The Evolution of High Incomes in Northern America: Lessons from Canadian Evidence

By EMMANUEL SAEZ AND MICHAEL R. VEALL*

The evolution of income inequality during the process of development has attracted enormous attention in the economics literature, as well as in the political sphere. Understanding the relative roles of "natural" economic progress such as technological change versus policy interventions such as taxation, redistribution, and regulation in shaping the distribution of income requires analyzing long-term series on inequality. Income tax statistics are the only source of income distribution data available on an annual basis for extended periods of time, and are still the best source to study upper-income groups. Recent studies have used income tax statistics to construct an inequality time series for various countries over the course of the twentieth century (Thomas Piketty, 2003, for France; Piketty and Saez, 2003, for the United States; Anthony B. Atkinson, 2002, for the United Kingdom). All these studies have found dramatic declines in the top income shares in the first part of the century, but the pattern has been different in the last two or three decades: an almost complete recovery in the United States, some recovery in the United Kingdom, and no recovery in France. This di-vergence casts doubt on pure technological explanations, although other explanations are still tentative.

These "high income" studies raise three important issues. First, and most important, do tax statistics reveal real changes in income concentration rather than changes in tax reporting behavior, following tax changes? Many U.S. studies have shown, for example, that tax-induced income shifting between the individual and corporate tax base can have dramatic effects on reported individual incomes (see, e.g., Roger H. Gordon and Joel Slemrod, 2000; and Saez, 2004). Second, an increase in cross-sectional income concentration over time, as in the United States and the United Kingdom in recent years, has very different welfare consequences depending on whether or not it is associated with increases in income mobility, and none of the previous studies has analyzed the mobility question for high-income earners. Finally, there has been a substantial rise in married women's labor force participation in recent decades. To what extent is the increase in U.S. top incomes (which must be calculated at a family level for the United States because of its family-based income taxation) due to increases in spousal income correlation rather than increased individual income concentration?

This study sheds new light on these three issues by using Canadian income tax statistics beginning in 1920 (the first year such statistics were produced) to estimate a homogeneous series of income shares and income composition for various upper-income groups within the top decile. Our series are based on individual income because personal income taxes in Canada are based on individual income (not family income as in the United States). For more recent years, we use a micro-data set of a kind not available for the United States—a large panel based on tax returns but linked by family—to analyze wage income concentration, mobility within top income groups, and the differences between the patterns of individual and family income concentration.

Our estimated top shares series shows that, similar to the French, British, and American experiences, top income shares in Canada fell sharply during World War II with no recovery during the next three decades. Over the last 20 years, top income shares in Canada have increased dramatically, almost as much as in the United States. This change has remained largely unnoticed because it is concentrated within the top percentile of the Canadian income distribution and thus can be detected only with tax return data covering very high incomes. As in the United States, the increase is largely due to a surge in top wages and salaries. As a result, the composition of income in the top income groups has also shifted in Canada since World War II: many more high-income individuals derive their principal income from employment instead of as a return to capital.

The recent surge in Canadian top income shares does not seem to be mainly the consequence of tax-induced changes in behavior, including tax-reporting behavior. The Canadian reduction in marginal tax rates was much more modest than in the United States and did not induce shifting between the corporate and personal income tax base. Moreover, much of the Canadian surge occurred when there were no major tax changes. There is evidence (including a formal regression analysis we present) that the surge in Canadian top incomes has a U.S. association, perhaps because many high-income Canadians have the option of leaving to work in the United States. If this "brain drain threat" explanation (or some other U.S.-related explanation) is correct, it would imply that the surge in top reported incomes in the United States has not just been a tax-induced change in tax-reporting behavior. Otherwise, it is difficult to reconcile the association between top U.S. and Canadian incomes.[1]

Longitudinal micro-data show that income mobility for high-income earners in Canada has been stable or has even decreased slightly since 1982. Similarly, top income shares based on three- or five-year averages display the same surge as those based on single-year income.

This suggests that the recent increase in cross-sectional income concentration is associated with a large increase in the concentration of lifetime resources and welfare. Using the family linkages in the Canadian micro-data, we also show that the increase in income concentration is identical at the family and individual levels.

To the best of our knowledge, this is the first time that Canadian income tax statistics have been used to construct long-term series on inequality in Canada. McKinley L. Blackburn and David E. Bloom (1993) summarize a number of studies that examine both individual and family income inequality in Canada in the postwar period. The view that emerges from their summary is that changes in inequality from the late 1940s to the 1980s were modest. Andrew Heisz et al. (2001) summarize more recent Canadian inequality research, which largely finds that Canadian earnings inequality has increased since 1980, but by much less than in the United States. Most of the studies discussed in these papers are based on survey data and none examines the war/prewar period or focuses on top shares.

The paper is organized as follows. Section I describes our data sources and outlines our estimation methods. In Section II, we present and analyze the trends in top income shares and their composition. Section III focuses on the recent increase in Canadian top incomes and provides a systematic comparison with the U.S. experience. Finally, Section IV offers a brief conclusion. All series and complete technical details of our methodology are gathered in appendices of our working paper version (Saez and Veall, 2003).

I. Data and Methodology

Our estimates are from personal income tax return statistics compiled annually by the Canadian federal taxation authorities since 1920. It is important to note that income taxes in Canada have always been assessed at the individual level and not at the family level, as they are in the United States. Thus, most of our series are based on individual (and not family) income. Before World War II, because of high exemptions, only about 2 to 8 percent of individuals had to file tax returns and therefore, by necessity, we must restrict our analysis to the top 5 percent of the income distribution (denoted as

---

[1] The question of whether the surge in top U.S. incomes is due to supply-side effects following tax cuts or to non-tax-related effects is still debated (see Saez, 2004, for a recent survey). The Canadian evidence could be consistent with either explanation of the U.S. surge.

TABLE 1—THRESHOLDS AND AVERAGE INCOMES IN TOP GROUPS IN CANADA, 2000

Thresholds (1)	Income level (2)	Fractiles (3)	Number of tax units (4)	Average income (5)
		Full population	22,807,585	$24,859
P90	$59,232	P90–95	1,140,379	$66,310
P95	$75,670	P95–99	912,303	$95,982
P99	$145,774	P99–99.5	114,038	$171,728
P99.5	$210,150	P99.5–99.9	91,230	$303,035
P99.9	$530,311	P99.9–99.99	20,527	$923,385
P99.99	$2,396,050	P99.99–100	2,281	$4,695,923

Notes: Computations based on income tax return statistics. Income is defined as annual gross income excluding capital gains and before individual taxes. Amounts are expressed in 2000 Canadian dollars. In year 2000, 1 US dollar = 1.5 Canadian dollars.
Source: Table A and Table B3, row 2000, in Saez and Veall (2003).

P95–100).[2] Beginning with World War II, we can extend our analysis to the top decile (P90–100). We also construct series for a number of finer fractiles e.g., P90–95, P95–99, P99–100 (the top 1 percent), P99.5–100 (the top 0.5 percent), P99.9–100 (the top 0.1 percent), and P99.99 (the top 0.01 percent). Each fractile is defined relative to the total number of adults (aged 20 and above) from the Canadian census (not the number of tax returns filed). Table 1 gives thresholds and average incomes for a selection of fractiles for Canada in 2000.

We define income as gross income before all deductions and including all income items reported on personal tax returns: salaries and wages, self-employment and small business net income, partnership and fiduciary income, dividends, interest, other investment income, and other smaller income items. Because capital gains are realized infrequently in a lumpy way, are volatile, and before 1972 were not taxable and hence not reported on tax returns, we focus mainly on series excluding capital gains.[3] Our income definition is before personal income taxes and personal payroll taxes, but after employers' payroll taxes and corporate income taxes.

Our principal data consist of tables of the number of tax returns, the amounts reported, and the income composition (since 1946) for a large number of income brackets. As the top tail of the income distribution is very well approximated by Pareto distributions, we can use simple parametric interpolation methods to estimate the thresholds and average income levels for each fractile. For the years when microdata are available, we check that the errors introduced by the interpolation method are negligible.[4]

We then estimate shares of income by dividing the income amounts accruing to each fractile by 80 percent of personal income, not including transfers from the National Accounts.[5,6] After analyzing the top share data, we turn to the composition of income, concentrating on the period since 1946 when composition data were first published. Using this published information and a simple linear interpolation method, we decompose the amount of income for each fractile into employment income,

[2] All taxpayers with income above the exemption threshold are required to file a return. The exemption threshold is substantially lower for single persons than for married couples. Therefore, in the years when fewer than 5 percent of individuals filed, we use data on singles and a simple extrapolation method to estimate our income shares. (See Saez and Veall, 2003, for details of this procedure and its validation.)

