Issues and Commentaries/ Issues et commentaires

Canadian Inequality: Recent Developments and Policy Options

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Les inégalités de revenus ont fait l'objet d'inquiétudes de plus en plus marquées depuis quelque temps dans le monde. Toutefois, le débat s'est fait en des termes très généraux et a surtout porté sur le cas des États-Unis. On ne peut comprendre comment le Canada devrait réagir à cette situation sans présenter des faits et des chiffres clairs. Dans cet article, nous analysons les tendances des inégalités de revenus, et nous examinons en particulier le groupe constitué par le 1 % des citoyens ayant le revenu le plus élevé – celui dont il est le plus souvent question. Nous résumons ensuite les connaissances actuelles sur les causes des inégalités croissantes de revenus, dont la disparité salariale entre les sexes. Enfin, nous décrivons des politiques publiques qui permettraient de réduire ces inégalités – ou à tout le moins d'en ralentir l'aggravation.

Mots clés : inégalité de revenus, polarisation, transformation technique, régime d'impôt et de transferts, salaire minimums, disparité salariale entre les sexes, syndicats, mondialisation

Considerable concern has recently been expressed worldwide about growing income inequality. Much of the discussion, though, has been in general terms and focused on the US experience. To understand whether and how Canada ought to respond to this development, we need to be clear on the facts. This paper documents Canadian patterns in income inequality and investigates the top 1 percent of earners—the group receiving the most attention. We summarize what is known about the causes of growing income inequality, including the role of gender wage differences. Finally, we outline policy options for reducing—or slowing the growth of—inequality.

Keywords: Income inequality, polarization, technical change, tax and transfer system, minimum wages, gender wage gap, unions, globalization

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The Occupy Movement spread around the world in the summer and fall of 2011. While the movement often seemed muddled in its goals, one message that did come through was a concern with growing inequality. Much of the discussion in the media, though, has been in the most general of terms and largely focused on the US experience. To understand whether and how Canada ought to respond to this potential policy concern, we need to be clear on the facts for this country. In this paper, we document the patterns in overall income inequality for Canada and investigate who makes up the top 1 percent of earners in Canada—the group receiving the most attention in recent debates. We summarize what is known about the causes of changes in income inequality and discuss specifically how gender differences in wages have contributed to changes in earnings inequality. Finally, we outline policy options for reducing—or slowing the growth of—inequality.

Earnings and Income Inequality: The Broad Strokes

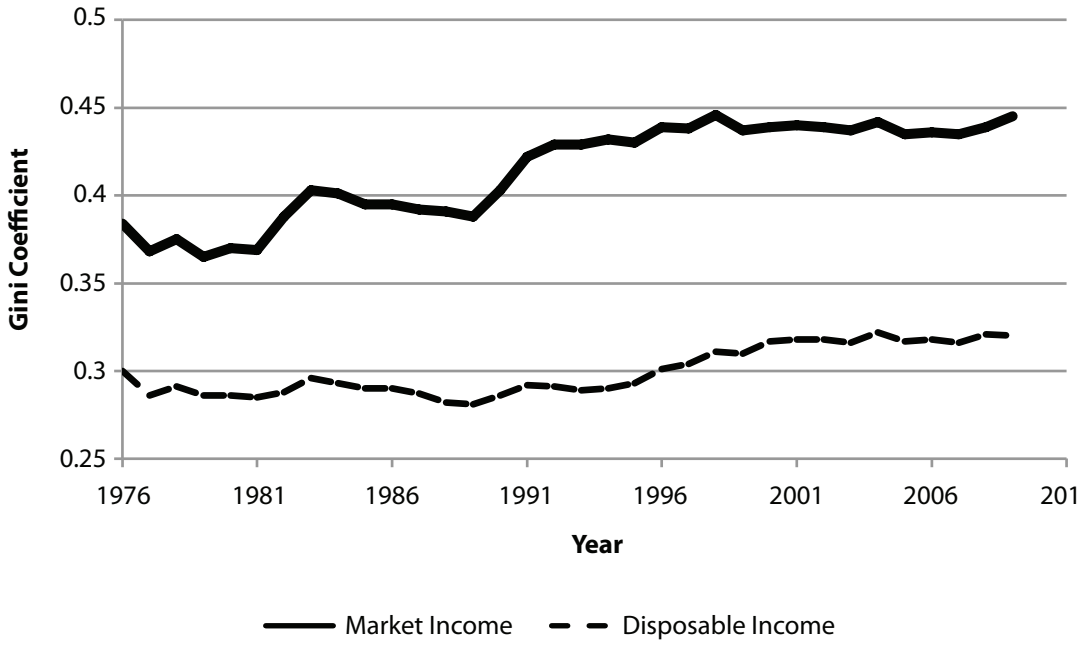
At the outset it is important to note that there are several alternative measures of earnings and income and that the choice of measure can matter for inequality, especially over relatively short time periods. One key measurement difference is that between individual and family income. For some purposes, we will show numbers for what Statistics Canada calls "all family units," which includes "economic families" and unattached individuals.[1] At other points, we will use individual measures, particularly for earnings. Looking across different units of measure is important, because family income inequality can increase even if individual income inequality is constant, due to factors such as increased numbers of singles and lone parents as well as "assortative mating"—high-earning men and women becoming increasingly likely to marry each other.

Another key distinction is between pre-tax and transfer (or "market") income and post-tax and transfer (or "disposable") income. Market income consists mainly of the sum of earnings (from employment and net self-employment), net investment income, and private retirement income. Disposable income is obtained by adding government transfers to market income and then subtracting taxes. The tax and transfer system may offset rising market income inequality, and (as discussed below) appears to have done so in Canada over the 1980s. Likewise, changes in taxes and transfers can contribute to increased disposable income inequality, as appears to have been the case in Canada in the late 1990s. Finally, earnings inequality may result from inequality in wage rates or from differences in hours or weeks worked. In this paper, much of our focus is on labour market earnings, and in particular wage rates (hourly or weekly wages). However, we also examine trends in family income inequality, both before and after taxes and transfers.

The top line in Figure 1 shows the trend in family market income inequality for Canada between 1976 and 2009 using the Gini Coefficient as the measure of inequality. In rough terms, the Gini Coefficient represents the difference between the actual distribution of income and a benchmark in which everyone has the same income.[2] The main disadvantage with the Gini is that it places disproportionate weight on movements in inequality in the centre of the distribution and less at the extreme ends. We use it, however, because it is the most common measure and allows easy comparisons with other countries. In the next section, we present results focusing on the top 1 percent of earners that have been the focus of much of the debate and that are not well captured by the Gini.

The top line in Figure 1 reveals a few key patterns. First, there is no doubt that market income inequality has risen in Canada in the past three decades. The Gini rose from 0.37 to 0.44 between 1980 and 2007, which were both years at the peak of economic booms. This increase implies an 18 percent increase in inequality. To put this trend in more intuitive terms: in 1980 the top 20 percent of

FIGURE 1
Canadian Inequality Trends



Source: Statistics Canada, CANSIM Table 202-0709.

income earners received 45 percent of total income earnings, while by 2007 they received 52 percent.[3]

Second, inequality rises sharply during recessions because it is low-income earners who bear the brunt of bad economic times. This happened in both the busts of 1981–83 and the early 1990s. We might expect inequality to then decline as we come out of recessions, but this did not happen in either the 1980s or '90s. Instead, the level of inequality ratcheted upward over time. In the strong labour market before the downturn in 2008, inequality did decline somewhat but has been rising again in the current slowdown. If recent history is any guide, we could be witnessing another ratcheting up in inequality, though the wage patterns discussed later in this section suggest that the pattern may not repeat itself this time.

The lower line in the figure shows the Gini for after-tax and transfer family income, or disposable income. It is noteworthy how much lower this line is: taxes and transfers really can reduce inequality. In 2009, inequality in disposable income was 28 percent lower than market income inequality. To put the numbers underlying this line in perspective, in international comparisons, Canada stands roughly in the upper middle of the pack of developed countries. Our Gini for disposable income is about 25 percent higher than Sweden's but about 14 percent lower than the US value. Our growth in inequality over the past three decades, though, has been substantial, albeit somewhat less than that in the United States. Between 1980 and 2009, Canada's disposable income inequality grew by 13 percent, while south of the border inequality grew by 17.5 percent (US Census Bureau 2011).

