax — 33.2% of their reported total income, excluding capital gains. This produced a total $37.5 billion in income tax revenue for Canada's governments. Raising the marginal tax rate to 65% on income over $205,000 (the threshold for the top 1% income category) would be closer to historical norms and 65% is the average estimate of the revenue-maximizing top marginal tax rate found in recent economics literature. If capital gains are ignored, this would yield between $15.8 and $19.3 billion for public programs. If capital gains are also included as income, it could yield between $21.8 and $26.1 billion.

For comparison, the paper notes that income taxes raised an average of $176.7 billion annually for federal, provincial and territorial governments in Canada during the 2008–12 period. Hence, raising top marginal tax rates would represent a significant, but not a fundamental, change to total tax revenues in Canada. However, as a concrete comparison, one can also note that the total revenue of Canada's universities and colleges from tuition and other fees was $8.1 billion in 2012–13 and Federal support for provincial, territorial and municipal infrastructure was $5 billion. Raising top marginal

tax rates could therefore enable both tuition-free post-secondary education and a doubling of the federal infrastructure renewal programs that benefit everyone, including Canada's one percenters. For those reasons, the report concludes there is plenty of scope for higher top marginal income tax rates in Canada.

1. Introduction

OVER THE LAST 35 years, Canada has seen substantial increases in market income at the top of the income distribution, while middle class incomes have stagnated[1]. Simultaneously, top income tax rates declined significantly. An increasing fraction of Canada's total potential tax base has thus become concentrated at the top, but is now taxed at a lower marginal rate.

At the same time, cuts to social programs and public services have undermined the well-being of less well-off Canadians — cuts which could have been less severe, or even avoided, if those Canadians with the greatest ability to pay taxes had not, in fact, received tax rate reductions. Concern with the increasing budgetary importance of top tax rates and the fairness of increasing inequality in disposable income has motivated a surge of research on how much income tax the top 1% could and should pay.

Section 1 summarizes the context of the current debate on top tax rates. It starts by presenting the estimates of the International Monetary Fund (IMF 2013) and other recent researchers of revenue-maximizing top marginal income tax rates. Section 1.2 then compares the top marginal income tax rate over time and across provinces, while Section 1.3 compares Canadian provinces and U.S. states. Section 1.4 notes that the tax rates actually paid by top income tax filers in Canada are considerably less than the nominal top marginal rates.

Section 2 then asks if the "standard methodology" used by the IMF and other recent authors to calculate the revenue-maximizing top marginal income tax rate depends on over-estimated labour supply effects, which would

imply their estimates of the revenue-maximizing top marginal tax rate are probably too low. Specifically, Section 2.1 emphasizes that labour supply responses to tax rates are, in fact, constrained by total possible labour time while Section 2.2 notes that optimal taxation will pool risks through higher tax rates when there is income uncertainty and people are risk averse. As well, although the "standard model" presumes that top earners are motivated solely by individual wages, relative competitive consumption norms are key drivers for top earners, which implies that higher marginal top tax rates, if uniformly applied, have little incentive effect — as Section 2.3 argues. Finally, Section 2.4 briefly discusses the importance of continental pay norms for Canada's top earners.

Two issues particularly relevant for Canada are possible migration responses to top end tax differentials and the policy room available for subnational governments, which Section 3.1 and Section 3.2 discuss. Section 3.3 addresses the quiet side of tax policy — the facilitation (or not) of avoidance and evasion — and, in particular, the problems for top 1% taxation raised by Canadian Controlled Private Corporations (CCPCS).

In Section 4, the revenue implications of Atkinson's (2014) suggestion of an effective top marginal tax rate of 65% are considered. Section 5 is a conclusion.

1.1 Recent Estimates of the Revenue-Maximizing Top Marginal Income Tax Rate

As a point of reference, *Figure 1* reproduces recent IMF (2013: 37) estimates of the revenue-maximizing top marginal income tax rate in 16 affluent nations.

As *Figure 1* documents, most OECD countries now have significantly higher top marginal tax rates than Canada. Nevertheless, in almost all countries the existing top marginal tax rate is below the revenue maximizing tax rate. The estimates underlying *Figure 1* are just part of a general study by the IMF of revenue raising capacity. Governments around the world face the prospect that public sector deficits and increasing debt/GDP ratios may produce increasing debt fragility and, eventually, an increasing likelihood of financial crises. The IMF, as the international organization most directly mandated to preserve the systemic stability of international capitalism, is not advocating specific tax changes but it is underlining the obvious — governments need tax revenue to pay their bills, and global financial stability depends on governments having enough of it. Because the top end of the income distri-
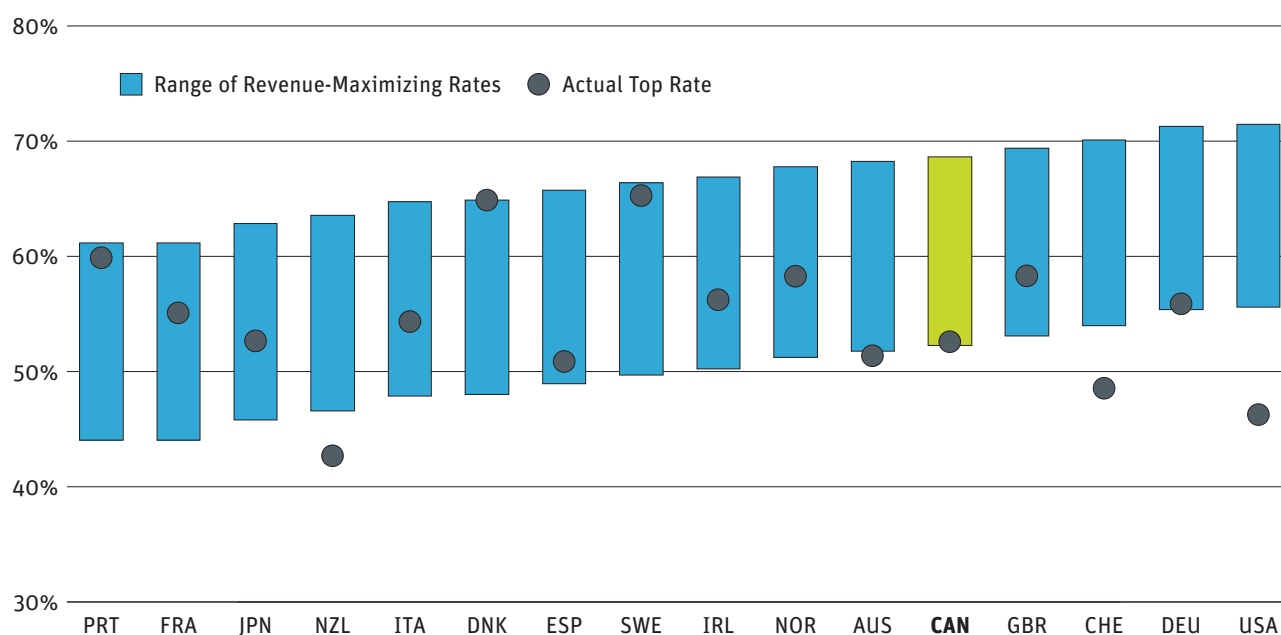
TABLE 1 Top Marginal Tax Rate Suggested

Top Rate	Author(s) (year)	Journal	Methodology and Notes
90%	Kindermann & Krueger (2014)	NBER Working Paper No. 20601	Social welfare maximizing top tax rate from calibrated overlapping generations model with idiosyncratic income risk; revenue-maximizing top rate is 77%
83%	Piketty, Saez & Stantcheva (2011)	American Economic Journal: Economic Policy	Revenue-maximizing top U.S. tax rate, allowing for labour supply, avoidance and bargaining effects (= 73% with Canadian income distribution)
72.7%	Saez, Slemrod, & Giertz.(2012)	Journal of Economic Literature	Revenue-maximizing top tax rate for U.S., including state income tax; increases to 76.8% if taxable income is partly displaced to other tax bases
73%	Diamond, & Saez (2011)	Journal of Economic Perspectives	Revenue-maximizing top marginal income tax rate for U.S.
65%	Atkinson (2014)	British Journal of Sociology	Recommendation for top marginal income tax rate for U.K. based on literature survey
52%	Badel & Huggett (2014)	Federal Reserve Bank of St. Louis	Revenue-maximizing rate for U.S. if all human capital formation is endogenous to top tax rate; = 66% if exogenous
60.3% & 27.9%	Milligan & Smart (2014)	NBER Working Paper 20489	Revenue-maximizing rates for Canada: 60.3% rate for P90-P99.9 & 27.9% for P99.9+. Assumes no bargaining or shifting

FIGURE 2 Marginal Income Tax Rates in Canada for Various Percentiles
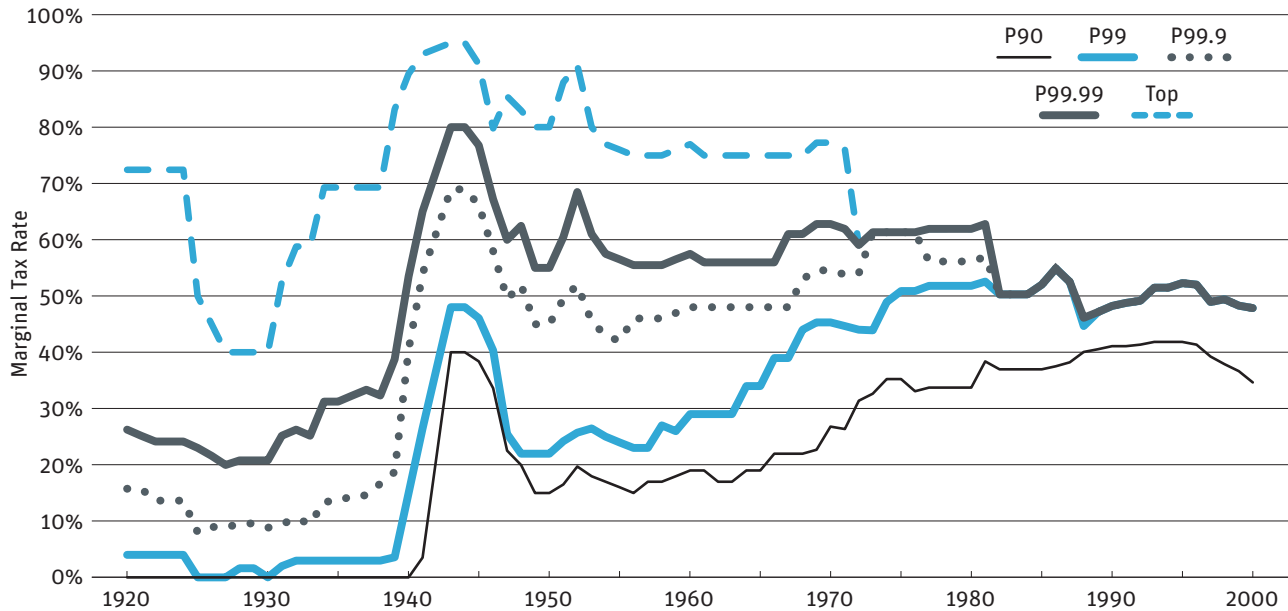
bution has received an increasing share of total income in recent decades in many countries, an increasing fraction of potential tax revenues has become concentrated at the top. Hence, a full discussion of systemic financial stability has to consider the revenue-maximizing top marginal tax rate.