[3] Saez and Veall (2003) analyze this issue in detail and show that series with and without capital gains are very similar and display the same general pattern for the period 1972–2000.

[4] Atkinson (2003) discusses this issue in much more detail.

[5] We used tax returns to compute the level of top incomes and national accounts to compute the total income denominator dates from the famous Simon Kuznets (1953) study on American inequality.

[6] Personal income is higher than total income from tax returns because it includes such non-taxable items as imputed rent, imputed interest, etc. In recent years, in which virtually all adults with income file tax returns, total income from tax returns has always been very close to 80 percent of personal income net of transfers.

entrepreneurial income (self-employment and small business income), and capital income (excluding capital gains).

We produce top wage share series for the period 1972 to 2000, using composition tables for 1972 to 1981[7] and longitudinal micro-files of tax returns (covering 20 percent of the total tax-filing population, over 4 million records in 2000) available beginning in 1982. In this case, fractiles are defined relative to the total number of individuals with positive wages. (Throughout this paper, "wages" or "wage income" includes salaries or any other type of employment earnings, including exercised stock options.) We also link married couples and recompute top wage income shares at the family level. In that case, each fractile is defined relative to the total number of families (single adults and couples) with positive wage income. We also use the longitudinal structure of the micro-data to study income mobility. We compute mobility matrices for all our income groups for one-, two-, and three-year lags, and top income shares using real income averaged over three and five years instead of single-year income.[8]

II. Top Income Shares

A. Trends

Figure 1, panel A, displays the income share of Canada's top 5 percent (P95–100) from 1920 to 2000. Before World War II, the top 5-percent income share in Canada displayed sharp counter-cyclical fluctuations, varying between 30 and 40 percent of total income. There are particularly noticeable declines during the depression of 1920–1921 and the Great Depression of 1930–1933, suggesting that the business cycle was an important influence. The top 5-percent income share declines drastically during the World War II years, from almost 40 percent in 1938 to less than 25 percent in 1945. After World War II, the top 5-percent income share declines very slowly (now with very small fluctuations) from 25 percent to 22 percent by

the mid-1980s, then jumping substantially to about 29 percent in 2000. Therefore, the Canadian evidence suggests that the twentieth century decline in inequality took place precisely during World War II. This evidence is very much in line with American (Piketty and Saez, 2003), French (Piketty, 2003), and British (Atkinson, 2002) findings.[9] The Kuznets (Simon Kuznets, 1955) inverted U-curve theory of inequality (where inequality first rises and then falls as the economy develops) does not fit well with the Canadian experience.

In order to understand these changes in top income shares in Canada, we decompose the top decile into three groups, P90–95, P95–99, and P99–100, and depict their income shares in panel B of Figure 1. Three aspects should be noted. First, the counter-cyclical pattern before World War II appears to be stronger for P95–99 than for the top percentile. Second, the drop during World War II is larger for the top percentile (from 18 percent in 1939 to 10 percent in 1945) than for P90–95 and P95–99. Third, and most importantly, the upturn during the last two decades is also concentrated in the top percentile (whose share increased from about 7.5 percent in the late 1970s to 13.5 percent in 2000, while the P90–95 and P95–99 shares were virtually flat).

Examination of the very top groups (P99.9–100 and P99.99–100) in Figure 2 reinforces these three empirical findings. In particular, the P99.99–100 share drops by more than half from 1938 to 1945, continues to drop until the mid-1970s (in contrast to the lower groups) and then recovers so strongly that it almost recovers to its pre–World War II level. This surge is somewhat smaller than comparable estimates for the United States from Piketty and Saez (2003), also included in Figure 2.

The remainder of the paper will be aimed at understanding the three key facts: the counter-cyclical pattern of top income shares (except the very top income share) in the prewar period, the sharp fall of top income shares during World War II (with the most dramatic decline at the very top) with no recovery after the war, and the surge in top income shares over the last 20 years

---

[7] Top wage shares for 1972 to 1981 are estimated using the number of tax returns reporting wages and the amount of wages reported by income brackets (Saez and Veall, 2003).

[8] In this case, our adult population and denominator are defined as the average across the relevant years.

[9] In the United States, the fall in top income shares does not start before U.S. entry into World War II in 1941, providing further evidence that the fall is closely related to the war.
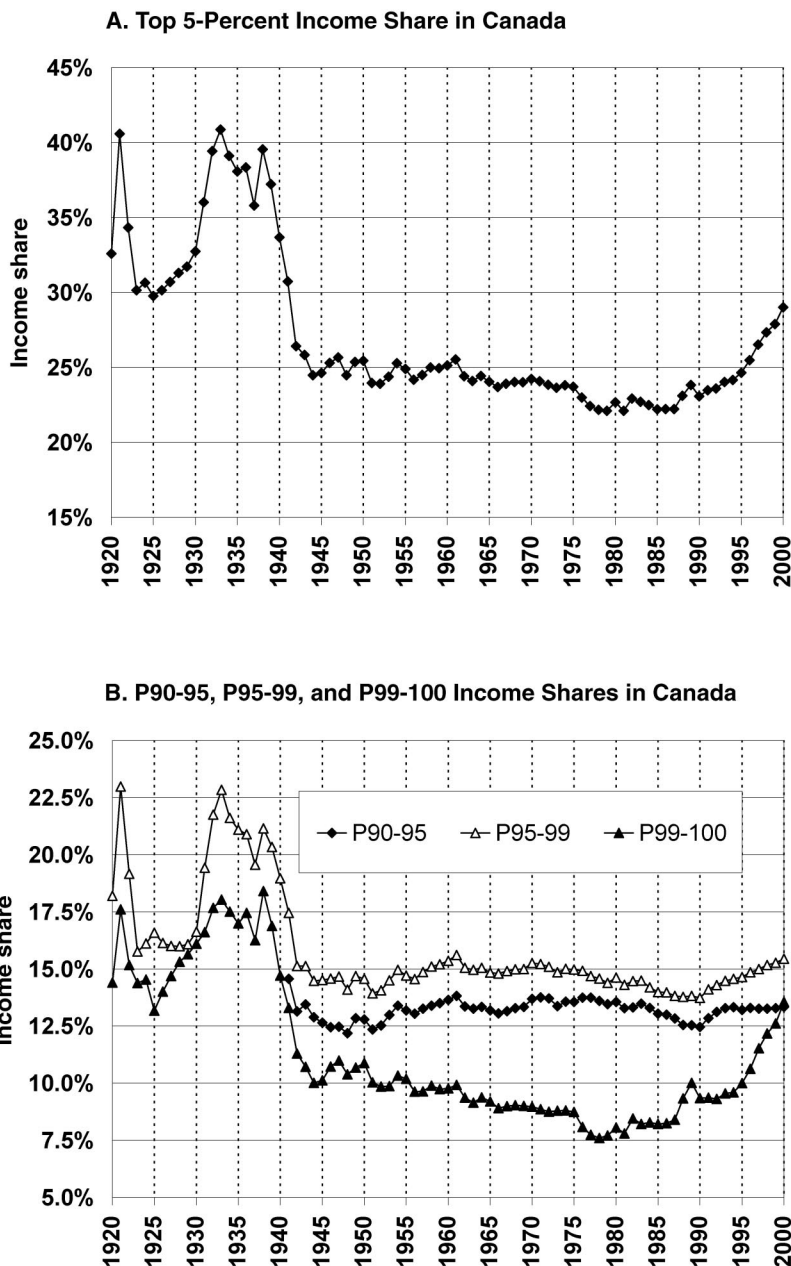
A. Top 5-Percent Income Share in Canada