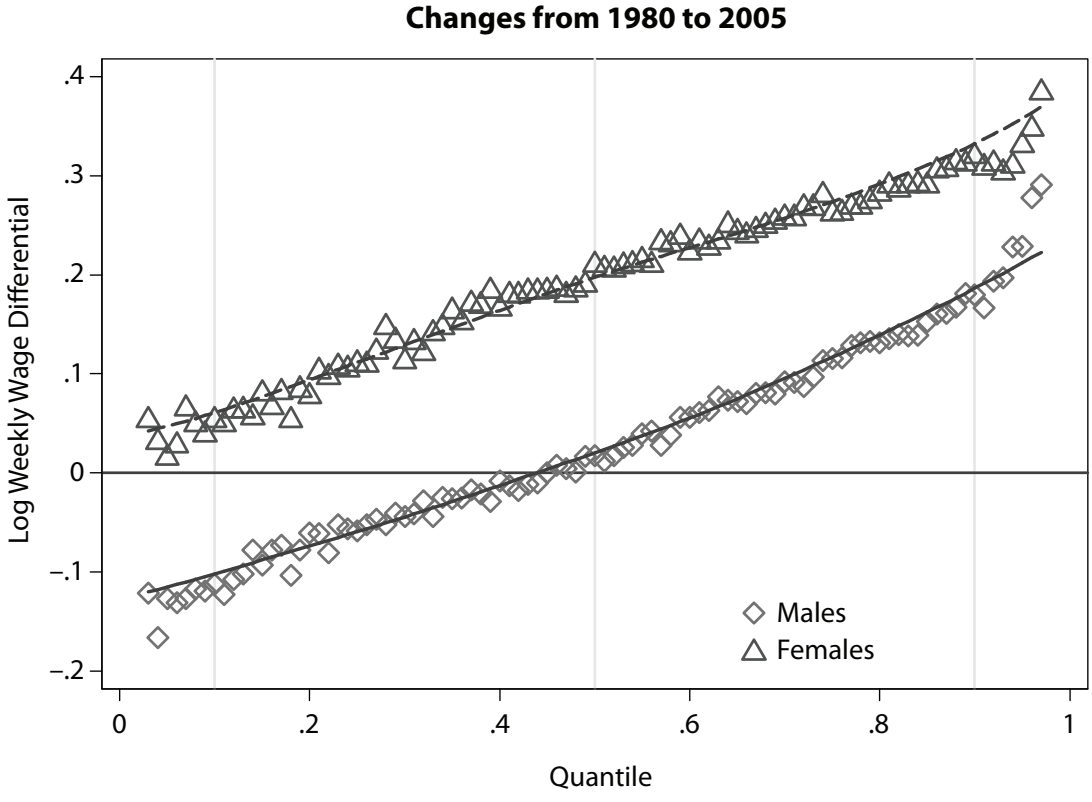
The disposable income line reveals a very important shift in policies affecting redistribution in Canada. Up to about 1990, the line changed very little. Frenette, Green, and Milligan (2009) argue that the increasing market income inequality trend in the 1980s was transposed into a flat disposable income inequality trend because the tax and transfer system became more progressive to match the increasing earnings inequality over the 1980s. That is, the system was not inherently more progressive in the early 1980s; it became so as the tax and transfer system changed from the 1980s through the mid-1990s. Much of these changes happened at the provincial level, as virtually every province increased both social assistance transfers and surtaxes on high earners in the 1980s. But in the mid-1990s the mitigation of pre-tax inequality by the tax and transfer system stopped as these policy trends at the provincial level reversed and disposable income inequality ratcheted up. As a result, in the first part of the past decade, while family market income inequality fell, disposable income inequality rose slightly. For disposable income, the share of the top 20 percent of families rose from 40 percent in 1980 to 44 percent in 2009. One possible conclusion from these patterns is that while taxes and transfers can work to reduce inequality, the political will to address persistent increases in earnings inequality through these policy tools alone may not exist. The real solution must have to do with addressing earnings inequality directly.

Measures of individual earnings also show substantial growth in inequality over the past three decades. Based on recent work by Green and Sand (2011), Figure 2 show trends in the distribution of real weekly wages, separately for men and women, from the 1981 and 2006 Censuses.[4] Among Canadian men, individual earnings declined at the bottom of the wage distribution—by approximately 10 percent at the 10th through to the 25th percentiles, and rose at the top of the distribution—by about 18 percent at the 90th percentile. Over this 25-year period the change in earnings at the 50th percentile (median) was approximately zero. Among women, the growth in individual earnings inequality was similar, though slightly less pronounced. Another noteworthy difference by gender—discussed further below—is that women's wages grew more than those of men throughout most of the distribution. Weekly earnings of females rose by about 5 percent at the bottom of the 10th percentile, by nearly 20 percent at the median and by just over 30 percent at the 90th percentile.

In order to provide insight into recent developments in Canada, we use data from the monthly Labour Force Survey (LFS) that has collected information on hourly wages since 1997. Figure 3a shows changes in the distribution of real hourly wages, separately for men and women, over the period 2000–01 to 2005–06.[5] These changes are similar to those seen in census data over the same time period (not shown here in the interest of brevity); wages increased much more at the top of the distribution than at the bottom for both men and women, and women's wages rose more than those of men. Interestingly, however, some reversal in the trend toward growing inequality is evident in the past five years. This recent period has been characterized by two noteworthy developments, both evident in Figure 3b. The first is the significant growth in real wages—on the order of about 6 percent for men and 8 percent for women over the period 2005–06 to 2010–11. The second noteworthy development—evident for both genders—is the clear tendency for wages to increase more at the bottom of the distribution than at the top. We discuss possible reasons for these developments later in the paper.

One key disadvantage of examining measures of inequality using cross-sectional data is that it necessarily misses dynamics related to the lifecycle. Thus, suppose that all individuals have a profile of earnings that increases over their working lives. A measure of inequality at any one point in time will reflect income differences between older and younger workers. It is not clear, however, that we should be concerned about that inequality—especially if individuals are able to borrow money when