Section 2 of this paper critiques the methodology underlying *Figure 1*, but one should emphasize that its conclusions are not unusual. *Table 1* presents a selection of other recent estimates of the optimal[2] or revenue-maximizing top marginal income tax rate.

1.2 Canada: Top Marginal Tax Rates Over Time

As *Figure 2* illustrates, the top marginal income tax rate has been well over 50% for most of time that Canada has had an income tax system.[3] Indeed, the 1940 to 1980 period of significantly rising real incomes for the bottom 90% of the Canadian population[4] was also a period when the top marginal income tax rate was well over 70%. Apart from a very brief period in the 1920s, the years from 1982 to the present stand out as a time of exceptionally low top marginal tax rates.

FIGURE 3 Federal + Provincial Top Nominal Tax Rates, 2013

	Provincial	Combined
NL	0.133	0.423
PE	0.184	0.474
NS	0.210	0.500
NB	0.161	0.451
QC	0.258	0.500
ON	0.205	0.495
MB	0.174	0.464
SK	0.150	0.440
AB	0.100	0.390
BC	0.147	0.437

Top Provincial and Combined Marginal Tax Rates
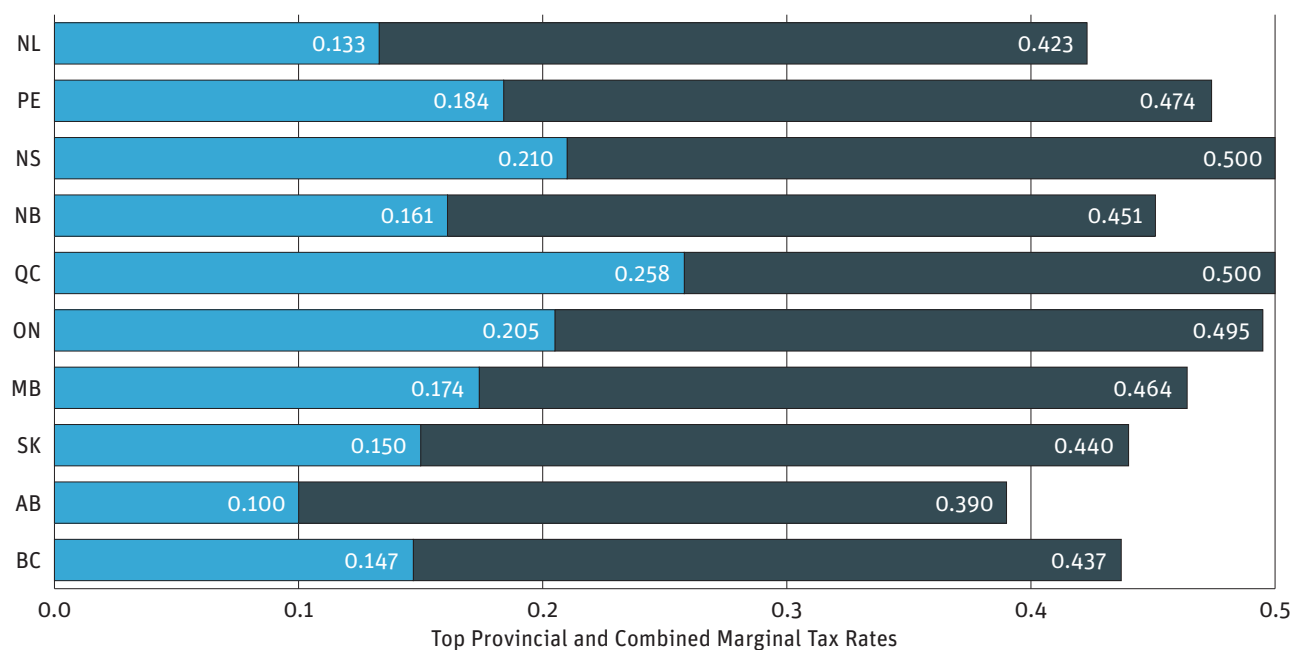
Source Milligan and Smart (2014: Figure 1)

TABLE 2 Top Marginal Income Tax Rates, 2015

Provinces/Territories	Top Marginal Provincial Income Tax Rate — 2015
Newfoundland and Labrador	13.3% on the amount over $70,015
Prince Edward Island	16.7% on the amount over $63,969
Nova Scotia	21% on the amount over $150,000
New Brunswick	17.84% on the amount over $129,975
Quebec	21% on the amount over $102,040
Ontario	20.53% = (13.16 % *1.56 surtaxes) on amount over $220,000
Manitoba	17.4% on the amount over $67,000
Saskatchewan	15% on the amount over $125,795
Alberta	10% of taxable income
British Columbia	16.8% on the amount over $151,050

Sources Canada Revenue Agency: http://www.cra-arc.gc.ca/tx/ndvdls/fq/txrts-eng.html; http://www.taxtips.ca/taxrates/qc.htm;

In recent years in Canada, the federal government's top marginal income tax rate has been stationary at 29% while the provinces have set different add-on top marginal tax rates as illustrated in *Figure 3*. In 2013, residents of Alberta faced the lowest combined top marginal income tax rate (39%), significantly lower than the top combined nominal rate of Ontario, Nova Scotia, Quebec, or neighbouring BC and Saskatchewan.

Figure 3 is a snapshot from 2013, but tax policy is always subject to amendment. *Table 2* shows top marginal provincial tax rates for 2015. Note that several provinces have changed their top marginal tax rates since 2013. As *Table 2* shows, the provinces have tax schedules in which the top tax rate kicks in at very different levels of taxable income. In PEI, for example, the top provincial marginal tax rate of 16.7% is applied on the amount over $63,969 while Ontario's top tax bracket starts at $220,000. (The top federal tax rate of 29% of taxable income applies in 2015 to income over $138,586). Within the last year (i.e. 2014–15), the electoral process has also produced new governments in both Alberta and New Brunswick whose campaign promises included a pledge to increase top marginal tax rates. The Liberal Party of Canada also promised to raise the top federal marginal income tax rate to 33% before its election in October 2015.

1.3 Top Tax Rates in Canadian Provinces and U.S. States

As Canada's new governments contemplate the fulfilment of their campaign promises, they will undoubtedly encounter over-heated rhetoric about the competition for talent and capital within North America and the dangers for economic growth of being a high tax jurisdiction[5]. *Table 3* therefore includes Canadian provinces in Pomerleau's (2014)[6] ranking of U.S. states by top 2013 marginal tax rate on labour income[7]. The two highest top marginal tax rate jurisdictions in the U.S. (New York City and California) include some of the most dynamic and high-income areas in the U.S. (i.e. Wall Street and Silicon Valley), which continue to prosper. It can also easily be seen that although two Canadian provinces were near the top of North American rankings, most provinces were not. Indeed, for high-income earners, the two lowest top marginal income tax rate jurisdictions in North America were both in Canada (Newfoundland and Alberta). In recent years, Canada has been, on average, a low-tax jurisdiction for the affluent compared to the U.S. — in 2013 the average across U.S. states of top marginal income tax rates (47.9%) was higher than the average across Canadian provinces (45.7%).

TABLE 3 Top Marginal Income Tax Rate on Wage Income, 2013

Rank	State/Province	Rate	Rank	State/Province	Rate
1	California	51.9%	29	Illinois	46.9%
2	Hawaii	50.5%	29	Kansas	46.9%
3	New York (+ municipal = 51.7% in New York City)	50.3%	29	Mississippi	46.9%
	Quebec	**50.0%**	29	New Mexico	46.9%
	Nova Scotia	**50.0%**	29	Utah	46.9%
4	Oregon	49.9%	34	Arizona	46.7%
5	Minnesota	49.8%	34	Colorado	46.7%
	Ontario	**49.5%**	34	Indiana	46.7%
6	New Jersey	49.3%	34	Pennsylvania	46.7%
6	Vermont	49.3%	38	Michigan	46.6%
8	Maryland	49.2%		**Manitoba**	**46.4%**
9	Maine	49.0%	39	North Dakota	46.3%
10	North Carolina	48.6%	40	Louisiana	46.1%
10	Wisconsin	48.6%	41	Alabama	45.7%
12	Ohio	48.5%		**New Brunswick**	**45.1%**
13	Idaho	48.4%		**Saskatchewan**	**44.0%**
13	Kentucky	48.4%		**British Columbia**	**43.7%**
15	Arkansas	48.1%	42	Alaska	42.8%
15	Montana	48.1%	42	Florida	42.8%
15	South Carolina	48.1%	42	Nevada	42.8%
18	Delaware	48.0%	42	New Hampshire	42.8%
18	Nebraska	48.0%	42	South Dakota	42.8%
20	Connecticut	47.9%	42	Tennessee	42.8%
21	West Virginia	47.8%	42	Texas	42.8%
22	Missouri	47.6%	42	Washington	42.8%
23	Georgia	47.5%	42	Wyoming	42.8%
23	Rhode Island	47.5%		**Newfoundland**	**42.3%**
25	Iowa	47.4%		**Alberta**	**39.0%**
25	Virginia	47.4%		Washington D.C.	49.3%
	Prince Edward Island	**47.4%**			
27	Massachusetts	47.1%		**Canada Average**	**45.7%**
27	Oklahoma	47.1%		**U.S. Average**	**47.9%**

	Top 0.01%	Top 0.1%	Top 1%	Top 5%	Top 10%	Top 50%
Total Income						
Average Income	5,349,620	1,737,400	441,000	196,980	144,620	68,300
Average Taxes*	1,819,780	556,480	146,800	56,420	37,800	13,260
Average % Tax Rate	34.0%	35.4%	33.3%	28.6%	26.1%	19.4%
Total Income with Capital Gains						
Average Income	6,267,080	1,827,120	494,980	211,660	152,760	70,320
Average Taxes*	1,847,880	554,900	146,720	56,520	37,860	13,280
Average % Tax Rate	29.5%	30.4%	29.6%	26.7%	24.8%	18.9%

* Average federal and provincial or territorial income taxes paid
Source CANSIM Table 204-0001 High income trends of tax filers in Canada, provinces, territories and census metropolitan areas (CMA), national thresholds, annual (accessed: May 20, 2015)

1.4 Nominal and Actual Tax Rates at the Top

So far, like most of the discussion of top marginal tax rates, this paper has presented the nominal top marginal income tax rate on labour income which is contained in current tax legislation. However, Canadian tax law allows income of different types to be taxed at very different rates. For example, in Ontario in 2015, for taxpayers with taxable income in excess of $220,000, the combined federal and provincial top marginal income tax rate was 24.76% for capital gains income, 33.82% for eligible Canadian dividend income, and 40.13% for non-eligible Canadian dividend income. Only "other income" (primarily labour earnings) faced the combined federal and provincial top marginal income tax rate of 49.53%[8].

As *Table 4* indicates, the average income tax rate at the very top which is actually paid is considerably lower than *Figure 3* or *Table 2* would imply, even combining federal and provincial or territorial income tax[9].