B. P90-95, P95-99, and P99-100 Income Shares in Canada

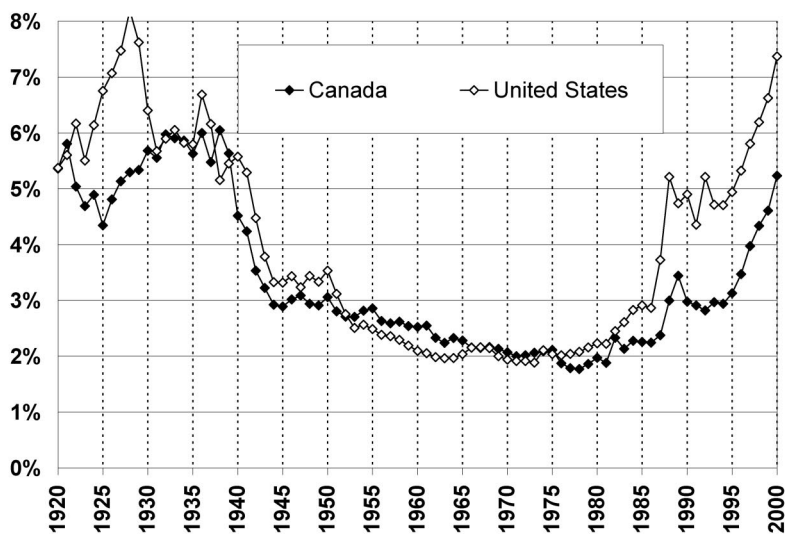FIGURE 1. TOP INCOME SHARES IN CANADA, 1920–2000

Source: Table B1, columns P95–100, P90–95, P95–99, and P99–100, in Saez and Veall (2003).

(characterized by an extreme concentration at the top). We begin with an analysis of the composition of incomes reported by the top income groups.

B. *The Composition of Top Incomes*

From 1920 to 1945, systematic and detailed composition of income is not available in

A. Income Share of the Top 0.1 Percent (P99.9-100)

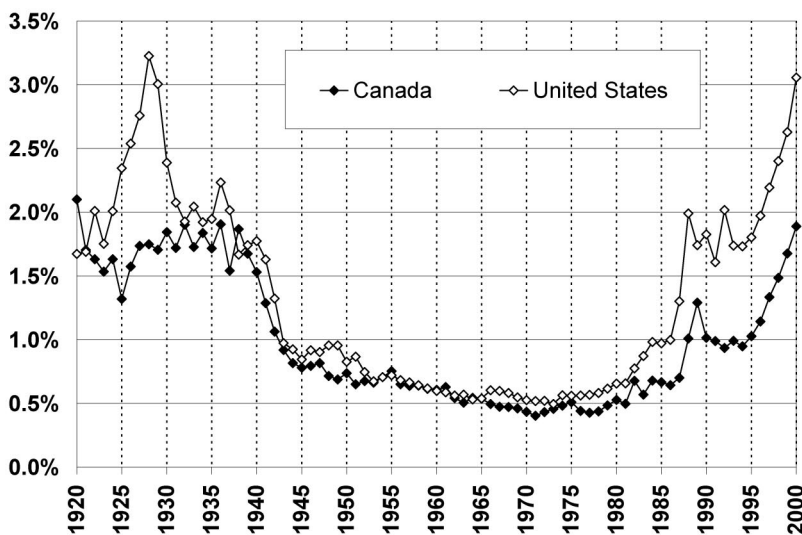## B. Income Share of the Top 0.01 Percent (P99.99-100)

FIGURE 2. THE INCOME SHARES OF THE TOP INCOME GROUPS IN CANADA
AND THE UNITED STATES, 1920–2000

Sources: Canada, Table B1, columns P99.9–100 and P99.99–100, in Saez and Veall (2003).
United States, Table II, columns P99.9–100 and P99.99–100, in Piketty and Saez (2003).

Canadian personal income tax data. The tax statistics, however, include some data on occupation summarized in Saez and Veall (2003). This evidence suggests that well-compensated employees formed a very important fraction of the top 5 percent of income earners, and prob-ably the overwhelming majority of the P95–99 group.[10] If wages are nominally rigid in the

[10] This is also the pattern in France (Piketty, 2003) and in the United States (Piketty and Saez, 2003) and will be

short run, this can explain why the P95–99 share is so clearly counter-cyclical in Canada's prewar period, as sharp downturns of the prewar period were associated with sharp deflations. The top 1 percent of the income distribution is less counter-cyclical, likely because it contains many more entrepreneurs and capital income earners.

Our Canadian top share series display a sharp drop during World War II, and that drop is larger for the very top groups. This fall can be explained, in part, by the fiscal shock in the corporate sector. As part of financing the war, Canada substantially increased taxes on corporations. Moreover, corporations reduced their payout ratios during the war because of the high demand for investment, and perhaps also to avoid the personal income tax, which imposed extremely high marginal tax rates (in excess of 90 percent) on the highest incomes. Hence very top incomes, composed primarily of dividends, declined during the war. The shares of income groups P90–95 and P95–99, composed mostly of well-compensated employees, also fell. Saez and Veall (2003) confirm these results by showing that salary earners gained significantly relative to nonsalaried employees in terms of employment and compensation during the downturns of 1920–1921 and the Great Depression, but lost significantly during World War II.[11]

From 1946 on, detailed tables on the composition of income are published annually; hence we are able to construct series for each fractile within the top decile. Figure 3 shows the composition of income for each fractile in 1946 (panel A) and 2000 (panel B). Comparing the two panels, the share of individual income that is wages is inversely related to individual income in the 1946 cross section, but that wage share rises so substantially for high-income groups that by 2000 the inverse relationship is eliminated. For high-income groups, the share of income that is "entrepreneurial income" (income from self-employment or direct business proprietorship) falls very sharply. Moreover, the share of income that is capital (dividends,

interest, and other investment income, excluding capital gains) also falls for high-income groups, even though the share of capital income in Personal Income from the National Accounts is about the same in 2000 as it is in 1946 (Saez and Veall, 2003). Therefore, the self-employed business proprietors and capital income earners have been in large part replaced by highly compensated employees at the very top of the income distribution.

The decline in the importance of capital income at high incomes suggests that the top capital income earners were never able to constitute fortunes as large (relative to the average income) as those of the prewar period. Piketty and Saez (2003) argue in the case of the United States that the most natural explanation is the development of a progressive income and estate tax system, which since the beginning of World War II has reduced substantially the after-tax returns earned by wealthy individuals. The same may well apply to Canada. The recent surge in top incomes in both countries (and in Canada the repeal of federal and provincial estate taxes in the 1970s and 1980s) may restore the importance of capital income in the coming years.

III. The Recent Increase in Top Incomes

A. *Top Wage Incomes*

Our previous evidence suggests that the recent upturn in top income shares in Canada is the consequence of an unprecedented surge in the pay of the top compensated employees. We now examine this issue more fully using the detail available in the micro-files that begin in 1982. In this subsection, we focus on wage income and offer some tentative explanations for the surge. In the following subsections, we consider aspects that have been raised in the U.S. context as alternative possible explanations for the increased concentration of income: family composition, income mobility, and changes in taxation.

Figure 4, panel A, displays the share of wages accruing to the P90–95, P95–99, and the top percentile of the wage income distribution in Canada (bold lines) and the United States (dashed lines). We begin this figure in 1972 using extrapolations based on composition tables published for the 1972–1981 period. Our

---

confirmed in our analysis of Canadian income composition after World War II.