FIGURE 2
Changes in Log Weekly Wage by Percentile

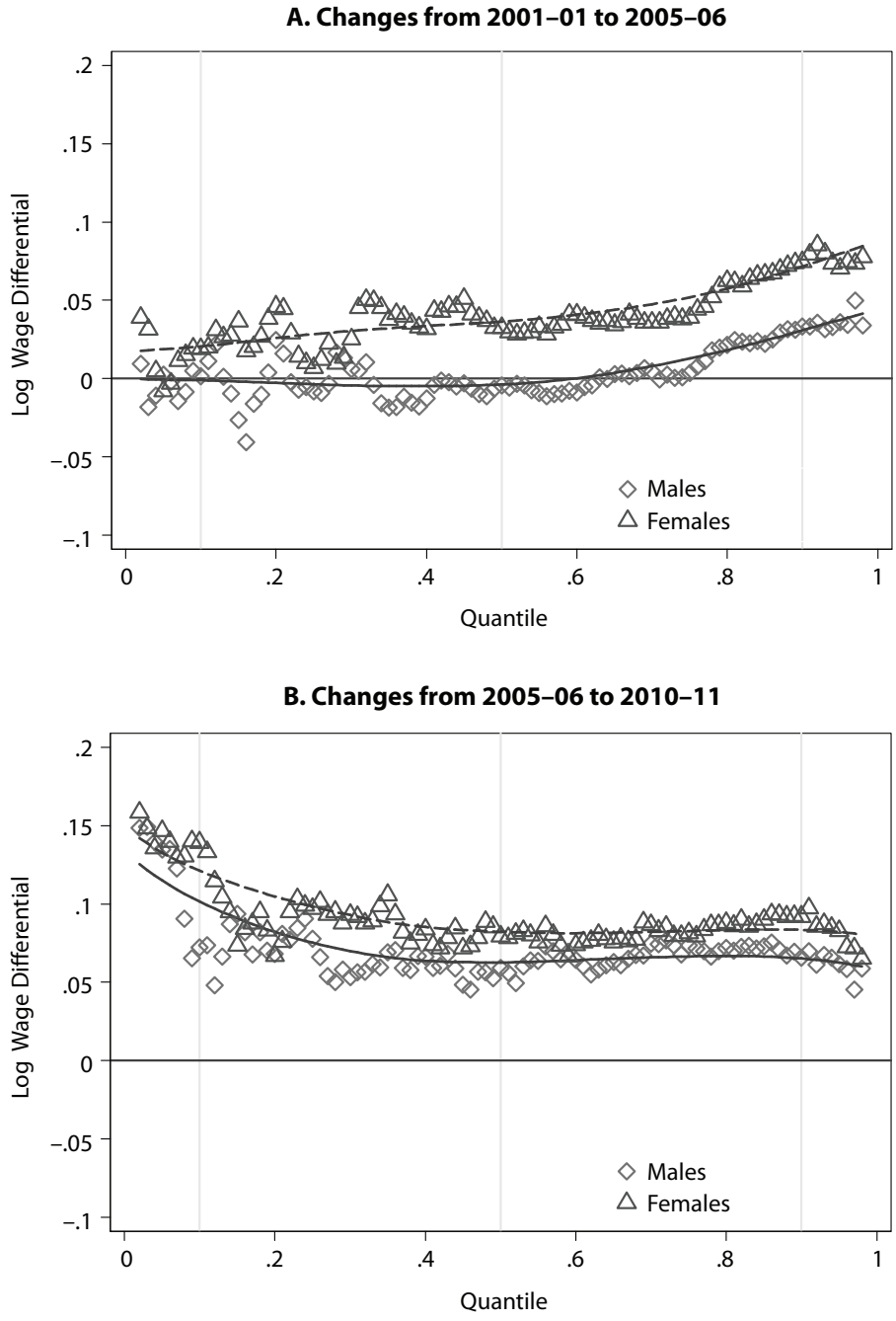


Source: Authors' calculations from census data from Green and Sand (2011).

they are young in order to smooth their consumption across their lifecycle. One potential response to this lifecycle issue is to use data on consumption rather than income (Brzozwski and Crossley 2011) since, theoretically, consumption should reflect "permanent income" (roughly speaking, individuals' average income over their lifetime). Meyer and Sullivan (2011) argue that consumption and income inequality patterns for the United States are very different, though Ottanazio, Hurst, and Pistaferri (2012) conclude the opposite. Furthermore, Bzozwski et al. (2010) show that while the inequality levels are lower for consumption than income for Canada (as one would expect), the trends are very similar. Thus, for Canada at least, the rise in inequality shown here using income measures would also be evident if we were to use consumption data.

Income dynamics matter for our assessment of trends and levels of inequality in another way as well. We could have a different assessment of a society where everyone takes a turn at having a low income versus one with the same cross-sectional level of inequality where people are either persistently poor or persistently rich. Charles Beach (2006) has shown that 18 percent of those in the

FIGURE 3
Changes in Log Hourly Wages by Percentile



Source: Authors' calculations using hourly wages from the Labour Force Survey from 2000–11. Deflated using the monthly CPI series V41690973 from CANSIM.

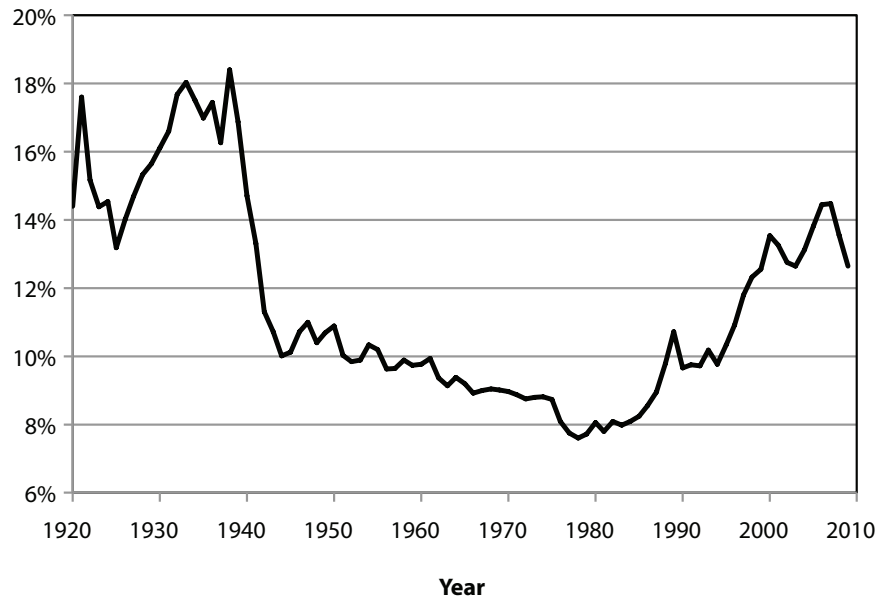
bottom 10 percent in one year are still stuck at the bottom eight years later. This is somewhat reassuring—a strong majority is able to escape the bottom. For those in the top 10 percent, 72 percent of them are still at the top eight years later, and the probability of moving from the middle to the bottom grew during the 1980s and '90s. At the same time, breaking into the top income club got harder. More recent numbers comparing mobility in the late 1990s to mobility a decade later show little change (Statistics Canada 2011). This pattern fits with that in Figure 1, where overall market income inequality rose through the 1980s and much of the '90s but has been relatively level in the first decade of this century.

Taken as a whole, these numbers reveal that the ratcheting up of inequality in Canada is real. Whatever else it achieved, the Occupy Movement shone a light on our growing inequality.

Inequality and the Top 1 Percent

One statistic that has received much attention in the inequality debate is the share of income that goes to the richest, or "top," 1 percent of the population. For the analysis of this statistic, we switch our focus from families to individuals. Figure 4 shows that the concentration of income at the top has increased dramatically over the past few decades (Saez and Veall 2005, updated using data provided by Michael Veall on 4 April 2012). In the late 1970s, about 8 percent of total income in Canada was concentrated in the hands of only 1 percent of the population. In other words, those in the top 1 percent had incomes that were eight times larger than the average income of (all) Canadians. Things have changed dramatically since then. The top income share almost doubled to reach 14 percent in recent years. Such an uneven distribution of income has not been seen since the dark days of the Great Depression, when it reached

Figure 4
Share of Total Income in Canada, Richest 1 Percent



Source: Saez and Veall (2005), updated using data provided by Michael Veall, 4 April 2012.

an all-time high of 18 percent. Thus, it is no surprise that these dramatic figures have been a focal point in recent discussions of whether inequality is reaching socially unacceptable levels in Canada and elsewhere.

But before discussing how we got here and what to do about it, it is important first to demystify just who the top incomes earners are who have done so well lately. In the eyes of many, the culprits are to be found at the very place where the Occupy Movement started: on Wall Street or our own Bay Street. But there are just not enough investment bankers and high-flying stock brokers to fill the ranks of the 275,000 individuals (1 percent of Canada's adult population of 27.5 million) in the top 1 percent.[6] So who else is part of this group?

The now-defunct Long Form Census provides, among other things, comprehensive information on the composition of the top 1 percent (as of 2005). A number of interesting facts emerge from the analysis of census data as reported in Table 1. First, one needs an annual income of at least $230,000 to be part of the top 1 percent. The average income for people in the top 1 percent is $450,000, compared to only $36,000 for the whole Canadian population. Second, we could call the group of top income earners the "brotherhood of top incomes," since a staggering 83 percent of individuals in this top income group are men. So despite the significant gains by women over the past few decades, they remain dramatically underrepresented at the very top of the income distribution. Young people (under age 35) are also underrepresented, though this may be a transitory phenomena linked to the fact they have not yet reach their peak life-cycle earnings.[7]

While Steve Jobs, Bill Gates, and Mark Zuckerberg did not have to complete college to become billionaires, 58 percent of individuals in the top 1 percent do have at least a bachelor's degree, compared to 19 percent university graduates in the adult population. Education is not a substitute for hard work, however, as 52 percent of individuals in the top 1 percent work at least 50 hours a week, compared to less than 20 percent for the overall population. A related statistic is that individuals in the top 1 percent earn 70 percent of their income through work, a smaller percentage than for the overall population for whom the number is over 80 percent. Note that since people in the top 1 percent are typically workers, as opposed to rentiers, one has to consider possible labour supply impacts of increasing their tax rates (an option discussed later in this paper). However, adverse impacts on tax revenues may be limited since labour supply for these workers is likely quite inelastic (Saez, Slemrod, and Giertz 2012).