When the average tax rate is nearly constant, as it is for the top 1% when capital gains are included, the marginal tax rate must equal the average rate (i.e. approximately 0.3). If capital gains are excluded, comparing the increase in average total income tax paid when moving from roughly $200,000 to about $440,000 with the increase in income tax over the range $1.7 million to $5.3 million, the implied marginal income tax rate in Canadian data actually declines slightly (from 0.371 to 0.334)[10] as incomes increase at the very top.

Evidently, there is a significant difference between nominal top marginal income tax rates on labour income and the tax rates actually paid. The recommendations in *Table 1* on revenue-maximizing top marginal rates assume that taxpayers in fact pay the stated nominal tax rate. Hence, the revenue and behavioural implications of implementing such tax rates are two-fold:

(1) The impact of moving from current actual tax rates to stated nominal rates (for the top 0.1%, an increase of roughly 10 percentage points, since the nominal average top rate is 45.7% and the actual effective marginal tax rate paid is 35.4%, if capital gains are ignored) and

(2) The impact of any increase in nominal tax rates (e.g. the 65% recommendation of Atkinson (2014) would suggest a further increase of about 19 percentage points, for a total increase of 29 percentage points).

2. Top Tax Rates and Labour Supply

FIGURE 1 PRESENTED the range (roughly 50% to 70%) for the revenue-maximizing top marginal income tax rate in Canada estimated by the IMF, which used the methodology advocated by Piketty, Saez and Santcheva (2011, 2014 — henceforth PS&S). Milligan and Smart (2013, 2014) and others have used this methodology as well[11]. Because this methodology focuses on labour supply effects, sections 2.1 to 2.4 will do likewise. The key issue examined is whether the assumptions underlying this "standard model" are plausible or whether more believable models might imply that the responsiveness of labour supply to higher tax rates is over-estimated, and, as a direct consequence, that the revenue-maximizing tax rate is under-estimated.

2.1 Taking the Total Time Constraint Seriously

Economists have long been greatly concerned that an increase in the tax rate on top incomes might produce a decrease in the labour supply of top earners, which might be large enough to offset any increase in tax revenues from higher tax rates. In estimating the revenue-maximizing top tax rate, the three key references in the recent literature have slightly different titles[12] but essentially identical models, all of which emphasize the importance of labour supply[13].

In the standard neo-classical model of labour supply, individuals maximize utility, subject to the constraint that total time available (T) is divided between work hours (H) and non-labour time/leisure (L). Utility is dependent on both the level of consumption (C) and the amount of leisure time (L) enjoyed, while consumption is constrained by net income, which is equal to any after tax non-labour income (V) plus net labour earnings (wH)—i.e. the after-tax hourly wage rate (w) times work hours (H). In this model, the utility maximization problem can be written as the maximization of equation (1) subject to the cash budget constraint (2) and the total time constraint (3).

(1) Maximize U =u(C,L) $u'(C) > 0, u''(C) < 0; u'(L) > 0, u''(L) < 0$

Subject to

(2) $C \leq wH + V$

(3) $T = H + L$

The reason for having a labour supply model is to have an explanation for the relationship between the net hourly wage and total labour supply. Given equations (1) to (3), the Slutsky equation decomposes the total wage elasticity of labour supply into the compensated net wage elasticity or substitution effect (i.e. the impact of higher net hourly wages on labour supply holding utility constant) and the income effect (the impact of higher non-labor income on work hours holding net wages constant), as in equation (4).

$$(4) \qquad \eta_w \qquad = \qquad \eta_{w|U} \qquad + \qquad \eta_{V|w}$$

Total wage elasticity of labour supply (H)	substitution effect (compensated wage elasticity)	income effect (if leisure is normal good)
?	+	-

Convexity of preferences implies the substitution effect of the marginal net hourly wage on labour supply is always positive, since leisure becomes more expensive when the after-tax wage increases. If leisure is a normal good (as typically assumed), this model implies that people want more of it when their potential income rises, so the income and substitution effects have opposite signs and the net effect of rising hourly wages on labour supply is theoretically ambiguous over much of the wage distribution. However, as working hours approach total time available, the marginal utility of remaining leisure time increases, so this model is unambiguous in predicting that the income effect will at some point at least equal the substitution effect.

Higher hourly net wages cannot always increase hours of work, because increasing work hours increase the scarcity and therefore the marginal utility of leisure and increasing money incomes reduce the marginal utility of further consumption increases. To put it more plainly, even very rich people need some non-work time in which to consume their income and when they get rich enough they decide they can afford to enjoy some leisure. Certainly working hours cannot always increase as the after-tax hourly wage increases, because eventually one runs out of time. Indeed, after some point further increases in the hourly wage may cause hours of work to decline.

Osberg and Phipps (1993) are among those whose econometric results suggest that labour supply functions that are quadratic in the hourly wage (i.e. backward bending) are realistic, in the Canadian context. Backward bending labour supply functions have the property that working hours are maximized at some critical value of the net wage W, above which individuals decide that further increases in net wages mean they are rich enough to afford more leisure[14]. When the net wage exceeds its hours maximizing level W, cuts in the net wage then produce increased labour supply — i.e. if w > W , a cut in the net after tax wage caused by an increase in the marginal income tax rate will unambiguously increase tax revenue, because both the tax rate and the tax base increase. If one rejects the hypothesis that work hours are maximized at a specific net wage (W) and wants to assume that the total wage elasticity of labour supply is always positive, then one faces the problem that the total wage elasticity of labour supply has to be very small if the labour supply function is to fit both middle income data and enable top earnings to be consistent with feasible hours.

There is enormous variation in Canadian hourly wages. Mackenzie (2015:6) reports that "the average (annual) compensation of the top 100 CEOs was $9,213,416 in 2013." On an hourly basis, if Canada's top CEOs worked 16 hours a day for 365 days per year, their average annual labour supply would be 5,840 hours[15], implying an average hourly wage before tax of $1,577. Since the median hourly wage of full-time employees in 2014 was $23.08[16], a labour supply function consistent with the observed range of hourly wages would have to have an implied elasticity of labour supply with respect to the pretax wage of 0.0303 or less. Any labour supply function with an always positive labour supply elasticity which was any larger would hit maximum possible annual hours at income levels below $9.2 million.

In the recent literature on optimal taxation, Piketty and Saez (2012:13) start from the basis that: "earnings are determined by labor supply and that individuals derive disutility from work. Individual i has utility $u_i(c, z)$ increas-

ing in c but decreasing with earnings z ". Since the pre-tax wage rate (w^*) is exogenous, and annual earnings before tax are equal to the average hourly pre-tax wage rate times annual work hours (i.e. $z = w^*H$), this amounts to saying that utility is decreasing in H. However, the crucial difference[17] with equations (1) to (3) above is that equation (3) has disappeared — Piketty and Saez (2012) do not specify any upper bound to work hours. Arguably, it is the upper bound to total time (i.e. scarcity) that implies working time has an opportunity cost in foregone leisure. The scarcity of time and the opportunity cost (i.e. leisure) of working time are the reasons why more working time might have, at the margin, negative utility. If hours are not scarce or if time has no alternative use (as omitting equation 3 implies), there is no particular reason why using time for work should have a disutility.

In Saez, Slemrod, & Giertz (2012), labour supply is discussed in terms of "effort" instead of "hours" [e.g. "Individuals supply effort to earn income" (2012:16)], but, in principle, this should not matter analytically for labor supply. Total effort over a period of time is the product of hours worked and the average intensity of work per hour. Hence, the elasticity of effort supply with respect to the after-tax hourly wage will be the sum of the elasticity of work hours with respect to the net hourly wage and the elasticity of work intensity with respect to the net hourly wage[18]. But the crucial issue in the "standard methodology" results reported in *Table 1* is still the omission of any mention of an upper bound to either working hours or work intensity. An equivalent to equation (3) is simply non-existent.

As a consequence, it is implicitly assumed that working hours and/or work intensity can increase without limit. Of course, if there is no scarcity of time or of effort (i.e. no opportunity cost to either), there is no obvious reason why supplying more of either should have any disutility — but scarcity is an essential aspect of economic life. Work hours per year cannot increase without limit. One can question whether it would really be possible to work 16 hours a day, 365 days a year (5,840 total annual hours), with no allowance for illness or any other form of interruption, ever. If one day a week is allowed for rest, and if one day of annual holiday is taken, then annual work days would be 312, so working 16 hours a day on every workday implies annual working hours would be 16×312 = 4,992 hours. Many people might think this would be a pretty grim life, but at least total annual hours have an upper bound that is fairly easy to think about. In round numbers, an upper bound of roughly 5,000 work hours per year implies that a full-time full-year 2,000 hour per year worker (40 hours per week for 50 weeks per year) could possibly increase work hours by roughly 150% — but no more.

Unlike work hours, "work intensity" does not have a natural unit of measurement — but it also cannot plausibly increase without limit. We are all familiar with working harder occasionally (e.g. to meet an overdue deadline) but most of these short surges are mainly increases in working time per day or per week. Increased work intensity per hour means working faster all day and all year, not just during busy periods. Increasing average annual work intensity per hour requires no respite — and no decline in work quality. If average work intensity is to, for example, double, then all day, every day, people have to work twice as fast as they used to, without any increase in errors — and they have to keep that error-free intensity up, year after year. One can question if it is possible for real people to double their speed of work on an all-year, every year basis without the quality of that work suffering — but, as a first approximation, this paper assumes that a 100% increase in work intensity is the upper bound.

Neo-classical models of labour supply ask the question: "How much would the desired labour supply (hours or effort) of a given individual change if their net hourly wage were to change?" Labour supply based models of taxation specifically ask: "How much would the desired labour supply (hours or effort) of a given individual change if their net hourly wage were to change because their tax rate changed?" Since tax models of labour supply just refer to a particular source of change in net wages they should be consistent — i.e. have similar response elasticities — with labour supply variations motivated by differences in the hourly wage which might arise for other reasons. Hence one can ask: how much could differences in work effort motivated by differences in the net hourly wage possibly explain of the differences in income observed within Canada's top 1%[19]?

In Canada, the range of top 1% incomes started in 2012 at $213,800 in market income (not including capital gains) or $154,700 after tax. Assuming that one has to work full-year, full-time to make it into the top 1%, the 2,000 hours per year of work of the "threshold one percenter" implies an hourly after-tax wage of about $77. Assuming an effort elasticity of 0.2 implies that if his or her hourly after-tax wage were to rise by 100% (to $154 hourly), and if work intensity remained constant, one should observe a 20% increase in working hours (to 2,400)[20]. Working 2,400 hours at $154 hourly would imply an after-tax income of $369,600. That size of increase in labour supply would certainly be feasible.

However, the problem for an "effort responds to incentives" theory of top incomes in Canada is that it has to explain much, much higher incomes than that — the earnings of Canada's top 100 CEOs *averaged* $9.2M in 2013.

If one assumes that Canada's CEOs worked 5,000 hours per year, a pre-tax hourly wage of \$1,840 is implied, or approximately \$1,227 per hour after-tax[21]. The after-tax hourly wage and annual work hours differences between Canada's top 100 CEOs and the threshold one percenter could be explained by a labour supply function with an hours supply elasticity of 0.101 with respect to the after-tax wage. However, any higher assumption for the hours elasticity of labour supply would hit the upper bound on work hours well before it could explain observed upper incomes.