[11] The most direct explanation is that war labor regulations set strict bounds on the raises that corporations were able to give to their high-salary employees.
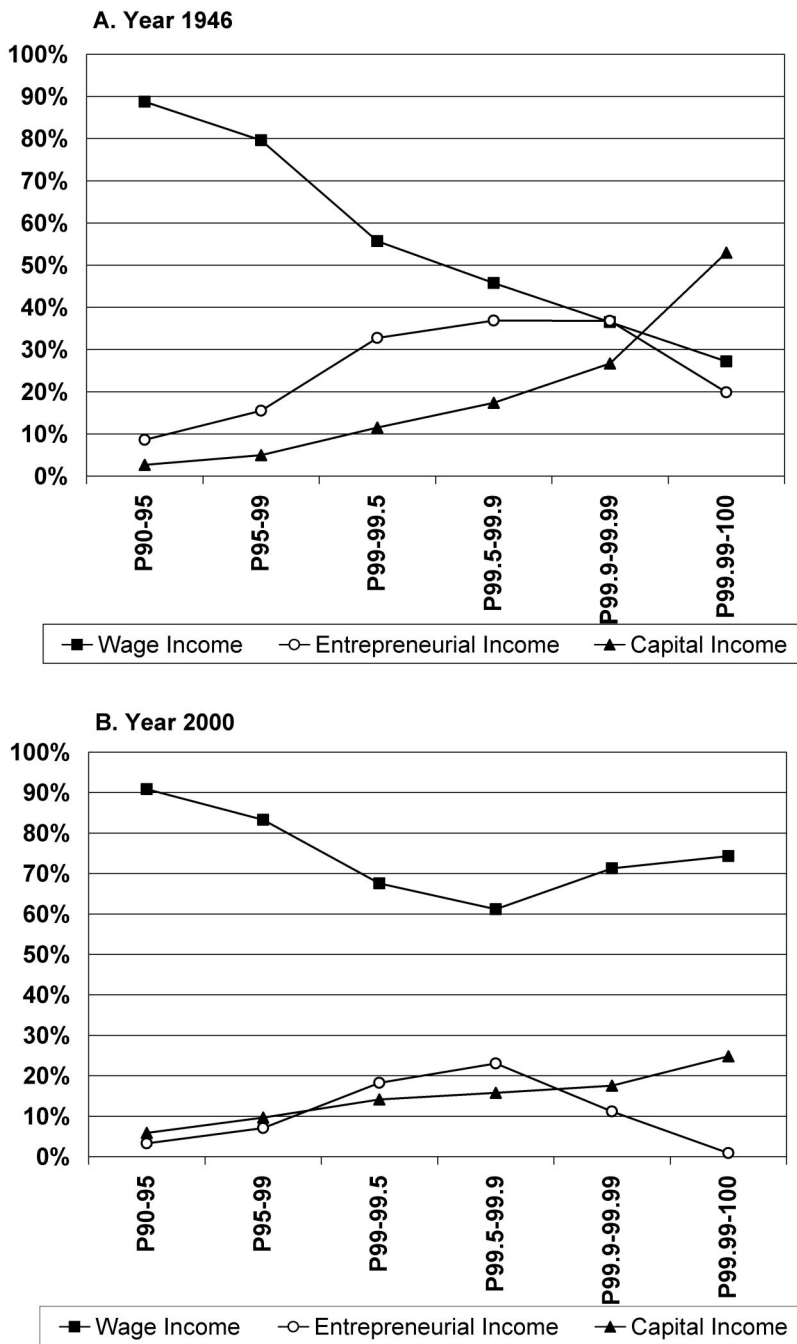
A. Year 1946

B. Year 2000

FIGURE 3. INCOME COMPOSITION OF TOP GROUPS WITHIN THE TOP DECILE IN 1946 AND 2000

Note: Capital income does not include capital gains.
Source: Table C3, rows 1946 and 2000, in Saez and Veall (2003).

A. Wage Income Shares of P90-95, P95-99, and P99-100
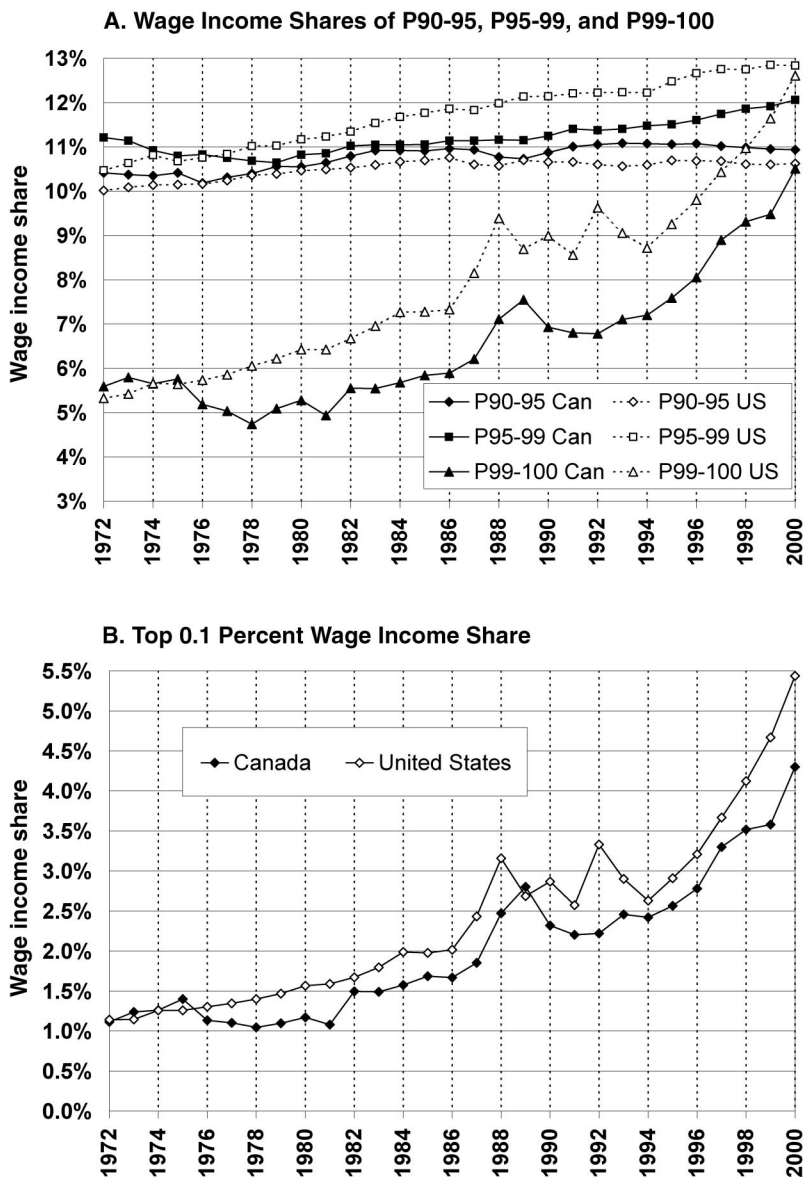

B. Top 0.1 Percent Wage Income Share

FIGURE 4. THE TOP WAGE INCOME SHARES IN CANADA AND THE UNITED STATES, 1972–2000

Note: United States series are based on family earnings while Canadian series are based on individual earnings.
Source: Canada, Table D2, panel A, columns P90–95, P95–99, P99–100, and P99.9–100, in Saez and Veall (2003). United States, Piketty and Saez (2003), Table IV, col. P90–95, P95–99, P99–100, and P99.9–100, updated to 2000.

top groups are now defined relative to the total number of individuals (Canada) or families (United States) with positive wage income. It shows that, as with the total income shares, the increase in Canada is concentrated within the top percentile. In Canada, the shares of P90–95 and P95–99 are almost flat, while the P99–100 share doubles from around 5 percent in the late

1970s to over 10 percent in 2000. Interestingly, as displayed in Figure 4, the surge in top wage shares in the United States was not as concentrated at the very top, as it was in Canada: P95–99 increases significantly from 10.5 percent to almost 13 percent from 1972 to 2000.[12]

Panel B of Figure 4 displays the top 0.1–percent wage income share in Canada and the United States (from Piketty and Saez, 2003). Over the 1972–2000 period, the top 0.1–percent wage income share in Canada increased more than fourfold, from about 1 percent to 4.3 percent, and accounts for most of the gains accruing to the top 1 percent. The surge in the top 0.1–percent wage income share in Canada tracks the top 0.1–percent wage income share in the United States very closely. Given that taxation changes were different in the two countries and hence are unlikely to provide a complete explanation (more on this in Section III D), one possibility could be that the two economies have experienced very similar technological change and thus distributions of earnings in both countries have followed a similar path. A second possible explanation might be competition for highly skilled executives driven by the U.S. market. Canadian executives and other professionals can relatively easily move and find jobs in the United States as part of what is sometimes called the brain drain. Therefore, Canadian firms might attempt to retain their best-paid employees by increasing their salaries.

The brain drain threat explanation seems more convincing to us than the technology explanation for a number of reasons. First, if technological change (such as an improvement in information technology) is viewed as economy-wide, this would seem to suggest that gains would be distributed more broadly across Canada's highly-skilled workers, rather than be concentrated at the top. Second, European

countries experienced the same change in technology as did Canada and the United States. Piketty (2003) has demonstrated, however, that France has not had an increase in inequality at the top of the wage distribution.[13] Third, if the migration threat explanation is true, then groups with higher mobility costs (or smaller benefits from moving) should experience a smaller rise in their compensation. Three pieces of evidence suggest that this is the case.