But besides being mostly educated men, the top income earners are fairly scattered over different sectors of the economy.[8] Wall and Bay Street may have been the focus of much attention, but only 10 percent of people in the top 1 percent work in the finance and insurance industry. Senior managers and CEOs are also overrepresented in the top group but only account for 14 percent of top earners. The other large group of top income earners besides financial professionals and executives are physicians (and dentists and veterinarians), who account for close to 10 percent of top earners, despite representing less than 1 percent of the workforce. Public debates about inequality may not have targeted physicians who, unlike those working in the financial sector, are more generally perceived to make a positive contribution to society. But what these census numbers show is that policy measures such as a new tax on "the rich" would mostly target people who are neither top executives nor financial professionals.[9]

Because top income earners are such a diverse group, it is hard to come up with a simple explanation for the growing incomes at the top end. A reasonable candidate explanation is that, like hockey teams, Canadian corporations have little choice but to pay higher and higher salaries to keep their "top players," who would otherwise be lured away by the

TABLE 1
Characteristics of Top Income Earners (Top 1 Percent), 2006 Canadian Census

	Top 1%	*All Individuals*
Mean income	$452,887	$36,837
Share of employment income	69.9%	82.7%
Men	82.7%	48.4%
Work 50 hours or more a week	52.2%	18.6%
Education		
Less than a bachelor's degree	41.8%	81.0%
Bachelor's degree	28.1%	12.3%
Medicine, dentistry, veterinary	8.4%	0.5%
Other post-graduate degrees	21.7%	6.2%
Age groups		
Under 35	4.5%	28.8%
35–64	79.0%	54.5%
Over 64	16.5%	16.7%
Selected occupations		
Senior management	14.1%	0.9%
Other management	19.1%	6.1%
Professionals in health	11.6%	2.0%
Prof. business and finance	7.1%	1.8%
Selected industries		
Mining, oil, and gas	4.6%	1.0%
Finance and insurance	10.0%	3.0%
Prof., scientific, and technical	15.8%	4.9%

Note: Authors' calculations based on the public use files of the 2006 Census. Sample size is 656,884 individuals age 15 and above. The 99th percentile of the income distribution is $230,000. The "top 1 percent" includes all individuals earnings $230,000 and more. The "selected" occupations and industries are those with the highest fraction of workers in the top 1 percent.

ever-growing salaries across the border. This leads to the next obvious question: Why have incomes at the top grown so much in the United States? In the case of CEOs and top executives, one frequently mentioned explanation has to do with flaws in corporate governance (Bertrand and Mullainathan 2001; Bebchuk and Fried 2004; Piketty, Saez, and Stantcheva 2011). In the case of the financial industry, weak regulation by US agencies has also been implicated (Bebchuk and Spamann 2010). But since most individuals at the top are neither executives nor financiers, the sources of increasing inequality have to be found elsewhere. In the next section, we examine some possible driving forces.

Forces Driving Income Inequality

In this section, we consider several possible explanations for the increases in inequality documented in the previous two sections. Starting with education and age, we move on to the impact of technological change and the related "off-shoring" of work. This set of factors is fairly common across developed

countries. We also consider institutional explanations that vary more strongly across countries, such as minimum wages and the role of unions.

Education is widely recognized as a significant factor in determining future earnings. And changes in the role of education have been important in driving up inequality—though less dramatically in Canada than in some other countries. For Canada, in 1980, men with a university bachelor's (BA) degree earned 32 percent more than those with a high school (HS) diploma, after controlling for differences in work experience (Boudarbat, Lemieux, and Riddell 2010). By 2005 that gap had increased to 40 percent. Wage differences widened among all educational groups—high school dropouts versus graduates, college and trades versus high school, and those with post-graduate degrees versus high school graduates. Earnings differences by education are even larger among women but have grown less quickly. The BA-HS gap for women, for example, increased from 45 percent to 51 percent between 1980 and 2005**.**

An even more important factor in Canada has been the dramatic widening of the wage gap among different age groups (Beaudry and Green 2000). Most of this widening occurred during the 1980s and early '90s—two periods in which Canada experienced severe recessions—and has stabilized somewhat subsequently (Boudarbat, Lemieux, and Riddell 2010). In both recessions, new labour market entrants fell behind more experienced workers, and never caught up. High-school educated men beginning a job in the mid-1990s had a starting wage over 20 percent lower than in 1980, after accounting for inflation. In the better labour markets beginning in the late 1990s, wages for new job starters improved, but by the start of the recent recession they were still earning more than 10 percent less than 1980s' new job starters (Green and Townsend 2010). Younger workers, especially those with limited education, face a world with worse earnings prospects than their parents' generation. These changes are not immediately evident in overall inequality numbers (see, for example, Figures 2 and 3) because older, higher tenure workers have maintained their real wages over time. The implication is that as the older cohorts retire, average wages will fall, and overall inequality could increase further.

What accounts for these dramatic changes in Canada's wage structure? One factor that has received much attention among economists is technological change, especially advances in information and computer technologies.[10] Those advances have meant an increase in the demand for well-educated workers, pulling up their wages, and reduced demand for the less skilled. Although technical change need not be biased in favour of skilled workers, most technological advances in the twentieth century appear to have resulted in increases in the demand for skilled relative to unskilled labour (Goldin and Katz 2008). The information and communications technology revolution has also made it easier for firms to outsource production to low wage countries. That has meant cheaper goods for consumers but is also another force reducing demand for low wage workers. At the same time, increased exports have tended to positively affect high wage workers.

Although the "skill-biased technical change" hypothesis appeared to be able to account for the dramatic rise in inequality in the United States in the 1970s and '80s, problems emerged with this explanation for inequality in the 1990s (Card and DiNardo 2002; Beaudry and Green 2005). In the United States, inequality grew much less in the 1990s—puzzling because, according to most indicators, technological change was more rapid than in the previous decade. In addition, the nature of wage inequality changed in the United States in the 1990s, with inequality continuing to increase above the median wage but growth in inequality slowing or even reversing below the median.

At the same time, new research on the impacts of the adoption of computers on the workplace has

suggested that the consequences are more complex than the simple "skill-biased technical change" view implies (Autor, Levy, and Murnane 2003). Computers are especially suited to carrying out "routine tasks" based on well-defined rules and procedures—think bookkeepers and some manufacturing jobs. Computers are much less suited to tasks requiring personal interactions—such as those performed by barbers and baristas—as well as non-routine analytical and interactive tasks such as those performed by scientists, engineers, and managers. Research based on this "routinization" view concludes that the occupations in the middle of the wage distribution are most adversely affected by computer adoption—resulting in a "polarization" of the workforce, with fewer jobs paying a "middle-class wage" and greater employment at the top and bottom of the distribution (Goos and Manning 2007; Autor, Katz, and Kearney 2008).

This polarization in employment outcomes has also been documented in the Canadian setting. Green and Sand (2011) show that from 1980 to 2005, the share of employment accounted for by high wage, high skill jobs increased relative to middle and low wage jobs, while the employment share of the lowest paid jobs increased slightly or remained stable. Jobs in the middle of the occupational wage distribution experienced declining shares of total employment. This pattern of "hollowing out" of the occupational employment structure was also found in the United Kingdom by Goos and Manning (2007) and in Germany by Dustmann, Ludsteck, and Schonberg (2009). Along with this polarization in employment outcomes, the occupational wage distribution in Canada displayed continued growth in inequality over this 25-year period. Wages at the top of the occupational wage distribution increased relative to those in the middle, and wages in the middle grew relative to those at the bottom, which declined in absolute as well as relative terms (see Figure 2). This pattern of polarization in employment outcomes but growing inequality in wages contrasts with that observed in the United States but is similar to patterns observed in the UK and Germany. As noted by Green and Sand (2011) these Canada-US differences in wage inequality and polarization remain a puzzle to be addressed by future research.