The dilemma for labour supply explanations of top incomes is that the higher the effort elasticity one believes in, the faster work hours and work intensity will max out. Once one takes the upper bound on total labour time and work intensity seriously, only a very inelastic upward-sloping labour supply curve could possibly explain the observed variation in total incomes within the top 1%[22]. In 2012, the market income threshold for the top 0.01% (\$2,605,900) was 1219% of the income threshold for the top 1% (\$213,800). (The ratio was 1,086% (= \$1,680,500/\$154,700) in after-tax income)[23]. Since the percentage range of incomes to be explained is over seven times greater than the feasible percentage change in either hours or work intensity, the elasticity of effort with respect to the net wage has, necessarily, to be small[24].

As already noted, in the standard neo-classical labour economics model of "labour-leisure choice", when the wage rate rises and work hours increase in response, it is the increasing scarcity of leisure time which eventually drives the increasing importance of the income effect. However, in the recent literature on the revenue-maximizing top marginal tax rate summarized in *Table 1*, the income elasticity in equation (4) is just assumed away[25]—despite the fact that Saez (2001:213)[26] earlier noted: "at fixed compensated elasticity, the optimal (tax) rate is very sensitive to the size of income effects."

When PS&S concluded that 83% is the revenue-maximizing top marginal income tax rate for the U.S., their key behavioural assumption was that the "effort elasticity" is 0.2—and that it remains constant over the entire range of top incomes. However, the literature also contains substantially higher estimates of the effort elasticity—Milligan and Smart (2014), for example, report a "preferred estimate" of 0.689 for the top 1% as a whole[27]. But the higher the effort elasticity is assumed to be, the more responsive labour supply is to the after tax wage, which simply means that if the net hourly wage increases much at all, workers will run out of total time more quickly, at a lower total income.

For example, assume that increased effort is equally composed of increased hours and increased work intensity per hour and that the effort elasticity is a constant 0.3. If so, then the threshold one percenter who gets an increase in their net hourly wage of 1,000% while climbing the corporate ladder (i.e. hourly wages increasing from $77 after tax to $770), would increase their work hours by 150% (i.e. to about 5,000 hours annually). Work intensity similarly would have to increase by 150% (if that were possible). However, total after-tax income would hit its maximum at $3,850,000, far below actual average top CEO pay ($9.2M).

If an effort elasticity of 0.5 was divided between an hours elasticity of 0.4 and an intensity elasticity of 0.1, a 375% increase in the net hourly wage of the threshold one percenter (from $77 to $289). would be enough to raise labour supply to 5,000 hours per year. This would imply after-tax earnings of about $1.44 million, which is well short of the bottom threshold of the top 0.01 percent income group in Canada ($1.68 million).

In short, estimates of the responsiveness of work effort to increased marginal tax rates which are higher than the PS&S estimate of a 0.2 effort elasticity are inherently implausible. However, PS&S argue that changed work effort is only one of the possible behavioural impacts of changing top marginal tax rates. They emphasize that high earners can also change their tax avoidance efforts and that when tax rates decline it becomes more profitable for top corporate executives to bargain harder for higher pay, at the expense of shareholders and other employees. They argue that the strong negative correlation between top tax rates and top 1% income shares in the U.S. since 1960 implies that the overall elasticity of top reported incomes with respect to tax rates is large, but mostly due to a reallocation of compensation, from the bottom to the top[28].

Since more vigorous bargaining for higher CEO pay comes at the expense of other people's incomes[29], who would pay taxes on that income if they could get it, this "bargaining elasticity" undercuts much of the argument against higher top marginal income tax rates. If higher top marginal income tax rates imply that top executives bargain less aggressively for their pay packages and leave more of a firm's revenues available for dividends or for wage increases for other employees, the tax paid on such income offsets much of any initial loss of tax revenue. And to say the "avoidance elasticity" is high is to say there are many loopholes in the tax law — which is an argument for tightening up tax administration. From a social perspective, the "effort elasticity" is "the sole real factor limiting optimal top tax rates"

(PS&S: 2011:2) — and their estimate of 0.2 drives their calculation of 83% as the revenue-maximizing top marginal rate for the U.S.

An important reason for focusing on the labour supply effects of top marginal tax rates is the fact that these are the only true social costs of behavioural response to higher top marginal tax rates, because a reduction in labour supply due to higher marginal tax rates means that output actually disappears. When, in response to higher tax rates, top earners successfully increase their avoidance or evasion of income tax, current income tax revenues decline but the income involved does not evaporate. Income which avoids taxation by a high earner this year because its reporting is delayed or because it is split with a lower tax rate relative still attracts income tax, albeit later or at a lower rate. Even if income tax is entirely avoided or evaded forever, consumption and sales taxes will typically be paid when income is spent. And aside from the benefits to governments of these eventual tax revenues, net after-tax unreported income is a benefit to the individuals who receive it. Similarly, reallocation of income between managers, owners and lower level workers affects the distribution of total income, and who pays income tax, but not the level of total income.

Nevertheless, an important cost of focusing on labour supply effects is that it means ignoring income from capital. In 2012, capital income comprised about a third of the declared taxable income of Canada's top 0.1%, a percentage that increases strongly as income increases. Since no 'effort' is required to receive income from capital, no disutility of taxable income story is even remotely plausible. Hence, the plausibility of a labour supply focus decreases the closer one gets to the peak of the income pyramid.

One should also emphasize that income from capital is increasingly important. Osberg (2008) noted that, in Canada, "labour's share" of aggregate output has been declining since 1982, while Lemieux and Riddell (forthcoming) show how that trend is accentuated if the labour income of the top 1 percent is excluded. As well, savings from the current labour earnings of the top 1 percent produce capital income from assets and inheritances, which will increase over time. As Piketty (2014) has emphasized, when the interest rate exceeds the growth rate (as it historically has), there is a long-run tendency for capital's share to increase. Piketty also notes that the tendency for an increasing long-run concentration of capital ownership is particularly strong when the real rate of return is higher for large wealth holders — which means inheritance becomes an increasingly important aspect of ever-growing inequality.

2.2 Why Sharing Good Luck Can Improve Expected Well-Being

Piketty, Saez and Stantcheva (2011), like much of the optimal tax rate literature, assume a world of certainty. However, in the real world, luck matters — a chance meeting or being in the right place at the right time can be crucially important to lifetime earnings. When incomes are uncertain, and part of high incomes is not due to effort but to luck, what are the costs, or potential benefits, of taxing (i.e. sharing) that 'good luck'?

An important strand in neo-classical economics emphasizes the benefits of insurance for well-being. People who are averse to risk will, for example, feel better off even if they buy fire insurance all their lives and never file a claim because they never have a fire. Insurance is costly, but diminishing marginal utility of current consumption implies that greater certainty improves well-being.

If the distribution of income contains a few very high incomes, with low probability and low marginal utility of income, then progressive taxation of income can be seen as an optimal form of risk pooling. Individuals share their good luck with others (via taxation) in their good years and they share the good luck of others (via public services) in their own bad years. Ex ante, individuals voting on a tax rate schedule trade off the expected utility value of winning the income lottery and paying taxes against the expected utility value of the government services (funded by taxation of lottery winners) which they would receive in the far more likely event that they do not win. A rational individual voting on the top marginal tax rate would compare the expected utility value of the public services they would get during the years when they do not get high income with the expected utility value of the after tax income they would get during the years they do. The optimal — i.e. well-being maximizing — tax rate is a trade-off between the certain value of public services every year and the chance of high after tax individual income in winning years.

In the debate on top income tax rates, the issue posed by the role of luck is that there is no efficiency cost to taxing purely random events. Diminishing marginal utility means that very high incomes have correspondingly lower marginal utility of income, and since these are a tail event with very low probability, their ex ante expected marginal utility is lower still. Hence, it is not unreasonable for rational agents to prefer the utility gains from greater certainty of a higher "social wage" partially paid for by higher top marginal tax rates.

The trade-off will depend on the risk aversion of individuals and the relative importance of labour supply (both of human capital and of hours) and luck in the determination of high incomes. Kindermann & Krueger (2014) therefore develop a complex life cycle, overlapping generations' model and calibrate it to reflect U.S. empirical reality. Even specifying relatively low risk aversion (CRRA = 2) and assuming a high labour supply elasticity (0.6) as their preferred base case, they calculate the well-being maximizing top marginal income tax rate as 90%. Since greater certainty has a money cost as well as utility benefits, the revenue-maximizing top marginal tax rate is calculated to be lower at 77%. One can summarize their results as saying that in deciding on the optimal top marginal income tax rate when income is uncertain, a little risk aversion quantitatively offsets a lot of presumed labour supply responsiveness.[30]

2.3 Competitive Consumption and the Motivations of Top Earners

The conventions of neo-classical economics dictate the assumption in equation (1) above, that individuals care only about their own consumption and never worry about comparisons with the income and consumption of others. But sociologists, advertising executives and normal people have long known that this is nonsense — and particularly for the very affluent. At the income levels typical of Canada's top 1%, and especially of the top 0.1%, basic needs and normal creature comforts have long ago been satisfied, so higher after-tax incomes primarily finance discretionary spending on status goods, whose major function is social ranking. And as those who attend boat shows know, the main difference between owning a 35-metre yacht and a 33-metre yacht is that the former is two metres longer, thereby demonstrating to the world that its owner is more successful and more important than the owners of smaller toys. For taxation, the important fact is that competitive consumption is about relative rank; having more and bigger goodies *compared with* others, however much everyone else actually has.

Let $R^\star_i$ denote the income rank of individual i when the pre-tax income distribution $f(y^\star)$ of a population of size n is ordered such that $y^\star_1 > y^\star_2 > y^\star_3 > .... > y^\star_n$. Let post-tax income be denoted by y and the post-tax income rank as R_i such that $y_1 > y_2 > y_3 > .... > y_n$. If K is an arbitrarily large scaling constant, then K/R_i will be trivially small at the bottom of the income distribution and large at the very top. A parsimonious way to express the idea

that absolute income matters most for poor people while relative status matters more at the top would then be to amend equation (1) as in equation (5).

(5) $U_i = u\,(C_i,\,L_i,\,K/R_i)$

Equation (6) then makes the tax function $t(Y)$ more explicit than it was in equation (2), where w★ and V★ refer to the pre-tax hourly wage and before tax non-labour income, respectively.

(6) $C_i \le y_i = t(\text{w}^\star_i H_i + V^\star_i)$

Any tax function t that maintains rank ordering (i.e. satisfies $R_I = R^\star_I$ for all i) will leave the influence of relative after-tax income (K/R_i) on labour supply unchanged for everyone, because a person's *relative rank* in the pecking order is not affected if everyone at the same market income level pays the same tax rate. The pecking order of relative consumption is unaffected by any uniform change in the top tax rate, and a decrease or increase in marginal tax rates that applies to everybody leaves status rankings unchanged. However, relative consumption rank remains powerful as a labour supply motivator at the top of the income distribution. Before and after a tax rate change, when relative status is what people want, every person still has the same incentive to want to try to "get ahead" and there is no change in the incentive for effort facing people at or near the top. The international evidence indicates that although there are large differences across countries in the tax rates that people at the top end of the income distribution pay, top executives work hard everywhere. There are relatively small international differences in the weekly hours of work that top income earners supply (Osberg, 2003).