First, the surge in inequality at the top is more concentrated in Canada than in the United States. The benefits from moving are clearly higher for the very top wage earners (who experienced the greatest increase in compensation in the United States, both in absolute and relative terms). If the cost of moving is fixed, those at the very top are most likely to move, and U.S.–driven competition should be stronger at the top, producing a more concentrated rise in inequality in Canada than in the United States. Ross Finnie (2002) finds that migration by Canadians is in fact much more likely among those with high incomes.

Second, as shown in Figure 4, panel B, the surge in top income shares started earlier in the United States than in Canada. Mahmood Iqbal (1999) documents the brain drain and concludes that emigration of high-income Canadian workers to the United States increased during the 1980s, especially after 1995 when the North American Free Trade Agreement (NAFTA) allowed highly skilled workers to receive temporary work visa permits much more easily. The brain drain pressures from the United States, therefore, correspond to the increase in top wage shares in Canada, suggesting that the latter might well have been driven by the former.

Third, the French-speaking community in Quebec may be more reluctant to move to the United States because of cultural differences. Finnie (2002, 2004) finds that Quebec francophones are much less likely to migrate interprovincially and internationally than residents of

---

[12] Hence, in contrast to Canada, U.S. studies using survey data such as the Current Population Survey were largely able to document the surge in high wages. (See Lawrence Katz and David Autor, 1999, and Daron Acemoglu, 2002, for recent surveys of these U.S. studies.) Another very important difference between the United States and Canada is the pattern of inequality at the bottom. Low-income earners have lost dramatically in the United States relative to Canada, explaining why overall inequality measures such as the Gini coefficient have increased much more in the United States than in Canada (see Blackburn and Bloom, 1993; Michael C. Wolfson and Brian B. Murphy, 2000).

[13] British top income shares have increased significantly as well since 1980, although less than in the United States or Canada (see Atkinson, 2002). This is consistent with the migration threat explanation, as we expect mobility to the United States from the United Kingdom to be higher than from continental Europe, but lower than from Canada. Naturally, however, there are many other differences among these countries: these patterns are merely suggestive.
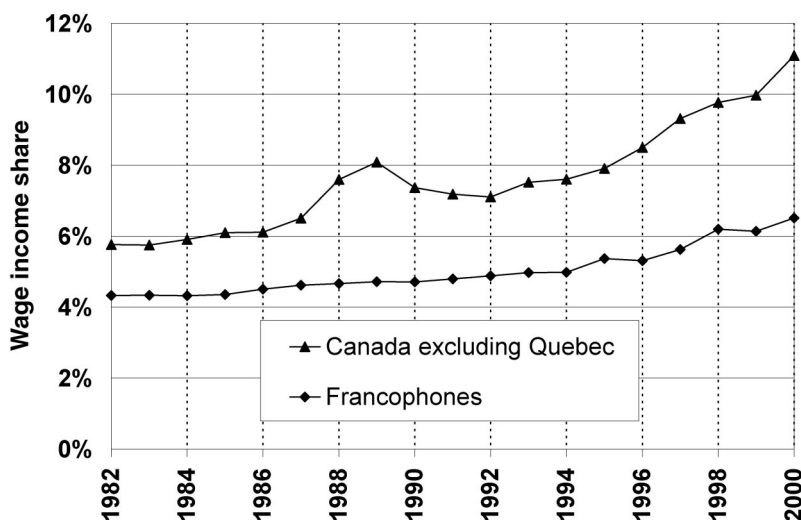
FIGURE 5. THE TOP 1 PERCENT WAGE INCOME SHARE OF QUEBEC FRANCOPHONES VERSUS ALL FILERS FROM THE REST OF CANADA, 1982–2000

Note: Francophones defined as those filing a tax return in French.
Source: Table D4, panel A and B, column P99–100, in Saez and Veall (2003).

other provinces, and than Quebec anglophones. Figure 5 displays the top 1-percent wage share for francophones in Quebec and for Canadians in all other provinces from 1982 to 2000.[14] The figure demonstrates that the rise in the top 1–percent income share has been much more modest for francophones in Quebec (from about 4.5 percent to 6.5 percent) than for the rest of the provinces (from less than 6 percent to more than 11 percent). Moreover, as a group, anglophones in Quebec experience a surge in top wage shares similar to those in the rest of the provinces.[15] This evidence is consistent with the brain drain threat explanation and is more difficult to reconcile with pure technology

change (which we would expect to spread quickly across Canadian provinces).

The surge in top executive compensation in the United States is perhaps the most important factor that has driven up top wage income shares and is due in large part to the development of stock options. In Canada, CEO compensation has clearly also surged[16] even though the development of stock options has been slower because CEOs do not receive as favored an overall tax treatment (Kenneth J. Klassen and Amin Mawani, 2000).

In contrast to the United States, on Canadian tax returns, profits from stock-option exercises can be separated out from wages and salaries. Saez and Veall (2003) use data obtained from the Canada Customs and Revenue Agency to document that the fraction of total employment income from the exercise of stock options rose

[14] Francophones are defined in the data as those who complete their income tax returns in French. Hence an alternative explanation for the smaller rise in francophone top income shares could involve high-income francophones choosing to file in English. Without independent information on language status, we cannot rule this out. We do note, however, that accounting firms in Quebec almost invariably allow a client to choose filing language. We also note that our tax-based data do not contain information about education or occupation, so we cannot determine whether those who file in French are different in other respects.

[15] For Quebec anglophones, the top 1–percent share increases from less than 7 percent in 1982 to over 14 percent in 2000.

[16] Data on CEO compensation in Canada during the 1970s and 1980s are fragmentary. Using reported compensation for the top ten CEOs in 1978 (*The Financial Post,* June 9, 1979, pp. 1 and 14) and roughly comparable values for 2000 (*Report on Business Magazine* (*Globe and Mail*), July 2002, pp. 115–16), we find that the ratio of average top ten CEO compensation (including stock options) to average wage income was about 40 in 1978, but almost 1,000 in the year 2000, similar to the surge in CEO pay in the United States (see, e.g., Piketty and Saez, 2003).

from less than 0.1 percent before 1990 to about 1.5 percent in 2000. They show, however, that since 1978, the share of income received by the top 0.1 percent of earners would still have increased by a factor of 3.5 if stock options had been completely excluded, instead of by a factor of 4.3 with stock options fully included.

B. *Family versus Individual Units*

Canadian income taxes are assessed at the individual level, whereas U.S. income taxes are based on family income (as U.S. married couples almost always file a joint return).[17] Thus Canadian top income shares based on individual income and U.S. top income shares based on family income might not be comparable (Atkinson, 2003). This question is particularly important given the recent large increase in married women's labor force participation. The Canadian tax return micro-data allow us to link the incomes of spouses and explore this issue.[18] Figure 6 plots the top 1–percent wage income share estimated at the individual level (as reported above) and at the family level (as in the United States) for 1982 to 2000. Both the level and pattern of the two graphs are almost identical, suggesting that changes in the correlation of earnings among spouses have had no effect on top income shares. Given this Canadian evidence, it seems likely that the recent dramatic increase in family income concentration documented in the United States is also due primarily to an increase in individual income concentration.

C. *Mobility*

Has the surge in top incomes been accompanied by an increase in mobility for the high–

income groups? Using 1982–2000 longitudinal tax return data, we explore this issue in two ways. First, we recompute top income shares based on average income over three or five years instead of a single year. If high incomes were relatively transitory, we would expect to see less concentration when incomes are measured over a longer time period. Figure 7, panel A, plots the top 0.1–percent income share using one-, three- and five-year centered averages. The three curves match almost perfectly, suggesting that income mobility has not increased significantly in recent years.

Second, and more directly, panel B reports that the probability of remaining in the top 0.1–percent group is about 60 percent one year later, 50 percent two years later, and between 40 percent and 50 percent three years later. This suggests that mobility at the top is quite modest. Consistent with our panel A results, there is no increase in mobility after 1982, perhaps even a slight decrease. Similar results apply to all top groups and strongly suggest that the surge in annual income concentration that we have documented is associated with a similar increase in longer-term income concentration and welfare.[19] From the Canadian findings, it seems plausible that the surge in top U.S. incomes is also not primarily due to increased mobility.[20]

D. *The Role of Taxation*

For the United States, a number of studies have argued that the surge in top U.S. incomes in the 1980s might not reflect actual income changes, but rather changes in the way incomes are reported (Saez, 2004). For example, a large

---

[17] The Canadian personal income tax system in principle attributes capital income to the individual saver. Hence, there are attempts to prevent tax evasion through transfers from high-earning to low-earning spouses.