This more nuanced "routine-biased technical change" view appears to be able to account for the polarization of wages and employment in the United States and the polarization of employment in Canada and some European countries. A competing—though perhaps complementary—explanation is off-shoring. Many of the tasks that can be carried out by computers can also be readily executed in other countries with lower wages. Using measures of the "off-shorability" of occupational tasks, Firpo, Fortin, and Lemieux (2011) find evidence that this factor played an important role in the polarization of the US wage structure since the 1990s.

Explanations based on technical change as well as increased trade and openness in the world economy focus on the demand side of the labour market. However, developments on the supply side can also play important roles. For Canada, educational wage differentials increased much less than in some other countries, especially compared to the United States where these widened dramatically beginning in the 1980s. Several studies conclude that the Canada-US difference in this source of wage inequality was due to the much more rapid growth of post-secondary enrolment, and especially to university graduates, in Canada than in the United States (Freeman and Needels 1993; Murphy, Riddell, and Romer 2008). However, other studies conclude that differences arise from interactions of skill supply with endogenous choices of technology (Beaudry and Green 2005).

The other set of driving forces that economists have studied are institutional factors—particularly minimum wages and unionization. Minimum wages compress the wage structure at the bottom of the distribution, and countries that impose high minimum wages (relative to the average wage)—such as many

European countries—tend to have less earnings inequality than does Canada. Studies by DiNardo, Fortin, and Lemieux (1996) and Lee (1999) conclude that the decline in the real value of the minimum wage in the United States during the 1980s played a major role in the rise in wage inequality during that decade, especially among women. Autor, Manning, and Smith (2010) recently reassessed the impact of minimum wages using a model that accounts for potential spillover effects. They found sizable effects of the declining real value of minimum wages over the 1980s on the growth of lower tail inequality.[11]

In Canada, minimum wages have changed substantially in real terms and relative to the average wage in recent decades. Fortin and Lemieux (2000) provide striking graphical evidence of the significant impact that the minimum wage had on the shape of the bottom end of Canada's wage distribution. The impact was greater in the mid-1990s than during the '80s because both the value of the minimum wage relative to the average wage and the proportion of hours worked at the minimum wage increased over this period. Minimum wages are particularly important as a wage floor for women and young workers. Since the mid-point of the last decade, there have been noteworthy minimum wage increases in virtually all provinces, with particularly large increases since 2008 (Lemieux 2011).[12] We speculate that these upward adjustments have contributed to the large increases in real wages for both men and women at the lowest percentiles of the distribution in Figure 3b.

Unions also influence the wage structure, and changes in the extent of unionization have been linked to movements in wage inequality. Card, Lemieux, and Riddell (2004) analyze the relationship between unions and wage inequality in Canada, the United States, and the United Kingdom over the decades of the 1970s, '80s, and '90s for the US and the 1980s and '90s for Canada and the UK. During this period, unionization declined in all three countries, with the greatest drop being in the UK and the smallest decline in Canada. Wage inequality rose in all three countries, with the largest growth being in the UK and the smallest in Canada. The analysis of Card, Lemieux, and Riddell indicates that this correlation between the magnitude of the decline in unionization and the growth in inequality is no coincidence. At the same time, the relationship between union coverage and wage inequality is complex and need not always point in the same direction.

Unions have two offsetting effects on wage inequality. First, they create a gap between unionized and otherwise similar workers in the non-union sector—the union–non-union wage differential. This "between sector effect" is inequality increasing. At the same time, unions often compress the earnings distribution within the union sector by raising wages proportionately more at the bottom of the wage distribution than at the top. This "within sector effect" is inequality reducing. Freeman (1980) was the first to use microdata on individual workers to examine the magnitude of these effects. He found that for US men, the "within sector effect" dominated the "between sector effect," so the net impact of unions was to reduce inequality among US men. Card, Lemieux, and Riddell (2004) find this result continues to hold in all three countries throughout the 1980s and '90s.

Another important factor that influences the relationship between unionization and wage inequality is the part of the wage distribution that is most likely to be unionized. In all three countries, male union coverage is greatest in the middle of the wage distribution and relatively sparse at the top and the bottom of the wage distribution. This latter factor limits the inequality-reducing impact of unions. By compressing the wage structure, unions tend to raise the wages of those at the bottom of the distribution relatively more than those in the middle or top. But at the bottom of the distribution, fewer workers are represented by unions, reducing the magnitude of this inequality-reducing effect.

Interestingly, in all three countries, unions do not reduce (or increase) wage inequality among women. The gender differences arise for three principal reasons. First, unions raise female wages relatively more than those of men, so the "between sector effect" is larger in all three countries. Second, unions do not compress the female wage structure—they raise women's wages by about the same amount at the bottom as at the top of the wage distribution. Third, union coverage among women tends to be high in the middle and at the top of the wage and skill distribution, and (as for men) low at the bottom of the distribution.

Thus unions can contribute to lower earnings inequality, but whether they do so—and the magnitude of their impact—depends on several factors. Most important are the size of the union–non-union wage differential, the extent to which the union wage distribution is compressed compared to the non-union wage distribution, and the extent to which union members tend to be drawn from the bottom, middle, or top of the wage and skill distribution. For Canada as a whole, Card, Lemieux, and Riddell (2004) attribute about 15 percent of Canada's growth in inequality during the 1980s and '90s to declining unionization**.** For the United States and the United Kingdom, where the decline in union coverage was much more dramatic, more than 20 percent of the rise in inequality is attributed to deunionization.

Recent work (Beaudry, Green, and Sand, forthcoming) suggests that union effects may spread beyond these direct effects through spillovers onto non-union wages. Using data for US cities, th authors show that for workers of a specific skill level (e.g., with a high school education) in a given industry (e.g., construction), wages are higher in cities where the industrial composition of the rest of the labour force is disproportionately in high wage jobs (for example, in cities with steel mills instead of textile mills). They show that the data patterns are in strong accord with a bargaining model in which workers in all industries benefit from having high paid jobs in the city because they are able to bargain a higher wage for their own job. The same logic applied to the presence of unions would imply strong spillover effects of unions—perhaps raising the average wage by as much as two to three times what is calculated from direct effect estimates. Thus, the decline in unionization may have an even more substantial effect than what was described above.

Taken together, these forces paint a somewhat bleak picture of a loss of solid paying jobs to a combination of technological change, outsourcing, and declining unionization. The young and poorly educated have borne the brunt of these forces, but significant numbers of those previously in the middle and lower middle of the occupational skill and wage distribution have also been adversely affected. Looking ahead, many pundits have predicted a "golden age" for today's youths as the massive baby boom generation retires. Certainly demographic factors will lead to improved opportunities for some, especially the well educated. But others will unavoidably be left behind, which calls for possible policy responses that we discuss in the last section.

At the same time, it is important to recognize forces operating to reduce inequality. A key factor is the gradual narrowing of the gender wage gap.

Gender and Wage Inequality

Against this backdrop of changes in earnings inequality, we may wonder if there is some previously disadvantaged group of workers that have improved their lot. In this knowledge-based economy, where the demand for skills and higher education has been increasing, aren't women particularly well placed to take advantage of these changes?

Over the past 40 years, women have increased their participation in the labour market from 58 percent in the early 1980s to 74 percent in 2011. Among prime-age workers (25–44 year olds),

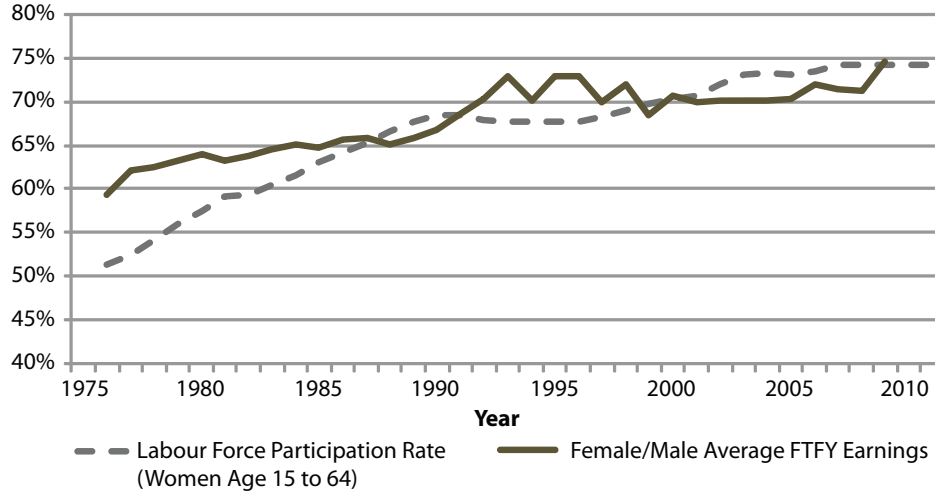
gender differences in the labour force participation rate are now in the single digits. Thanks to more generous maternity leave benefits, more new mothers are able to maintain a stronger attachment to the labour market (Baker and Milligan 2008), which bodes well for continued wage growth over their lifecycle. Women now make up close to 60 percent of university enrolments, while in 1976 they represented less than 45 percent of enrolees. The proportion of women aged 20–24 attending university continues to increase faster than for men: from 17.5 percent in 1997 to 23 percent in 2010, an increase of 5.5 percentage points. The corresponding proportion for men increased from 14.2 percent to 17.8 percent, a rise of 3.4 percentage points.