The implication of competitive consumption for tax policy is that there are very small costs in decreased labour supply and foregone output when top marginal income tax rates are raised, as long as this is done uniformly. And when status rankings that are now established using 45-, 40- and 35-meter yachts are displaced to the purchase of 35-, 30- and 25-meter boats, there may even be an environmental benefit[31].

2.4 Social Norms and Corporate Governance

This paper thus far has argued that more realistic estimates of the "supply side" motivations of top earners are consistent with higher revenue-maximizing top marginal income tax rate than those presented in *Table 1*. How-

ever, two key issues have not been mentioned — the "demand side" of top end labour markets and the capital income received by the top 1%.

In recent years, substantial scholarship (e.g. Gabaix and Laudier, 2008; Stiglitz, 2012) has documented how CEO compensation depends on the size and scale of corporate enterprises and the mutually beneficial coalitions of top executive compensation committees who ratify the new norms of "necessary compensation". Since the rents of top corporate jobs produce significant wealth, they feed into the cumulative accretion of concentration of ownership of capital (Piketty, 2014). However, although these issues are crucially important for understanding and evaluating long run trends in top income shares, the issue for present purposes is taxation. As PS&S have argued, to the extent that higher top tax rates might influence norms of top corporate pay, they may alter the division of rents from firms' operations and any alternative division of rents will generate tax revenue on the incremental gains of other employee groups.

Evidence for the importance of social norms of comparison in high-end pay determination can be found in Milligan and Smart (2014), who estimated (their *Table 2*[32]) a regression model of the relationship between Canadian top 1% income share and top tax rates, with and without a control for the top 1% share in the U.S. Including U.S. top pay trends in a regression with Canadian data is a test of whether top end pay rates in Canada in the post-FTA era are driven by comparisons with peers in the U.S. The U.S. share variables are highly significant, tightly determined (about 1:1), provide much improved R^2 and hugely reduce the measured impact of Canadian domestic tax rates (rendering local tax rates statistically insignificant at the standard 5% significance level). Hence, one reading of their results is that it is pay norms within the North American business community, and not marginal income tax rates in Canada, that primarily determine pre-tax top end incomes in Canada[33].

3. The Canadian Context

3.1 Raise My Taxes and I'll Threaten to Leave!

A perennial refrain in Canadian debates about top tax rates is that any increases will prompt a rush by "job-creators" or "the best and the brightest" to emigrate. However, there is very little supporting empirical evidence. Helliwell (1999, 2000) has debunked the myth that lower U.S. taxes in the 1990s were creating a brain drain from Canada to the U.S. Young and Varner (2011:258) summarize the wider research literature on tax-induced migration: "The consensus emerging from the migration literature — and from a range of research designs — is that people do not generally migrate in response to tax increases (or to tax differentials that would be "easy" to arbitrage)". Why might this be true?

Talk is cheap, but actually moving means giving up the public services that taxes pay for. Although taxes are disliked, they are the flipside of government expenditures. When comparing the pleasures of life in different places, what matters is the net advantage — i.e. including the cost of taxes paid and the benefits of public expenditures received. The affluent like many of the things — such as pothole free roads, nice parks and crime-free public spaces — that tax dollars enable, and they can afford to live where they want to.

In 2012 Canada's top 1% had an average total income of $445,200 ($499,500 if capital gains are included) and an income of this magnitude would enable consumption of much the same list of high end home enter-

tainment systems, household furnishings, luxury automobiles and other private goods anywhere in the world[34]. Rich people everywhere are able to consume much the same items within their homes — the real differences in their quality of life emerge when they consider what they can do when they go out in public. Some of the desirable public amenities which the affluent like to enjoy, like not being mugged or kidnapped, are the joint product of many agencies (i.e. social and police services) and are reasonably seen as "public goods" in the economic sense that they are generally available to all citizens. However, tax revenues also help subsidize some specifically elite activities — like symphony orchestras, live theatre or the opera — which are really publicly-supported private goods. Even if these activities are often primarily of interest to the affluent, public subsidies are essential to their survival, because their costs are typically beyond the capability of a single patron to finance[35]. The availability of such cultural activities is an important aspect of the attractiveness for the economic elite of particular places to live, and such public spending can be seen as a return for the economic elite on their payment of higher taxes.

Young and Varner (2011) emphasize a different set of reasons for immobility — dislike of commuting, the cost of job changes that may accompany changes of residence and the cost of separation from family, friends and neighbourhood. However, in some contexts — e.g. different cantons in Switzerland, or metropolitan areas in the U.S. that cross several state lines — individuals can escape an increase in their taxes with a remarkably short move, and can thereby plausibly keep their jobs and their friends. If little such migration within urban areas is observed when top tax rates rise, one can expect that more costly migration in response to tax rate increases is even less likely to be observed.

In 2004, New Jersey implemented an increase of 2.6% in the top (over $500,000) marginal state income tax rate. None of the three other states in the Greater New York area changed tax rates at that time. As Young and Varner (2011:260) point out "high earners living in Bergen County, New Jersey, can move about 30 miles to Fairfield County, Connecticut, and watch their marginal (state) tax rate fall from 8.97 percent to 5 percent. Few other places in the country make it easier to move to a different state without leaving one's city or completely separating from the social ties of friends and family."[36] Since there was no change in other New Jersey tax rates, Young and Varner were able to use this tax increase as a natural experiment and ask, using eight years of state income tax data on 40,000 taxpayers, whether there was any change in the millionaire emigration rate out of New Jersey.

Specifically, they compared the emigration rate of those who experienced a tax rate increase and those who were unaffected because their incomes remained just below the $500,000 threshold. They do not estimate tax flight to be zero, and they do find that it is more probable among the extremely wealthy and those approaching retirement age, but their main result is that tax flight is very small in magnitude. They conclude (2011:272): "the difference-in-differences estimates indicate that the effect of the new tax bracket is negligible overall." As a consequence, they conclude that the 2004 increase in top tax rates raised significant ($1.08 billion) net new revenue for the state of New Jersey.

Young and Varner are interested in the New Jersey example because it illustrates the possibility that U.S. states are quietly differentiating in top end taxation. *Table 3* of this paper showed the across-state variation in top marginal rates in 2013. Although there might be efficiency advantages to making changes to top tax rates at the national level, if national level politics are paralyzed change may have to come first at the local level — and their finding of negligible impacts on migration of state level variation in top tax rates is important for the policy room of local legislators. In Canada, there are much larger distances between cities,[37] so the affluent face higher costs if they change tax jurisdictions, which implies more possibilities for intra-country differentiation. In 2013, the within-country range in top marginal income tax rates was a bit larger in Canada (50.0% - 39.0% = 11.0%) than in the U.S. (51.9 % - 42.8 % = 9.1%) — but the 2015 Alberta election may well produce a shrinkage in the Canadian range.

3.2 Tax Avoidance and Evasion: The Quiet Sides of Tax Policy

Tax policy is only partly about nominal tax rates. Total tax yield also depends on the definitions of taxable income built into tax law (what some might call "loopholes") and the enforcement efforts of government. A low actual rate of income taxation on any given population group can be achieved by specifying a low nominal tax rate or by building tax avoidance mechanisms which they can easily access into the tax law or by tolerating low levels of compliance with tax law. And from the point of view of affluent taxpayers, a major advantage of public policy that facilitates tax avoidance or fails to penalize tax evasion is invisibility. In contrast with possible public attention and debate on tax rates, the complexity of tax law precludes pub-

lic discussion of the desirability of the tax law provisions that enable avoidance, while tax evasion is, by its nature, concealed. Since the beneficiaries of these quiet public policy decisions have no reason to complain, and few other people know what is going on, there can be little impetus for change.

In Canada, the tax treatment of Canadian Controlled Private Corporations (ccpcs) is an important case in point. Wolfson, Veall and Brooks (2014) note that for high-income individuals in Canada there may be major tax advantages in flowing income through a ccpc in deferral of taxation, the potential to income split with family members in lower tax brackets and the potential to restructure income as capital gains. Although not usually an option for most salaried employees[38], it is relatively cheap to incorporate and receive professional or business income through a ccpc — income that does not appear in the statistics on top-end incomes (such as those reported in *Table 4*). Wolfson, Veall and Brooks (2014:9) note that sophisticated tax planning may often involve multiple layers of ccpcs (in total there were about 1.95 million in 2010, of which 1.7 million were traceable). They emphasize the complexity of ccpc structures and ownership — fewer than 5% of tax filers in the bottom half of the income distribution owned shares in a ccpc (and these could be family members who are income splitting), but roughly 70% of tax filers at the very top 0.01% own one or more ccpcs. In total, they estimate ccpc income in 2010 to be $48 billion, which is about 44% of the total declared income of the top 1% of tax filers in that year. Their lower-bound estimate (2014:12) is that: "When ccpc income is added, the share of the top 1% rises by 3.3 percentage points to 13.3%." And they note (2014:13): "For the top 1%, taking account of ccpc income adds over $100,000. ccpc income adds more than $600,000 for the top 0.1%, and it adds from $2.7 to $3.5 million to measured annual income for the top 0.01%."

As *Table 4* indicates, there currently are huge tax advantages in Canada for receiving income in the form of capital gains, and very little public awareness or debate over why this might be socially desirable rather than mainly functioning as a benefit to those Canadians with the most sophisticated tax advisors. Wolfson, Veall and Brooks have been shedding some light on the importance of ccpcs, but there is no comparable work available on the magnitudes of the income sheltered in trust accounts or diverted to offshore banks and financial holding companies. As a consequence, there is little reliable information on the full extent of tax avoidance and evasion in Canada.

However, it is clear that since the federal government, through the Canada Revenue Agency, administers the definition of the taxable income base and the collection of income taxes, the federal government makes daily ad-

ministrative decisions that can lighten the tax load of affluent taxpayers.[39] The federal government also defines the tax code and the regulations that either do, or do not, facilitate tax avoidance and the banking regulations that either do, or do not, impede the offshore transfer of funds.

"Whistle blower rewards" are an example of the policy choices about tax collection quietly made by government. Tax evasion on a small scale can be a cash affair. Carpenters and electricians who work off the books can hide their undeclared earnings in the garage and spend it on groceries — nobody else need know. Tax evasion by the top 1% is different — concealing, and being sure that one can recover, serious money requires the co-operation of lawyers, accountants and bankers (and their sometimes underpaid secretaries and clerks). In the U.S., rewards to tax whistleblowers are a legal entitlement. "If the taxes, penalties, interest and other amounts in dispute exceed $2 million, the IRS will pay 15 percent to 30 percent of the amount collected." The rewards can be substantial — the maximum to date paid out being $104 million in 2012 for information uncovering the Union Bank of Switzerland's tax evasion schemes for U.S. clients.[40] In contrast, the Canada Revenue Agency website states: "The CRA does not pay for information received from informants"[41] — a policy choice whose beneficiaries are Canada's large-scale tax evaders. Fundamentally, at any particular point in time, public policy determines, in a quiet way, the possibilities for tax avoidance or tax evasion.

4. Implications

4.1 Room to Maneuver on Top Tax Rates

At the federal level, there is not much progressivity in Canada's income tax system. There are only four very wide tax brackets and, since the top federal rate (29%) starts well below the top 1% threshold (in 2015, at $138,586 taxable income), there is no progressivity in tax rates at all within the top 1%. Income tax brackets are wide (0 to $44,701, $44,702 to $89,401, $89,402 to $138,585, and $138,586+) and the jumps in tax rate from the second (22%) to the third bracket marginal tax rate (26%) and the fourth (29%) are very modest[42].