[18] Individuals in the tax return micro-data sample are matched to spouses using the universe of tax filers. Most matching uses tax form self-reports of the Social Insurance Number of the spouse (registered or common law). Additional matches are made based on address, individual names and ages, and the identification of any other individuals resident at the same address. According to internal Statistics Canada calculations, the gross count of couples matched is very close to independent demographic estimates of the number of such couples.

[19] More generally, Michael Baker and Gary Solon (2003) and Charles M. Beach et al. (2003) have used tax-based data to conclude that the overall increase in annual earnings inequality in Canada was not due to increased earnings variability, although they do not consider top incomes specifically.

[20] Because of lack of adequate data, top income mobility in the United States has not been examined in published work. A number of studies (e.g., Moshe Buchinsky and Jennifer Hunt, 1999, and Peter Gottschalk, 1997), however, have used survey data to find more generally that the increase in measured U.S. inequality is not due to increased mobility. Audra Bowlus and Jean-Marc Robin (2004) use a lifetime model of wage/employment mobility to conclude that the U.S. distribution of lifetime labor income has become more unequal over the last 20 years.
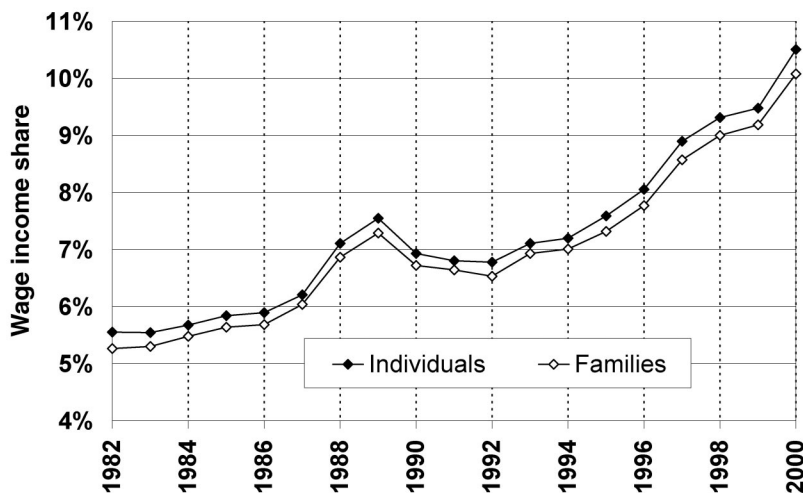
FIGURE 6. TOP 1 PERCENT WAGE INCOME SHARE FOR INDIVIDUALS AND FAMILIES IN CANADA

Note: For families, top 1 percent defined relative to the total number of couples and single adults with positive wage income.
Source: Table D2, panels A and B, column P99–100, in Saez and Veall (2003).

fraction of the jump in U.S. top income shares from 1986 to 1988 (see Figure 2) is due to shifts from the corporate sector to the personal sector (as the top personal tax rate became lower than the corporate tax rate after 1987). The Canadian experience casts new light on this issue in two ways.

First, the climb in Canadian top reported incomes is unlikely due to tax-induced shifting from the corporate sector. Canadian corporate tax rates remained relatively stable until 1987, have since declined, and in any case are offset in the personal income tax by a dividend tax credit, which reduces the double taxation of dividends. Also, in contrast to the United States, for the Canadian top 0.01–percent income earners, the share of business income reported on personal income tax returns as a percentage of total income reported has been relatively stable and very low, between 1 percent and 3 percent of total income over the last 20 years (Saez and Veall, 2003, Table C3).

Second, changes in marginal tax rates in Canada have been different in both timing and degree. Figure 8, panel A, presents Canada's average marginal personal income tax rate for 1960 to 2000 (weighted by income) for those in the top 0.1 percent, along with their income

share,[21] while panel B presents the same for the United States (Saez, 2004). While marginal tax rates for the top 0.1 percent are about the same in the 1960s and the 1990s in Canada (around 50 percent), U.S. marginal tax rates dropped dramatically from about 70 percent in the early 1960s to less than 30 percent in the mid-1980s (and then increased to around 40 percent in the 1990s).

It is clear from Figure 8 that the U.S. top 0.1–percent income share surge has so far been larger. There is perhaps also some indication that Canadian top shares started to increase during the 1980s at the time of some significant Canadian marginal tax rate cuts, although some of the effect was temporary (see below). But it is striking that between 1990 and 2000, *top shares surged very similarly in both countries,* particularly after 1995. This occurred even though there was very little further change in Canadian marginal tax rates facing these top-income individuals, and in spite of the substantial increase in the relevant U.S. marginal

---

[21] In Canada, provincial income taxes represent a significant portion of total income taxes. Therefore, Figure 8 displays marginal tax rates including both the federal and Ontario provincial income tax (as Ontario contains over 50 percent of top income earners in 2000).

A. Top 0.1 Percent Share, Centered Averages over Various Years
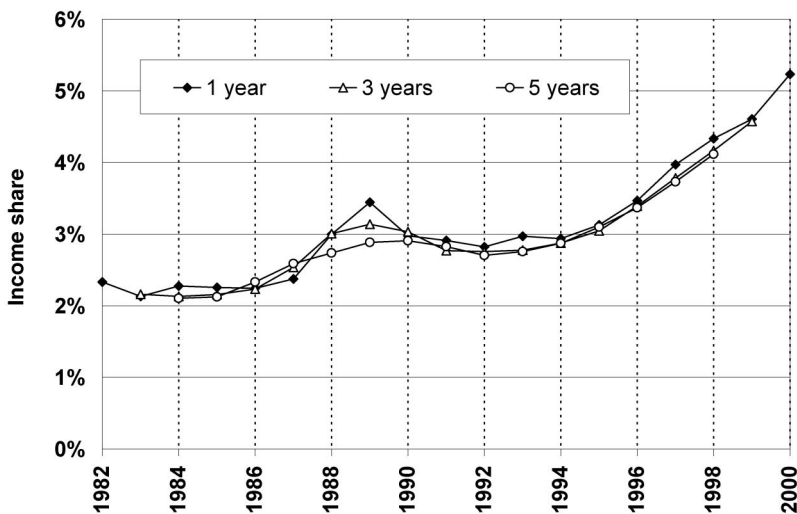
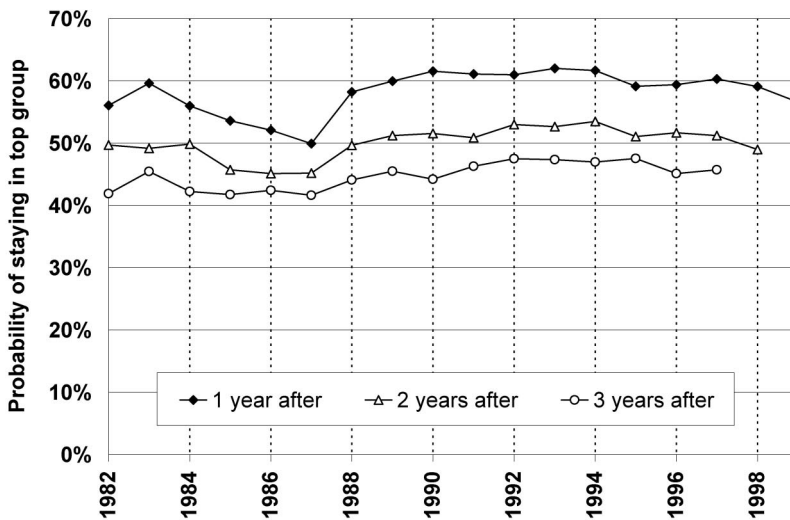**B. Probability of Staying in Top 0.1 Percent Group**

FIGURE 7. MOBILITY OF HIGH-INCOME EARNERS IN CANADA, 1982–2000

Source: Authors' computations based on the Longitudinal Administrative Database.