Furthermore, to the extent that women are more likely than men to work in the wider public sector, in the education and health sectors in particular, women were less likely to suffer from the decline in private sector unionization (Baker and Fortin 1999; Card, Lemieux, and Riddell 2004). Since women are less likely than men to work in the heavy manufacturing sector, they are also less affected by the decline of manufacturing jobs (e.g., in the Ontario auto industry) coming either from increased automation or from overseas competition. Many men displaced from well-paid manufacturing jobs have joined the ranks of the personal services sector once mainly occupied by women (Fortin and Huberman 2002). As with women, more men are now minimum wage workers, although the effect of the growth of the personal service sectors on lower end wage inequality has been mitigated by the sustained increase in minimum wages in most provinces since 2005 (Lemieux 2011). The implication from all of this is that the polarization in the Canadian labour market has mainly been a male phenomenon. Combining the wage changes shown in Figures 3a and 3b, we find that from 2000 to 2011, male wages from the third decile to the sixth decile of the wage distribution increased by about 5–6 percent, while female wages increased by about 12 percent. Wage increases in the bottom decile were similar for both men and women at about 11–12 percent. The numbers for the top decile were also in a similar range, 10 percent for males and 15 percent for females. Thus the workers who experienced the lowest wage increases over the first decade of the twenty-first century were men in the middle of the wage distribution.

Given that women are less likely to fall victim to the forces that are hollowing out the middle of the male wage distribution and that they are becoming more educated than men, their earnings should be on the rise relative to men's. This is indeed the case, though this is not always easy to see in the most traditional measure: the female/male average earnings ratio among full time, full year (FTFY) workers, which does reveal the gains of women at the top and the bottom of the wage distribution, shown in Figures 2 and 3. As shown in Figure 5, the timing of the progress in that gender pay ratio pretty much follows the path of increases in women's participation rate, with substantial progress from a ratio below 60 percent in 1976 to 73 percent in 1995, and much less progress after that. This pattern has led some researchers (Mulligan and Rubinstein 2008) to argue that most of that progress has come from improvements in the qualifications of women who choose to enter the labour market rather than from actual decreases in labour market discrimination.

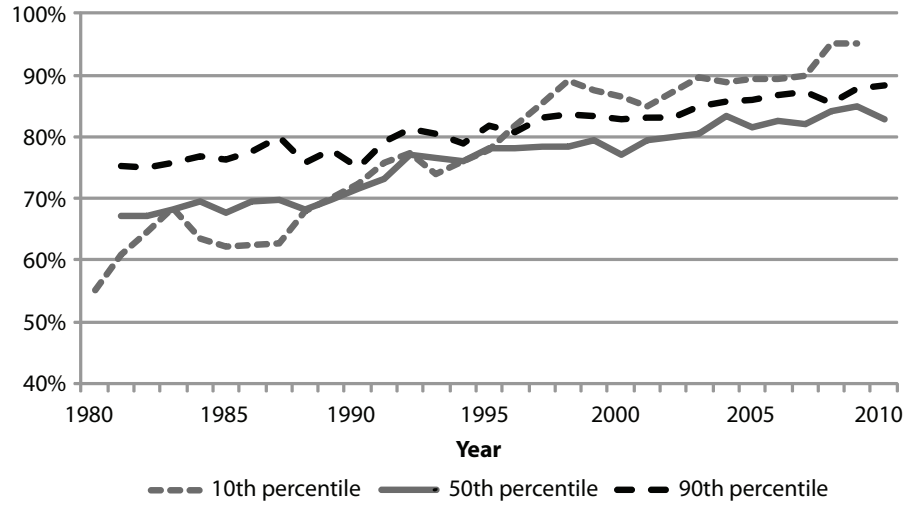
The transformation of women's work is the lot of highly educated women, not of women in the middle of the wage distribution. The latter, like their male counterparts, did not see much improvement in their real wages over the past three decades. As shown in Figure 6, from 1995 onwards the gender pay ratio is actually less favourable for middle wage workers (50th percentile) than for workers at the top of the wage distribution (90th percentile) or at the bottom of the wage distribution (10th percentile). In the two latter cases, it is approaching or even exceeding 90 percent. To some extent the similarity at the bottom is induced by the minimum wage. From 1997 to 2010, women across the wage distribution experienced larger wage increases than men, but these increases were smaller in the middle of the wage distribution. Thus the polarization of

FIGURE 5
Women's Labour Force Participation and Gender Pay Ratio



Source: Authors' calculations from the following CANSIM series: V2461672, the participation rate of females, 15 to 64 years; V1542060 and V1542064, the average earnings of full year, full time workers, females and males, respectively.

FIGURE 6
Female-to-Male Hourly Wage Ratio



Source: Hourly wage calculated from the Survey of Consumer Finances 1981–82 and 1984–97 and from the Labour Force Survey from 1997–2011. In the SCF, the hourly wage ratio is computed for a restricted sample of workers who report being with the current employer for more than one year.

the wage distribution has led to unequal improvements in the relative position of women across the wage distribution.

How these gender patterns translate into family income depends on who marries whom. Before the 1970s, women used to "marry up" in terms of education levels, such as a female nurse marrying a male doctor. But subsequent decades saw substantial increases in "educational assortative mating," where women and men tend to choose spouses of a similar education level (Schwartz and Mare 2005). Interestingly, women with less education have been particularly affected by these changes, as their odds of marrying up have declined substantially. This phenomenon tends to increase family income inequality, particularly since there has been an increase in the number of "power couples" without children (Fortin and Schirle 2006).

Examination of the gender patterns reveals two important lessons on the trends in inequality. First, within-family analysis uncovers different patterns than can be observed looking only at family-level inequality trends. Second, the trends in inequality are not all in one direction: women have fared better than men, although the effect varies across the earnings distribution for women as well.

Policy Options for Redressing Inequality

In this section, we consider a set of policy responses to the growing inequality that we have documented above, keeping in mind the potential explanations for the growth in inequality. The list is not intended to be exhaustive but, rather, indicative of potential policy directions. We consider two sets of policies. The first set attempts to change the after-tax income distribution by using the tax and transfer system to moderate the trends in market income inequality. The second set instead attempts to influence directly the pre-tax distribution of income.

One way to affect the inequality of after-tax incomes is to leave the labour market alone and try to use the tax and transfer system to achieve the desired distribution of incomes. There are two fronts to consider: increasing taxes at the top and increasing transfers to those at the bottom. Because about one-third of Canadian tax filers do not pay income tax, this greater redistribution to the bottom might take the form of refundable tax credits.[13]

The first option to consider is a substantial increase in the tax on high-income earners. During the recent NDP leadership campaign, Brian Topp proposed a new 35 percent federal tax bracket for those with incomes over $250,000. While Topp was unsuccessful in the leadership bid, his proposal did resonate with many voters, so is worthy at the very least of analysis as a benchmark. In what follows we use British Columbia tax rates as our example.

The top 2012 federal bracket starts at taxable income of $132,406. Income above that level is taxed at 29 percent. A new tax bracket at 35 percent starting at $250,000 wouldn't actually hit many Canadians—fewer than 1 percent of tax filers earn more than $250,000, and the tax on taxable income under that threshold would not change. More than 99 percent of Canadians would thus see no change under such a proposal. Given a top provincial tax rate in British Columbia of 14.7 percent, the combined federal-provincial top rate would be 49.7 percent instead of 43.7 percent with the six-point change to the federal top rate. This is not out of line with other jurisdictions: the top rate in the UK is 50 percent and the proposed top rate for 2012 in California is 46.3 percent. For those with longer memories, the top rate in Canada 40 years ago in 1971 was 80 percent.