If changes to income tax progressivity came through federal tax policy changes, the incentives to tax-induced migration within Canada would be minimized (although Section 4.1 indicates this may not matter much). But is there tax room for provincial tax policy changes to increase the progressivity of the income tax system and equalize the distribution of disposable income within provinces? Milligan and Smart (2013:3) discourage the idea. They report that they "find estimates for the reported income elasticity that are quite large. Our basic specification yields an estimate of 0.664. The magnitude of the estimated elasticity suggests only a limited scope for provinces to raise taxes on high earners while still gaining revenue."

However, as already noted, an effort elasticity of 0.664 is impossible to reconcile with the data[43]. Unlike PS&S (2014), Milligan and Smart do not decompose the total elasticity into its effort, tax avoidance and bargaining

components. But it is only when income disappears entirely (i.e. due to higher taxes motivating reduced labour supply) that income tax revenues also disappear entirely. If part of the responsiveness of top reported incomes to higher tax rates is due to greater tax avoidance behaviour or changed bargaining for shares of firms' revenues, these changes influence who reports taxable income when — but the income does show up eventually somewhere in tax revenue, albeit at lower tax rates (which Milligan and Smart do not account for). As PS&S emphasize, if higher top-end taxes increase tax avoidance behaviour, that is an argument for tightening up the administration of taxes and if higher top tax rates reduce the incentive to bargain aggressively for a larger share of firm revenue, that is an argument for increasing top tax rates. Milligan and Smart's estimates in their *Table 7* also show that the impact of tax rates is not constant as incomes increase. As they put it (2014:25): "the estimated elasticity for P99–P99.9 is 0.364, which delivers a revenue-maximizing tax rate of 60.3%, well above the top rate in all provinces." Their elasticity estimate for P99.9+ is very substantially higher. Milligan and Smart argue that this translates to a very low revenue-maximizing tax rate (27.5%) for the extreme top tail, but the incomes of this group are impossible to explain by an "effort elasticity", particularly since much of income at the very top is income from capital. Tax avoidance and CEO control of intra-firm bargaining are, as already noted, arguments for tougher tax administration and increased top end tax rates — not reduced tax rates.

4.2 Potential Revenue Implications (Approximately)

Averaging over five years, 2008–12, the top 1% of Canada's tax filers numbered just over 255,000 and paid an average $147,000 in federal and provincial income tax[44]. This was 33.2% of their reported total income, excluding capital gains, and produced $37.5 billion in tax revenue for Canada's governments. Although the nominal marginal tax rate on labour income in 2013 was, as *Table 3* showed, 45.7%, *Table 4* has also shown that the effective average tax rate was roughly constant at 33%, implying an effective top marginal income tax rate of 33%. Atkinson's recommendation of a true 65% top marginal tax rate[45] would therefore nearly double their current marginal tax rate. If Canada followed his advice, how much revenue would that produce?

The easy calculation is the "mechanical" one, assuming that no behavioural changes are induced by the tax rate increase — i.e. total pre-tax income is unchanged. If a new tax bracket was introduced at the $205,000

threshold for the top 1% and incomes above that amount were taxed at 65% rather than at 33%, tax filers would pay the same taxes as now on their first $205,000 and then a 65% tax rate on the excess over that threshold. The median member of the top 1% (with a total income of $289,000 before capital gains) would therefore face a tax increase of $27,700. In total, averaging over all 255,000 members of the top 1%, and assuming mechanically that all pre-tax incomes are unchanged, the increase in tax revenue on income excluding capital gains would be about $19.3 billion[46].

The more difficult issue is the plausible impact on the tax base. Reducing the after-tax net return from pre-tax income (i.e. the change from top earners keeping 67% of the marginal dollar of pre-tax income to keeping 35%) can be expected to affect the amount of income that is available to tax. As discussed above, there are conflicting estimates in the literature of the elasticity of taxable income with respect to the after-tax marginal return. PS&S (2011,2014) argue that the relevant elasticity is "0.2 (at most)". An elasticity of 0.2 would imply that a 50% change in after-tax marginal return to work time would produce a 10% decrease in the taxable base. If the total top 1% income base (excluding capital gains) were to shrink from its current $112.6 billion to $101.8 billion, a 65% rate of taxation on individual income in excess of $205,000 in this one-tenth lower tax base would then produce a net increase of $15.8 billion. When capital gains income is included, the tax revenue increases are significantly larger — the "mechanical" calculation produces a revenue gain of $ 26.1 billion and the elasticity-adjusted calculation is a $ 21.8 billion increase[47].

Much of this essay has been emphasizing the "at most" part of the PS&S estimate. Section 3.1 of this report criticized the model of PS&S and others for ignoring the total time constraint on work hours while Section 3.2 emphasized that uncertainty about incomes implies that risk-averse people will be better off from risk pooling via taxes. Section 3.3 noted that the incentive effect of competitive status consumption is unaffected by uniformly higher tax rates. The more seriously one takes those arguments, the closer one's estimate of the net revenue implications of a 65% marginal top tax rate for Canada will be to the "mechanical" calculation of a net revenue impact of +$19.3 billion (excluding capital gains) or $26.1 billion (including capital gains). Either estimate would be serious money, but not a fundamental change in Canadian public finances. As a percentage of tax revenue, $15.8 billion is about 9% of the $176.7 billion in income taxes raised annually by federal, provincial and territorial governments in Canada dur-

ing the 2008–12 period. Hence, raising top marginal tax rates would represent a significant, but not a fundamental, change to tax revenues in Canada.

As a concrete comparison, one can note that the total revenue of Canada's universities and colleges from tuition and other fees was $8.1 billion in 2012–13[48]. Forecasted expenditures in 2014–15 on the Guaranteed Income Supplement for Canada's senior citizens were $10.1 billion[49]. Federal support for provincial, territorial and municipal Infrastructure in 2012–13 was $5 billion[50] and international development assistance was $5.2 billion[51]. A top marginal income tax rate of 65% could therefore make it possible for Canada to (1) abolish tuition for post-secondary education in Canada and (2) double federal anti-poverty spending for senior citizens or (3) double federal aid for infrastructure renewal plus double Canada's foreign aid. These would all be serious initiatives but these particular options for spending are discussed here precisely because they all are, in today's political climate in Canada, totally "unrealistic" and are *not* part of the political debate. Although other OECD nations do now have adequate subway systems, tuition-free universities, respectable foreign aid budgets, etc., none of these options are on the menu of choices of "feasible policy alternatives" perceived in today's Canadian politics. The perceived possibilities for Canadian society are implicitly now limited by the level of taxation of Canada's top 1% seen as "feasible"—but new possibilities open up when the menu of possible tax choices is expanded.

5. Conclusion

THE DEBATE ON top marginal tax rates often features over-heated rhetoric[52], but incremental changes do soon become part of the landscape. This paper has calculated the revenue implications of a 65% marginal tax rate on income in excess of $205,000 as a sketch of possibilities — but the likelihood of an abrupt shift to such tax rates in Canada's near future is zero[53]. If increases in top marginal tax rates actually happen in Canada, it is far more probable that the tax room created by the combination of continuing strong growth of top 1% incomes and historically low top tax rates will be gradually encroached by incremental changes (e.g. the 2015 federal Liberal proposal of a four percentage point increase)[54]. These increases may be more likely if they are earmarked, as in California and New York City, for expenditure with an explicit agenda of increasing equality of opportunity or if they accompany, as in Nova Scotia in 2010 or (probably) Alberta in 2016, a general package of tax changes and expenditure cuts which address a perceived fiscal crisis.

Nevertheless, one can still confidently predict that doomsday predictions and howls of outrage will greet any and all proposals to increase top marginal income tax rates or to get serious about tax avoidance and evasion. Ownership of media outlets and contributions to public policy think tanks guarantee that the complaints of the affluent will be widely broadcast. However, as jurisdictions (e.g. New Jersey) discover that millionaires do not, in fact, emigrate and as high paying industries (such as Silicon Valley and Wall Street) continue to prosper in high tax jurisdictions, it is possible that

some provincial and state governments may gain enough nerve to implement change — which will make change in neighbouring jurisdictions easier.

Fundamentally, the importance of top income taxation in Canada is not likely to go away. Over the last thirty years, middle class incomes have stagnated in Canada while top 1% incomes have grown strongly. There is no clear reason why one would expect equalization of income growth rates — i.e. either top income growth slowing significantly and/or middle class income growth accelerating dramatically — to happen anytime soon. Continuation of unbalanced rates of income growth will imply an ever-widening gap in real incomes and an ever-greater concentration of "ability to pay" at the top of the income distribution[55].

Since unbalanced growth in market incomes has become the new normal, the political economy question is whether the trend to continuing concentration of economic power entails a similar increase in concentration of political power which prevents change in top end taxation and locks Canada ever further into accelerating inequality. Inequality in political power only partly shows up in observed influence over the decisions that come up for public discussion. The more fundamental power is the ability of economic elites to define the possible policy options open for discussion and keep some issues, like higher tax rates at the top, off the policy agenda. Time will tell if this is about to change.

Appendix

TABLE 5 Potential Income Tax Revenue Gain: 65% Top Marginal Tax Rate

Income concepts	Income groups	Statistics	2008	2009	2010	2011	2012	5 YEAR AVG	TOTAL TAX NOW PAID
Total income*	Top 1%	Number of tax filers	249,755	252,300	254,730	258,465	261,365	255,323	
Total income*	Top 1 %	Average income	461,800	424,900	429,600	443,500	445,200	441,000	
Total income*	Top 1 %	Average federal & provincial, territorial	156,800	140,100	142,900	146,600	147,600	146,800	37,481,416,400
		income taxes paid							
		AVERAGE % OF TOTAL INCOME PAID IN TAX= 0.330							
Total income*	Top 1 %	Threshold value	202,600	198,000	201,400	209,600	215,700	205,460	

Total Tax Base of top 1% = (# Taxpayers)×(Average Total Income) = 255,000×441,000 =112,597M

Average top 1% Income exposed to potential increase in taxation = 441,000 - 205,460 = 235,540

MECHANICAL CALCULATION = (exposed income)×(# taxpayers)×(increment to tax rate) = (441,000-205,460)*255,323*(0.65-0.33) =19,260 M

IF ELASTICITY w.r.t. NET WAGE = 0.2

% Change in (1-MTR)= ((1-0.65)-(1-0.33))/(1-0.33) = -48%

Elasticity = 0.2 implies % change in tax base = 0.2×(-0.48) = 9.6%

New Tax Base of Top 1% = (1 - % change)*(old base) = (1-0.096)×($112.6 B) = 101,788 M

New Average Income = 398,664

New Average Income exposed to tax increase = 398,664 - 205,460 = 193,204

Increase in average tax = (new rate-old rate)×(new tax base exposed)=(0.65*-0.33)×193,204= 61,876

Total Tax revenue increase = (# taxpayers×increase in average tax paid)= $61,876×255,323= $15.8 B

Data Source CANSIM Table 204-0001 High income trends of tax filers in Canada, provinces, territories and census metropolitan areas (CMA), national thresholds, annual(1,2,3,4)
Survey or program details: Longitudinal Administrative Databank - 4107
* Total Income excludes Capital Gains. Market income consists of income from earnings, investments, pensions, spousal support payments and other taxable income. Total (or before-tax) income is equal to market income plus government transfers and refundable tax credits.
Note All calculations have also been done cumulating the impacts of successive marginal changes.