personal income tax rates in 1993 (as emphasized by Piketty and Saez, 2003). Therefore, the dramatic climb in Canadian top reported incomes is unlikely to have been induced by changes in Canadian tax rates. If, as tentatively argued previously, some of the surge in Cana-

dian top incomes is due to brain drain threats (or some other association with U.S. factors), it must be the case that the surge in top U.S. wage incomes is real and not entirely due to changes in the way U.S. incomes are reported for tax purposes. Otherwise, those changes in the United
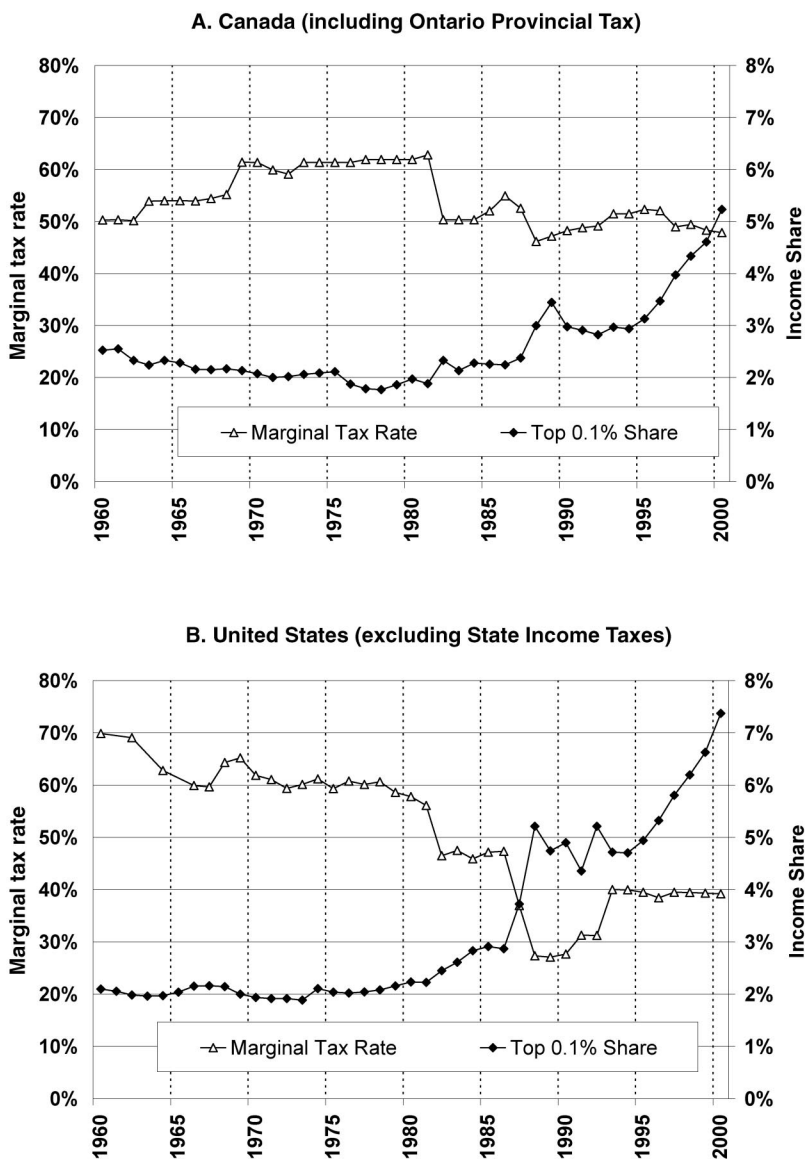
A. Canada (including Ontario Provincial Tax)

B. United States (excluding State Income Taxes)

FIGURE 8. MARGINAL TAX RATES AND INCOME SHARE FOR THE TOP 0.1 PERCENT
IN CANADA AND THE UNITED STATES, 1960–2000

Note: Marginal tax rates in Canada include federal and Ontario provincial income taxes, as well as applicable surtaxes and credits. Estimation details are provided in Appendix, Section E, of Saez and Veall (2003). United States (Saez, 2004) computations use micro tax return data and TAXSIM calculator (does not include state income taxes).
Source: Canada marginal tax rate computations based on Table E1 in Saez and Veall (2003).

States could not have increased incentives for Canadian top earners to move to the United States.

There are other things to learn from the Canada–United States comparison shown in Figure 8. First, as noted, there is clear evidence in Canada, as in the United States, of a short-term response to cuts in marginal tax rates. For example, there was a substantial tax cut in

TABLE 2—MARGINAL TAX AND U.S. EFFECTS ON CANADIAN TOP INCOME SHARES

	Top 1 percent		Top 0.1 percent	
	No U.S. control (1)	U.S. control (2)	No U.S. control (3)	U.S. control (4)
Panel A. Income Shares from 1920 to 2000				
Elasticity	0.826 (0.126)	0.476 (0.130)	0.961 (0.294)	0.299 (0.168)
log (U.S. top income share)		0.458 (0.093)		0.610 (0.101)
Number of Observations	81	81	81	81
Panel B. Wage Income Shares from 1972 to 2000				
Elasticity	2.550 (0.762)	0.177 (0.345)	3.023 (0.544)	0.278 (0.258)
log (U.S. top income share)		0.759 (0.175)		0.857 (0.059)
Number of observations	29	29	29	29

Notes: Estimates obtained by time-series regression of log (Canadian top income share) on a constant, log (1 − Canadian marginal tax rate). Results are from OLS regressions with standard errors corrected for heteroskedasticity and autocorrelation using the Newey-West procedure with 8 lags. In columns 2 and 4, log (U.S. top income share) is added as an additional right-hand-side variable.

Canada in 1988, and panel A shows a sharp increase in the 0.1-percent income share between 1987 and 1989, which is partially reversed by 1990. Several other figures show similar spikes, and it is particularly clear in the top wage series in Figure 4. This suggests that this short-term response was at least in part that highly compensated employees were shifting some of their compensation into the lower tax rate years. Austan Goolsbee (2000) found similar effects for the U.S. tax increase of 1993. Mary-Anne Sillamaa and Veall (2001) analyzed the Canadian tax cut of 1988 by comparing incomes in years 1986 and 1989. Consistent with our results, they found significant and large elasticities for high-income groups. Our top share series, however, shows that their elasticity estimates capture the short-term spike response but likely overstate the long-run response to the tax change.[22]

In order to test more formally that top income share movements in Canada are primarily due to U.S. developments rather than to changes in marginal tax rates in Canada, we estimate simple regression models of the form:

$$\text{Log}(TOP1\%SHARE_t) = \alpha + \varepsilon \, \text{Log}(1 - MTR_t)$$

$$+ \, \delta \, \text{Log}(TOP1\%SHAREUS_t) + u_t$$

where $TOP1\%SHARE_t$ is the share of income received by the top 1–percent earners in Canada in year t, $TOP1\%SHAREUS_t$ is the equivalent U.S. variable, and MTR_t is the average (income-weighted) marginal tax rate applicable to the top 1–percent group in Canada in year t. (We also estimate the corresponding regression for the top–0.1 percent share.) The central parameter is ε, the elasticity of top reported incomes (as a share of all reported incomes) with respect to the net-of-tax rate (defined as one minus the marginal tax rate). (See Saez (2004) for a discussion of identification assumptions.)

Results for these time series regressions are reported in Table 2. The Newey-West procedure (with 8 lags) is used to correct the standard errors for possible heteroskedasticity and serial correlation. Panel A focuses on incomes for the full period 1920 to 2000, while panel B focuses on wage incomes for the recent period 1972 to 2000. Columns 1 and 2 report results for the top 1

---

[22] Sillamaa and Veall (2001) use four years of the same micro-data set used as part of this study. They find much lower tax responsiveness for low-income groups, consistent with the U.S. findings of Jon Gruber and Saez (2002). Robert Gagné et al. (2000) use provincial-level aggregate data over the 1972–1996 period and find a large tax responsiveness for high-income individuals, but only for the 1988–1996 period.

percent, and columns 3 and 4 for the top 0.1 percent. Columns 1 and 3 exclude the U.S. share variable. In that case, the estimated elasticities of income shares with respect to net-of-tax rates are around 0.8 to 1 for incomes and around 2.5 to 3 for wage incomes for the recent period. The reason these elasticity estimates are so enormous is that the entire surge in top wage income shares is attributed to the very modest decrease in Canadian marginal tax rates since 1972. Columns 2 and 4 use the full regression model with the log U.S. income share as an additional independent variable. This has a dramatic effect on the estimated tax elasticities, which drop to around 0.3 to 0.5 for incomes and around 0.2 to 0.3 (not significantly different from zero at the 5-percent level) for wage incomes. The coefficient on the U.S. log income share is large and very significant and would imply that a 10-percent increase in the top U.S. wage income share leads to an 8-percent increase in the top Canadian wage income share. Even if we do not accept such a causal interpretation, the results reinforce our informal analysis and make it clear that Canadian top income changes are much more strongly associated with similar U.S. changes than with Canadian tax developments. This in turn is evidence that U.S. changes are more than changes in U.S. tax reporting behavior.