Data from the Canada Revenue Agency (2011) show that 182,410 individual taxable returns filed in 2009 had income over the $250,000 threshold. These returns reported about $93.6 billion in taxable income in total, meaning that $48 billion was

above the $250,000 threshold. A tax increase of 6 percentage points on this base would yield about $2.9 billion in revenue, if taxable income remained unchanged.

However, the literature on the sensitivity of taxable incomes to tax rates warns that the tax base is unlikely to remain unchanged. Saez, Slemrod, and Giertz (2012) review the literature on the elasticity of taxable income both empirically and theoretically and describe several reasons why we might expect some erosion of the tax base when faced with higher tax rates. The traditional argument comes from a decline in labour supply: top earners might choose to work a bit less. Evidence suggests, however, that labour supply of top earners is largely unaffected by taxation. It is possible that "alpha person" professionals and executives in the top 1 percent may be more motivated by staying at the top of their field than by the impact of a couple of tax points.[14]

A bigger concern than changes in labour supply is that top earners will put more effort into finding legal ways to avoid the higher tax burden by shifting their incomes around and using other loopholes devised by their tax advisors.[15] This avoidance behaviour decreases taxable income and reduces the total new revenue raised by a higher rate. Of course, if tax loopholes are the problem, the most direct solution may be to attempt to close those loopholes. However, solutions along these lines would involve a wholesale and tight redesign of the entire corporate and personal tax system that would require tremendous political will to achieve and maintain. Still, on the margin, closing tax-avoidance opportunities is an important option to consider.

With even a modest behavioural response, the impact of higher tax rates can be substantial. While estimates vary, Saez, Slemrod, and Giertz (2012, 42) suggest that a range of 0.12 to 0.4 for the elasticity of taxable income on average is reasonable—although for high earners it is likely to be substantially higher. With an elasticity of 0.2, more than one-third of the $2.9 billion in potential revenue from a new top federal bracket of 35 percent would disappear. By the time one approaches a higher-end elasticity of 0.6, any potential extra revenue is entirely counteracted by induced decreases in the tax base.[16] These calculations suggest that even a fairly large increase in the top marginal tax rate would yield at best a small increase in tax revenues.

The modest revenue haul from higher tax rates at the top does not on its own mean that higher tax rates for high earners have no merit. Instead, if one starts from the question of how the overall tax burden in society should be shared, it is not unreasonable to come to the conclusion that those who have seen great gains should bear more of the burden. Diamond and Saez (2011) argue forcefully that if society doesn't value very highly an extra dollar of consumption for those at the top, then the right goal for tax policy at the top is to push the tax rate up to the point where revenues are maximized. This argument would suggest much higher tax rates in Canada. With an elasticity of 0.2, the revenue-maximizing tax rate would be 75 percent, but if the taxable income elasticity were 0.6, the revenue-maximizing rate would be 49.5 percent.[17] In this way, the scope for raising top rates above today's prevailing rates relies to a large extent on beliefs about the elasticity. But even at the upper end of the likely elasticity range, the Diamond-Saez analysis suggests that an increase in top rates to around 50 percent could be appropriate.

A second option to change after-tax incomes through the tax and transfer system is increasing transfers to those struggling at the bottom. Cutting income tax rates in the bottom bracket doesn't do much to help, since the basic exemption and other tax preferences mean that few low-income earners actually pay income tax. Adjustments to provincial social assistance rates could help some people at the very bottom. A more broadly based intervention would be to enhance our system of refundable tax credits. As examples, think of the HST/GST credit,

the Canada Child Tax Benefit, or the Working Income Tax Benefit: these payments can be targeted by family income to make sure they help those in the parts of the income distribution most in need. A large volume of research tells us that well-designed tax credits can enhance employment prospects and improve the well-being of lower income families.[18] A downside of our current system is the confusing mess of overlapping federal and provincial programs. However, that does not change the strong case for using well-designed, targeted income transfers to improve the progressivity of our system.

The largest problem with this approach is its cost. Total federal spending on refundable credits for families with children is $13.2 billion; if one also included non-refundable credits, this figure would be even larger. By increasing spending on these lower income families (not to mention expanding beyond families with children), any extra revenue from a new higher tax bracket on the top earners would be used up very quickly. More taxes would then have to be levied on those below the top 1 percent in order to fund a substantial increase in such transfers. While increasing tax credits to low-income families may well be a desirable policy, revenue gained from higher earners will only fund a moderate expansion.

Our analysis in the preceding sections, however, finds evidence of the "hollowing out" of the middle of the earnings distribution. To the extent that this factor is driving total inequality, it would be hard to remedy it through the tax and transfer system. More appropriate policy tools for this purpose would try to influence the pre-tax distribution of income. For that, we turn to some institutional policy proposals.

As discussed previously, technical change and globalization of production appear to be major factors contributing to the growth in wage inequality. These forces result in growing demand for more skilled workers, and thus upward pressure on employment and wages in the upper part of the occupational wage and skill distribution. They also tend to reduce employment opportunities in the middle and lower middle of the occupational wage distribution and lead to lower wages in the bottom half of the earnings distribution. Investments in human capital—education, training, and skill formation—represent a key potential policy lever for offsetting these pressures. Investing in additional education, for example, increases the supply of highly skilled workers and reduces the supply of the less skilled, which might be expected to reduce inequality by lowering the wages of the former and increasing those of the latter. This, indeed, is what Goldin and Katz (2008) claim when they employ the metaphor of a "race between education and technology." However, Beaudry and Green (2003, 2005) argue that the data in Canada, the United States, and Germany fit with a model of technological change in which firms can choose between using more or less skill-intensive technologies. In that model, an increase in the supply of skilled labour induces more firms to choose the high skilled intensive technology, effectively reducing the demand for low skilled workers. Under conditions that they show hold for these countries, the increase in skilled labour supply can in fact generate an increase in skilled wage differentials.

As noted previously, Canada has performed reasonably well in generating new skills—for example, the portion of the labour force with a university degree approximately doubled during the 1980s and '90s. What this did to inequality, though, requires careful observation. As Boudarbat, Lemieux, and Riddell (2010) show, skilled wage differentials for all workers increased little in the 1980s, when the biggest increase in skill supply occurred. However, once we control for shifts in age composition, a stronger increase in skill differentials is evident in a decade when the supply of new university graduates (who should have been most directly affected by the supply shift) increased substantially. This outcome implies some caution is required in thinking about education as an inequality reducing policy. There are good economic growth and social inclusion reasons for investing in education, but under

some conditions, doing so may actually exacerbate inequality. Whether those conditions currently hold for Canada is worth studying.

The evidence discussed earlier of growing polarization in employment outcomes also points to the need for a flexible education system, one that can move resources out of areas with declining opportunities and into ones with growing demand. In this rapidly changing environment it is also important to have high quality and up-to-date labour market information so that individual students and educational institutions are less likely to make investments in fields with declining opportunities.

At the bottom of the education distribution (where the general equilibrium effects discussed in Beaudry and Green (2003, 2005) may not arise to the same extent), progress has been made in the past several decades in raising high school completion. Nonetheless, Canada's high school dropout rate remains high by international standards, especially given the substantial investments we make in elementary and secondary schooling (Riddell 2007). Furthermore, the wage gap between those with less than high school and high school graduates remained substantial during the 1980–2005 period as studied by Boudarbat, Lemieux, and Riddell (2010)—a gap of approximately 15 percent for men and 20–25 percent for women. This gap suggests that we are not winning the race at the bottom of the education distribution, and, in the case of women, are losing some ground. Riddell (2007) discusses a variety of interventions designed to raise secondary school completion rates, from increasing the compulsory school attendance age to improved programs in secondary school for those at risk of dropping out. Such interventions offer the potential of improved lifetime outcomes for the affected individuals, as well as less inequality.