References

Atkinson, A.B. (2014) *"After Piketty"* British Journal of Sociology 2014, Volume 65, Issue 4, Pp. 619–638

Badel, A. and M. Huggett (2014) Taxing Top Earners: A Human Capital Perspective Working Paper 2, Revised October 2014 Federal Reserve Bank of St. Louis

Broten, Laurel C. (2014) "Charting a Path for Growth: Nova Scotia Tax and Regulatory Review" November 2014, Province of Nova Scotia, 2014

Diamond, P. and E. Saez (2011), *The Case for a Progressive Tax: From Basic Research to Policy Recommendations*, Journal of Economic Perspectives, 25, 165–90

Francis, Diane (2000) *Ottawa tries to cover up who's behind the $800M tax waiver—Revenue Canada manoeuvre may nix a trial* Financial Post Ottawa, August 5, 2000

Francis, Diane (2013) *Why Are We Letting Tax Cheats Rob Canada?* The National Post Posted: 04/05/2013

Gabaix X and Landier A (2006), "Why has CEO Pay Increased so Much?" NBER Working Paper No. 12365 July 2006 and *Quarterly Journal of Economics* (2008)

Golombek, J. (2012) "If Mitt Romney were Canadian, he would pay even less tax" Financial Post January 28, 2012 http://business.financialpost.com/2012/01/28/if-mitt-romney-were-canadian-he-would-pay-even-less-taxes/

Fatih Guvenen, Fatih Karahan, Serdar Ozkan, and Jae Song (2015) What Do Data on Millions of U.S. Workers Reveal about Life-Cycle Earnings Risk? Federal Reserve Bank of New York Staff Reports, no. 710 February 2015

Heckman J.J. (1993) "What has been learned about labor supply in the last twenty years?", *American Economic Review,* Papers and Proceedings, Vol. 83, No.2, May 1993, pp. 116–121

Helliwell, John F. (1999) "Checking the Brain Drain: Evidence and Implications" *Policy Options* Pages 6–17, Septmber 1999

Helliwell, John F. and David Helliwell, (2000) "Tracking UBC Graduates: Trends and Explanations" Pages 101–110, *Isuma* Spring 2000

IMF (2013) *FISCAL MONITOR* October 2013 http://www.imf.org/external/pubs/ft/fm/2013/02/pdf/fm1302.pdf

Kindermann, F. and D. Krueger (2014) *High Marginal Tax Rates on the Top 1%? Lessons from a Life Cycle Model with Idiosyncratic Income Risk* NBER Working Paper No. 20601 October 2014

Kleven, Henrik Jacobsen, Camille Landais, and Emmanuel Saez (2013). "Taxation and International Migration of Superstars: Evidence from the European Football Market." American Economic Review 103 (5): 1892–1924

Kleven, Henrik Jacobsen, Camille Landais, Emmanuel Saez, and Esben Schultz (2014). "Migration and Wage Effects of Taxing Top Earners: Evidence from the Foreigners' Tax Scheme in Denmark." Quarterly Journal of Economics 129(1): 333–78.

Kocieniewski, David (2012) *Whistle-Blower Awarded $104 Million by I.R.S.* New York Times, SEPT. 11, 2012, http://www.nytimes.com/2012/09/12/business/whistle-blower-awarded-104-million-by-irs.html

Lemieux, T. and C. Riddell (2015) "Who Are Canada's Top 1 Percent? " In *Income Inequality: The Canadian Story*, edited by David A. Green, W. Craig Riddell and France St-Hilaire. The Institute for Research on Public Policy, Montreal (forthcoming)

Mackenzie H. (2015) *Glory Days CEO Pay in Canada Soaring to Pre-Recession Highs* Canadian Centre for Policy Alternatives January 2015 https://www.policyalternatives.ca/sites/default/files/uploads/publications/National%20Office/2015/01/Glory_Days_CEO_Pay.pdf

Milligan K. and M. Smart (2013) *Provincial Taxation of High Incomes: What are the Impacts on Equity and Tax Revenue?* Paper prepared for the CLSRN-IRPP Conference "Inequality in Canada: Driving Forces, Outcomes and Policy," held in Ottawa, February 24–25th, 2013.

Milligan, K. and M. Smart (2014), "Taxation and Top Incomes in Canada." Working Paper 20489 National Bureau of Economic Research, September 2014.

Mirrlees, J. A. (1971), "An Exploration in the Theory of Optimal Income Taxation", Review of Economic Studies, 38, 175–208.

Osberg, L. and S. Phipps (1993) "Labour Supply with Quantity Constraints: Results from a Large Sample of Canadian Workers" Oxford Economic Papers, Volume 45, April, 1993, pp. 269–291.

Osberg, L. (2003) "Understanding Growth and Inequality Trends: The Role of Labour Supply in the U.S.A. and Germany," *Canadian Public Policy,* Vol. XXIX, Supplement January 2003, pp. S163–S184

———. (2008a) *A Quarter Century of Economic Inequality in Canada: 1981–2006*. Toronto: Canadian Centre for Policy Alternatives. http://www.policyalternatives.ca/documents/National_Office_Pubs/2008/Quarter_Century_of_Inequality.pdf

Osberg, L. (2008b) "*Have most North Americans already met their Kyoto Obligations? - Trends in the CO_2 content of Expenditure and the role of Income Inequality*" Canadian Economics Association Vancouver, June 6, 2008

Osberg, L. (2014) "Can Increasing Inequality Be a Steady State?", OECD Statistics Working Papers, 2014/01, OECD Publishing. http://dx.doi.org/10.1787/5jz2bxc8oxq6-en

Piketty, T. 2014. Capital in the Twenty-First Century. Cambridge, MA: Harvard University Press.

Piketty T. and E. Saez (2012) "Optimal Labor Income Taxation" NBER Working Paper No. 18521 November 2012, Revised December 2012 [chapter in preparation for the Handbook of Public Economics, Volume 5].

Piketty T., E. Saez and I. Stantcheva (2011), "Optimal taxation of top labor incomes: a tale of three elasticities", *NBER Working Paper* , No. 17616; (2014) *American Economic Journal: Economic Policy* 6(1): 230–71.

Pomerleau, K. (2014) *High-Income Taxpayers Could Face a Top Marginal Tax Rate over 50 percent this Tax Season* January 23, 2014 http://taxfoundation.org/blog/high-income-taxpayers-could-face-top-marginal-tax-rate-over-50-percent-tax-season

Prante, Gerald T. and John, Austin, Top Marginal Effective Tax Rates by State and by Source of Income, 2012 Tax Law vs. 2013 Tax Law (as enacted in ATRA) (February 3, 2013). Available at SSRN:http://ssrn.com/abstract=2176526 or http://dx.doi.org/10.2139/ssrn.2176526

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. (2001) *Using Elasticities to Derive Optimal Income Tax Rates* The Review of Economic Studies, Vol. 68, No. 1 (Jan., 2001), pp. 205–229

Saez, E. and M. R. Veall (2003) The Evolution of High Incomes in Canada, 1920–2000 NBER Working Paper No. 9607 April 2003

Stiglitz J. E. (2012), *The Price of Inequality: How Today's Divided Society Endangers Our Future,* W.W. Norton and Co., New York

Wolfson, M., M. Veall, N. Brooks (2014) *Piercing the Veil — Private Corporations and the Income of the Affluent* http://igopp.org/wp-content/uploads/2014/06/wolfson-brooks-veall_-_incomes_of_affluent.pdf

Yakabuski, Konrad (2015) "Taxing the rich will not pay off for Trudeau" The Globe and Mail, Monday, May. 18 2015,

Notes

1 See Osberg (2008a, 2014) for detailed discussion.

2 If the Social Welfare Function considers only the well-being of the bottom 99%, then it will be socially optimal to set the top marginal income tax rate so as to maximize total revenue. If some positive value is also assigned to the well-being of the top 1%, the socially optimal marginal tax rate on the top 1% will be lower than the revenue-maximizing top marginal income tax rate. This paper will not attempt a specification of the optimal weighting of income shares.

3 Saez and Veall note that marginal tax rates are calculated assuming exemptions for a married person with two dependents and average deductions by gross income level. Before 1972, only the federal income tax rates are reported as these included provincial income tax rates in most cases. Beginning in 1972, the reported income rates include then-applicable provincial income tax, assuming residence in the largest province, Ontario. All rates include applicable surtaxes and credits. Note also that the average income tax rate actually paid has always been lower — see Saez and Veall (Figure A3, 2003).

4 See Osberg (2014:18).

5 A typical example is Nova Scotia's "Broten report" on taxation which, without any attempt whatsoever at providing empirical evidence, concluded confidently that: "reducing them (top marginal tax rates) should boost entrepreneurship and innovative activity in the economy. A boost to entrepreneurship — rewarding risk-takers, dreamers, doers, and builders — is exactly what Nova Scotia needs...Nova Scotia needs more people who will stay here or come here to create jobs, strengthen the economy, and build a prosperous future." (Broten, 2014: 33). In the business press, certainty of pronouncement is similarly unconstrained. Yakabuski (2015), for example, declares with papal self-assurance that increases to the top tax rate "do not work" because of emigration and avoidance. He states: "But the biggest impact of higher taxes is a function of what economists call 'the elasticity of income'", thereby demonstrating his ignorance of economics.

6 Based on the work of Prante and John (2013). Note that in Figure 1, the IMF considered only the US top marginal federal income tax rate, ignoring the importance of state income taxes, while using the Ontario provincial top tax rate for Canada, thereby ignoring the impact of lower tax rate provinces on the Canadian average top marginal income tax rate.

7 http://taxfoundation.org/blog/high-income-taxpayers-could-face-top-marginal-tax-rate-over-50-percent-tax-season

8 See http://www.taxtips.ca/taxrates/on.htm

9 During the 2012 U.S. Presidential election, it became an issue that Republican candidate Mitt Romney paid only 15.4% tax on his income of $21.6 Million — but Golombek (2012) noted that had he been Canadian, he would have been able to pay even less (14.2%).

10 This emphasis is not new. As Saez, Slemrod, & Giertz put it (2012:3): "until recently, the labor supply elasticity was the closest thing that public finance economics had to a central parameter. ... With some notable exceptions, the profession has settled on a value for this elasticity close to zero for prime-age males,... Overall, the compensated elasticity of labor supply appears to be fairly small...(which) implies that the efficiency cost per dollar raised of taxing labor income is bound to be low, as well."

11 The key equation is $t^* = 1/(1 + ae)$ where t^* is the revenue-maximizing top marginal tax rate, a is Pareto's a from an estimate of the Pareto distribution of the top tail of incomes and e is the elasticity of reported income with respect to the net-of-tax wage rate. See, for example, Saez, Slemrod and Giertz (2012:9).

12 Piketty and Saez (2012) and Piketty, Saez and Stantcheva (2011) make it clear in their titles that labor incomes are their focus ("Optimal Labor Income Taxation" and "Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities" respectively). Saez, Slemrod, & Giertz (2012) use the broader title; "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review" but do not explicitly discuss capital income.