IV. Conclusion

This paper has used personal income tax data to construct homogeneous series of top income shares in Canada over the course of the twentieth century. A number of important findings have emerged. First, and most striking, are the close parallels between the patterns and composition of top incomes in Canada and the United States. Both countries experienced a sharp drop in top shares during World War II, with no recovery before the 1970s. During the last two decades, however, the top groups have largely recovered their prewar levels. Interestingly, this recent increase in income concentration has not been associated with increased mobility at the top of the income distribution in Canada. Moreover, both countries have experienced the same shift in the composition of top incomes. Today, earners of employment income have, to a large extent, replaced capital income earners at the top of the income distribution in both Canada and the United States.

The Canadian experience may help us understand the role of taxation in explaining the recent increase in top income shares in the United States. Although the drop in marginal tax rates since the 1960s has been much more modest in Canada than in the United States, the surge in top incomes has been almost as large in Canada as in the United States. The analysis of top Canadian incomes is more transparent because it is not plagued with shifts between the personal and corporate sectors, which makes the U.S. results more difficult to interpret. Moreover, the concentration of the surge in the last decade and among only the very top income shares suggests that tax changes in Canada cannot be the sole cause. While clear evidence of short-term responses to taxation can be found in Canada, it could be very misleading to equate such responses to the permanent long-run effects of tax changes.

The surge in top wages in Canada is later and more concentrated within very top groups than in the United States, and is much less pronounced for francophones in Quebec. We suggest that this is evidence in favor of a brain drain explanation: the threat of migration to the United States by highly skilled Canadian executives or professionals may have driven the surge in top wage shares in Canada. This would be consistent with the smaller surge found for the United Kingdom (Atkinson, 2002) and the lack of a surge in France (Piketty, 2003). These international differences are difficult to reconcile with a simple skill-bias technological explanation. In any case, the relationship between the Canadian and U.S. surges suggests strongly that the latter cannot be the consequence of changes in the way U.S. incomes are reported for tax purposes. The remaining puzzle is why such a surge took place in the United States in the first place.

REFERENCES

Acemoglu, Daron. "Technical Change, Inequality, and the Labor Market." *Journal of Economic Literature*, 2002, *40*(1), pp. 7–72.
Atkinson, Anthony B. "Top Incomes in the United Kingdom over the Twentieth Century." University of Oxford, Discussion

Papers in Economics and Social History: No. 43, 2002.

Atkinson, Anthony B. "Measuring Top Incomes: Methodological Issues." Unpublished Paper, 2003.

Baker, Michael and Solon, Gary. "Earnings Dynamics and Inequality among Canadian Men, 1976–1992: Evidence from Longitudinal Income Tax Records." *Journal of Labor Economics,* 2003, *21*(2), pp. 267–88.

Beach, Charles M.; Finnie, Ross and Gray, David. "Earnings Variability and Earnings Instability of Women and Men in Canada: How Do the 1990s Compare to the 1980s?" *Canadian Public Policy*, 2003, *29*(0), pp. S41–63.

Blackburn, McKinley L. and Bloom, David E. "The Distribution of Family Income: Measuring and Explaining Changes in the 1980s for Canada and the United States," in David Card and Richard B. Freeman, eds., *Small differences that matter: Labor markets and income maintenance in Canada and the United States*. Chicago: University of Chicago Press, 1993, pp. 233–64.

Bowlus, Audra J. and Robin, Jean-Marc. "Twenty Years of Rising Inequality in U.S. Lifetime Labour Income Values." *Review of Economic Studies*, 2004, *71*(3), pp. 709–42.

Buchinsky, Moshe and Hunt, Jennifer. "Wage Mobility in the United States." *Review of Economics and Statistics*, 1999, *81*(3), pp. 351–68.

Finnie, Ross. "Leaving and Coming Back to Canada: Evidence from Longitudinal Data." Queen's University, Kingston, School of Policy Studies Working Papers: No. 32, 2002.

Finnie, Ross. "Who Moves? A Panel Logit Model Analysis of Inter-Provincial Migration in Canada." *Applied Economics*, 2004, *36*(16), pp. 1759–79.

Gagné, Robert; Nadeau, Jean-François and Vaillancourt, François. "Taxpayers' Response to Tax-Rate Changes: A Canadian Panel Study." University of Montreal, CIRANO Scientific Series Papers: No. 2000s–59, 2000.

Goolsbee, Austan. "What Happens When You Tax the Rich? Evidence from Executive Compensation." *Journal of Political Economy*, 2000, *108*(2), pp. 352–78.

Gordon, Roger H. and Slemrod, Joel B. "Are 'Real' Responses to Taxes Simply Income Shifting between Corporate and Personal Tax Bases?" in Joel B. Slemrod, ed., *Does Atlas shrug? The economic consequences of taxing the rich*. Cambridge, MA: Harvard University Press, 2000, pp. 240–80.

Gottschalk, Peter. "Inequality, Income Growth, and Mobility: The Basic Facts." *Journal of Economic Perspectives*, 1997, *11*(2), pp. 21–40.

Gruber, Jon and Saez, Emmanuel. "The Elasticity of Taxable Income: Evidence and Implications." *Journal of Public Economics*, 2002, *84*(1), pp. 1–32.

Heisz, Andrew; Jackson, Andrew and Picot, Garnett. "Distributional Outcomes in Canada in the 1990s," in Keith Banting, Andrew Sharpe and France St-Hilaire, eds., *The review of economic performance and social progress: The longest decade: Canada in the 1990s*. Montreal: McGill–Queen's University Press, 2001, pp. 247–72.

Iqbal, Mahmood. "Are We Losing Our Minds?" *Policy Options,* 1999, *20*(7), pp. 34–38.

Katz, Lawrence F. and Autor, David H. "Changes in the Wage Structure and Earnings Inequality," in Orley Ashenfelter and David Card, eds., *Handbook of labor economics*, Vol. 3A. Amsterdam: Elsevier Science, North-Holland, 1999, pp. 1463–1555.

Klassen, Kenneth J. and Mawani, Amin. "The Impact of Financial and Tax Reporting Incentives on Option Grants to Canadian CEOs." *Contemporary Accounting Research*, 2000, *17*(2), pp. 227–62.

Kuznets, Simon. *Shares of upper income groups in income and savings*. New York: National Bureau of Economic Research, 1953.

Kuznets, Simon. "Economic Growth and Income Inequality." *American Economic Review*, 1955, *45*(1), pp. 1–28.

Piketty, Thomas. "Income Inequality in France, 1901–1998." *Journal of Political Economy*, 2003, *111*(5), pp. 1004–42.

Piketty, Thomas and Saez, Emmanuel. "Income Inequality in the United States, 1913–1998." *Quarterly Journal of Economics*, 2003, *118*(1), pp. 1–39.

Saez, Emmanuel. "Reported Incomes and Marginal Tax Rates, 1960–2000: Evidence and Policy Implications." National Bureau of Economic Research, Inc., NBER Working Papers: No. 10273, 2004.

Saez, Emmanuel and Veall, Michael R. "The Evo-

lution of High Incomes in Canada, 1920–2000." National Bureau of Economic Research, Inc., NBER Working Papers: No. 9607, 2003.

Sillamaa, Mary-Anne and Veall, Michael R. "The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1988 Tax Flat-tening in Canada." *Journal of Public Economics*, 2001, *80*(3), pp. 341–56.

Wolfson, Michael C. and Murphy, Brian B. "Income Inequality in North America: Does the 49th Parallel Still Matter?" *Canadian Economic Observer*, 2000, *13*(8), pp. 3.1–3.22.