13 Table 2 reports averages of actual taxes paid over groups of taxpayers. Slightly higher estimates of implicit actual marginal income tax rates are obtained when the median income within each group is used (i.e. taxpayers at the 99.5[th], 99.95[th] and 99.995[th] percentiles of the market income distribution). However, in all cases top marginal tax rates actually paid are at least ten percentage points below nominal top rates.

14 An alternative motivation for a backward bending labour supply function is a target income — that individuals work the hours necessary to finance a specific material life style.

15 Clearly 5,840 hours is an extreme assumption — an upper bound on physically possible working hours (see below). Lower assumed working hours for Canadian CEOs imply an even lower wage elasticity of labour supply.

16 CANSIM Table 282-0070; assuming that the median full time worker works 1,920 hours per year.

17 Notation also differs, since the consumption constraint in Equation 2 is written in terms of the post-tax wage (w) while PS&S refer to the pre-tax wage (w*).

18 Defining total annual effort as E and work intensity (i.e. effort per hour) as e, then E = eH and $\partial(\ln(E))/\partial(\ln(w)) = \partial(\ln(e))/\partial(\ln(w)) + \partial(\ln(H))/\partial(\ln(w))$.

19 Note that since the top marginal tax bracket in Canada starts at well below the 1% threshold, no change in marginal tax rate or "virtual income" occurs within the top 1% income group.

20 Alternatively, work intensity and work hours might both increase by 10% — implying an hours increase to 2,200 and an income of $338,800.

21 Assuming lower annual CEO work hours would imply a higher hourly wage, which implies an even lower estimate of the net wage elasticity of labour supply.

22 A backward-bending labour supply curve could also satisfy the maximum hours constraint — in which case increases in top marginal tax rates will unambiguously increase labour supply, taxable income and tax revenue.

23 All data from CANSIM Table 204-0001.

24 A few of the top 1% are A-list athletes or entertainers, for whom competitive performance is a major motivator. It is doubtful if, when the pitch comes across the plate, any baseball player anywhere tries less hard to hit the ball because tax rates have increased.

25 The omission of income effects is justified by Saez, Slemrod, & Giertz in their footnote 3 (2012:6) by noting: "There is no consensus in the labor supply literature about the size of income effects, with many studies obtaining small income effects, but with several important studies finding large income effects (see Blundell and MaCurdy 1999 for a survey)." There is no recognition in their paper that the same could be said for substitution effects. As Heckman (1993) noted long ago, at the intensive margin (i.e. for already employed individuals, which is the relevant case for top earners) both income and substitution elasticities are very close to zero for the population as a whole. However, if L+H=T, then as hourly wages increase and H approaches T, income effects can be expected to increase rapidly at the very top end.

26 In Saez (2001) no upper bound constraint on total hours worked is considered but income effects are discussed (in the limited sense of the imputed change in virtual income which can make an actual increase in marginal income tax rates equivalent to a changed proportional tax system with a virtual income transfer). Saez notes (2001:212): "The higher are absolute income effects relative to uncompensated effects, the higher is the asymptotic (optimal) tax rate t. Put in other words, what matters most for optimal taxation is whether taxpayers continue to work when tax rates increase (without utility compensation)."

27 See their Table 3, column 2. Their Table 7 then decomposes this estimate of 0.689 into 0.364 for P99-P99.9 and 1.451 for P99.9+ (i.e. very top earners are much more eager to reduce taxable income than others are). Table 1 of this paper reported the disaggregated results for the top 1% because those estimates nest the estimates for all the top 1%. In general the Milligan and Smart coefficient estimates are quite unstable, varying significantly between specifications. Their preferred estimate of an hours elasticity of roughly 0.7 would imply hitting 6,000 work hours at an after tax wage rate of $400, with income of $2.4 million, which would leave all of the very top end unexplained. Milligan and Smart (2014) cast their argument in terms of the elasticity of taxable income with respect to the percentage change in after tax income. Because they ignore the impacts of bargaining and tax avoidance on the tax revenue received from other agents or other taxes, their estimate of the revenue-maximizing tax rate [as per their equation (8)] amounts to assuming that tax revenue losses are all due to changed work effort [as a comparison with equation (8) of PS&S shows].

28 Their preferred estimate of the over-all elasticity of taxable income to tax rates is 0.5, decomposed between an effort elasticity of "0.2 (at most)" and a bargaining elasticity of "0.3 (at least)" (2013:4).

29 They conclude (2013:26) "regressions consistently display negative coefficients across the full period, suggesting that low top tax rates are detrimental to growth. The estimates however are not fully robust to the choice of time period, ... Therefore, we can conservatively conclude that low top tax rates do not have any detectable positive impact on GDP per capita."

30 The model of Badel and Huggett (2014) has some similarities but they impose an even lower level of risk aversion and the assumption that children from poor backgrounds have the same chances of upward mobility as affluent children, which brings down the optimal level of risk pooling, and the revenue-maximizing top tax rate (see Table 1). Both papers neglect the evidence of Guvenen et al (2015) on the actual characteristics of income shocks in the U.S. labour

market — i.e. that income shocks are highly lepto-kurtic and fat-tailed. Guvenen et al argue (see their Table VI) that the combination of kurtosis and skewness implies dramatic (5x) increases in willingness to pay for risk avoidance.

31 See Osberg, 2008b.

32

Table 2: Comparing Time Series to Province-Year Results

	National Time Series		Province-Year Data		
	No Controls	Add US Top 1%	Province Controls	Add US top 1%	Add Time Controls
	(1)	(2)	(3)	(4)	(5)
Observations	24	24	240	240	240
R-Squared	0.473	0.864	0.710	0.882	0.941
Log (1-MTR)	2.046***	0.549*	1.673***	0.536*	1.068*
	[0.319]	[0.292]	[0.361]	[0.275]	[0.501]
Log US Top One Percent Share		1.009***		0.920***	
		[0.142]		[0.093]	

Note: The dependent variable is the log share ratio. MTR signifies the marginal tax rate. Province controls included in the last three columns. Estimation is by instrumental variables using threshold MTR as instrument. In brackets are robust standard errors, clustered by province for province-year data. One asterisk indicates significance at the 10 percent level, two asterisks for 5 percent, and three asterisks for 1 percent.

33 Milligan and Smart prefer to develop the results of column (5) in their Table 2, and the potential influence of U.S. top shares receives no further mention in their work — thereby implying there is an important omitted variable problem in their other regression results. Note also that their econometric results are a strong reason for thinking that the much slower recovery from the 2008 recession of top 1% incomes in Canada, compared to the U.S., is a temporary delay, rather than the start of a fundamental divergence in top 1% income trends in the two countries.

34 The big international differences in the living costs of the very affluent arise in real estate prices — one gets much more acreage for the dollar in Mogadishu than in Manhattan. However, rich people are not lining up to move to Somalia, despite the gulf in top marginal tax rates (0% vs. 51.7% in New York City). Since armed guards can easily be hired in Somalia, this is not due to differences in personal security within the home. Personal security outside the home is not as easily purchased on the private market. High-end real estate prices can be seen as a capitalization of the net advantages for the affluent (given top income tax rates) of differing locations. The high real estate prices of Paris and Manhattan, where top marginal tax rates are relatively high, can be seen as evidence in favour of the hypothesis that the quality of public spaces and elite public services are "luxury goods" for the very affluent.

35 In addition, arguably "going to the opera" is a social occasion and paying for a solo concert is buying a different commodity.

36 Central and southern New Jersey border on the Philadelphia metropolitan area, so there the tax competition is with Pennsylvania (with a 5.9 percentage point gap in top tax rate).

37 The Vancouver-Seattle metropolitan area is a partial exception in distance terms but bisected by an international border. Although Washington state's top rate of 42.8% was less than B.C.'s 43.7% in 2013, international mobility raises issues of citizenship status. http://taxfoundation.org/blog/high-income-taxpayers-could-face-top-marginal-tax-rate-over-50-percent-tax-season

38 However, an example of the potential for top end tax avoidance comes from Nova Scotia, where in 2015 the Deputy Minister of Priorities and Planning was paid through a contract to a pro-

fessional services corporation. See http://thechronicleherald.ca/opinion/1304259-howe-room-mcneil-stands-by-miller-deal

39 Sometimes these decisions come partially to light — the single most egregious example probably being the $800 million benefit to the Bronfman family of being forgiven capital gains tax on the transfer of $2.2 Billion in assets to the U.S. — see Francis (2000, 2013).

40 Although Bradley Birkenfeld had to serve two and a half years jail time for his roles in the tax fraud, his award amounted to more than $4,600 for every hour he spent in prison. See Kocieniewski (2012)

41 Awards under the CRA Offshore Tax Informant Program are discretionary and highly restricted. See http://www.irs.gov/uac/Whistleblower-Informant-Award; http://www.cra-arc.gc.ca/gncy/nvstgtns/lds/faq-eng.html#q6; http://www.cra-arc.gc.ca/gncy/cmplnc/otip-pdife/lgblty-eng.html

42 Canada's first income tax bracket has a tax rate of 15%. However, payroll deductions for Canada Pension Plan (9.9% on earnings below $53,600) and Employment Insurance (in 2015, 4.5% on earnings below $49,500) mean that low-income workers face federal payroll deductions of 29.4% on earnings below maximum contributable earnings. Since CPP and EI deductions phase out at about where the first income tax bracket ends, federal payroll deductions vary remarkably little as a percentage over the distribution of earnings. As a practical matter, the progressivity of the Canadian income tax system is largely a creation of provincial tax policies.

43 The main rationale for the standard methodology is the presumption that lower marginal tax rates successfully explain rising top income shares in the U.S. Whether or not this is true in the U.S., Milligan and Smart make it clear (2014:27) that they agree with Veall (2012) that taxes do little to explain the long-run trend toward higher income concentration in Canada — i.e. there is little empirical support for the importance of tax rates in explaining top end incomes in Canada.

44 All numbers in this section were taken from CANSIM Table 204-0001 (accessed March 25, 2015) and averaged over the five years 2008–12.

45 As it happens, 65.5% is the average of the revenue-maximizing tax rates reported in Column 1 of Table 1.

46 See Appendix 1 for calculations.

47 Since the long run trend rate of top 1% income growth since 1986 has been approximately 3% annually, this increment to tax revenues could be expected to grow similarly over time.

48 CANSIM Table 477-0058

49 http://www.servicecanada.gc.ca/eng/services/pensions/janmar15.pdf

50 http://www.infrastructure.gc.ca/pub/rpp/2014-15/2014-01-eng.html

51 http://www.international.gc.ca/development-developpement/dev-results-resultats/reports-rapports/sria-rsai-2012-13.aspx?lang=eng

52 Thomas Mulcair provides an example: ""*I am categorical on that,*" he said. "*Several provinces are now at the 50 per cent rate. Beyond that, you're not talking taxation; you're talking confiscation. And that is never going to be part of my policies, going after more individual taxes. Period. Full stop.*" St. John's Telegram: August 8th 2013.

53 Both Conservatives and NDP currently advocate zero change in top marginal income tax rates.

54 An abrupt large change in top tax rates would arguably also have a "shock effect" over and above the behavioural response to a series of incremental changes.

55 These ideas are developed much more thoroughly in Osberg (2014).