Institutional developments in the labour market also play an important role in wage inequality, and these features can be influenced by public policy. From the existing evidence it is clear that increases in minimum wages act to reduce inequality in the wage distribution. For the most part, that effect seems to occur from a truncation of the wage distribution and the creation of a spike right at the minimum wage. There is only limited evidence of minimum wage changes having an impact on the part of the wage distribution just above the minimum wage.

Whether the minimum wage is an effective tool for addressing income inequality depends partly on its impact on individual earnings and partly on the income of the families in which minimum wage earners live. The impact on total earnings depends on whether effects in increasing wages are more than offset by declines in employment for the least skilled. On this latter point there is more contention, but most estimates imply relatively small elasticities.[19] In a simple model, an increase in the minimum wage will lead to an increase in income to those affected by the minimum wage if the elasticity of demand is less than 1 in absolute value. Dube, Lester, and Reich (2010), who provide probably the most plausible set of minimum wage estimates currently available for the United States, generate an implied elasticity of demand for teenagers of approximately –0.7. This figure implies that an increase in the minimum wage would lead to an increase in total wages going to teenagers. Hamermesh (1993) argues that the consensus estimate for the elasticity of demand for all workers is –0.3, which is confirmed in recent work by Beaudry, Green, and Sand (forthcoming). This estimate again implies an overall increase in the wage bill as a result of a minimum wage increase. The estimate also provides a lower bound on the elasticity for groups directly affected by the minimum wage. In more complex models of the labour market, a minimum wage effectively prices out firms that use a low wage/high turnover employment strategy (Boadway and Cuff 2001; Brochu and Green 2011). As a result, jobs become harder to find but are better paid and longer lasting once found. The net impact on worker welfare is uncertain. Overall, it appears that raising minimum wages can help reduce inequality at

the very bottom of the distribution, and the size of related dis-employment effects suggests it may be a useful tool in affecting total earnings, but there is room for debate on the latter point.

Even if minimum wages raise individual earnings, they may have little (or even a negative) effect on family income inequality if minimum wage earners are mainly teenagers from rich families. Fortin and Lemieux (2000), using Canadian data for 1988 and 1995, show that approximately 44 percent of minimum wage earners live in families whose incomes place them in the lowest three deciles of the family income distribution. The authors conclude that minimum wage earners are not disproportionately rich teenagers. But they also conclude that the net impact of a minimum wage change on the family income distribution is small: this policy tool may work in the desired direction, but one would not want to rely on it solely or even to a large extent to reduce overall inequality.

The decline in union coverage since the mid-1980s also contributed to rising wage inequality, especially among men. Unionization fell less in Canada than in the other Anglo-Saxon countries—Australia, New Zealand, the United Kingdom, and the United States. Nonetheless, this factor is estimated to have contributed about 15 percent of the rise in male wage inequality over the 1980s and 1990s. The importance of de-unionization could be even greater if there are spillovers from union to non-union wages.

Changes in the structure of the economy and work force have resulted in a difficult environment for unions. Most of the shifts that have occurred in the past several decades—away from manufacturing and toward services, away from blue-collar and toward white-collar, away from male and full-time and toward female and part-time—represent declines in the relative importance of sectors that traditionally were highly unionized and increasing importance of sectors that traditionally had low union coverage. However, analysis by Riddell and Riddell (2004) concludes that these structural changes contributed little to the decline in unionization. Most of that can be attributed to a fall in the likelihood that an employee with given characteristics—such as gender, full-time or part-time, white collar or blue collar—is represented by a union. Canada's policy environment has gradually become less supportive to collective bargaining, and these policy changes have contributed to the decline in the propensity to unionize.

One important policy affecting the propensity to unionize is the procedure governing the initial certification (and decertification) decision. Canada traditionally employed the "card check" procedure, in which union organizers simply had to obtain signatures of a sufficient proportion of the proposed bargaining unit in order to be certified. This method contrasts with that used in the United States, where a secret ballot election is required to obtain the preferences of workers in the proposed bargaining unit. Before the 1980s only Nova Scotia had mandatory voting for union certification. Since the late 1980s, however, an additional five provinces—Alberta, British Columbia, Newfoundland, Ontario, and Saskatchewan—introduced such laws. Research by Johnson (2002) and Riddell (2004) finds strong evidence that these changes resulted in substantial reductions in success rates in certification applications. This is one of several examples of "small differences that matter"—what might appear to be relatively small differences in the legal and policy regime leading, over time, to substantial declines in union coverage.

Assessing the "optimal" legal and policy regime governing unions and collective bargaining goes beyond the scope of this paper. Unions influence the degree of wage inequality, but they also have many other effects on workers, on the economy, and on society. The key point we make here is that if Canada wishes to reduce pressures toward increasing inequality, moving in the direction of a policy environment that is more supportive of unions is one of the options to be considered.

Conclusion

Our analysis of income inequality in Canada has produced several important findings that should guide any policy developments in this area. First, income inequality at the family level has increased substantially over the past few decades, and policy developments since the mid-1990s have likely reinforced rather than countered this trend. Second, the share of total income going to the top 1 percent has increased dramatically since 1980, mirroring trends in the United States. These high earners are mostly male and highly educated, and while many financial industry workers and executives can be found in the top 1 percent, so too can many professionals such as doctors. Third, the forces driving inequality are varied, ranging from technological change and off-shoring to institutional factors such as the role of unions and minimum wages. Fourth, we find that the experience of women is notably different from that of men; in particular, women have suffered less of the "hollowing out" of the earnings distribution.

With these facts in hand, we propose and assess a set of policy options that may be useful in redressing the trends in income inequality. While we do not necessarily endorse any of these options, it is important that policy-makers have a firm grasp on what tools are useful for addressing which aspects of inequality.

One question remains. Should we care about inequality? A great volume of research we have not addressed here studies the direct impact of inequality on economic growth, on consumption behaviour, and on health and social outcomes. However, the underlying core of concern about inequality is one's taste for redistribution, derived from personal values. Often those who are very successful have worked extremely hard or made great sacrifices to get where they are. Is it fair to ask them to contribute more? At the same time, some struggle because of an unlucky start in life or risks taken that did not pay off. Is it too much of a stretch for each Canadian to ponder, "Could that have been me?" Opinions may differ about the extent to which prevailing inequality represents adequate compensation for choices made and how much of this increased compensation ought to be shared.

Even those who care less about inequality in itself may still have an interest in curbing its increase. While growth-oriented economic policies such as encouraging trade and deepening investment in new technology may provide the basis for economic success for future generations, we have shown here that these policies may also have the effect of exacerbating inequality. If economic gains from growth continue to accrue in a lopsided fashion, public support for pro-growth policies is likely to wane. Otto von Bismarck pioneered the welfare state in nineteenth-century Prussia in part by arguing that the wealthy needed the working classes to benefit from the economy in order to forestall political instability and continue the path of growth. In the same way in contemporary Canada, even those who don't care much about inequality itself may want to ensure that economic growth benefits everyone in our society today. On that point, perhaps all 100 percent of us can agree.

Notes

This article is based in part on a series of four op-eds published by the authors in the *Vancouver Sun* in December 2011. We thank several referees for comments. We also appreciate feedback on the *Vancouver Sun* articles from Jonathan Rhys Kesselman that focused our thinking. Finally, Michael Smart helped clarify our thinking on income taxation. We thank Lori Timmins for research assistance with the SCF and LFS data. We are of course responsible for the contents of the final product.

[1] An economic family is defined as a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common law, or adoption.

[2] More formally, the Gini coefficient is defined as two times the area between the Lorenz Curve (which plots the

percentage of total income going to poorest p percent of individuals, against that proportion p) and a diagonal line that corresponds to complete equality of income. The Gini essentially aggregates the proportions of total income going to different groups into one index. The income series in Figure 1 are "adult equivalent" incomes where an adjustment is made to take account of economies of scale in larger families using the square root of the number of people in the family.

[3] The Gini coefficients are from Statistics Canada, Cansim Table 202-0709. The earnings share numbers are the authors' calculations based on Cansim Table 202-0707.

[4] These data actually refer to wages during the years 1980 to 2005. Data from the 2011 Census are not yet available, and in any event will not be comparable to those from earlier censuses. (See the December 2010 issue of *CPP* for a discussion of issues surrounding the 2011 Census.)

[5] The LFS data are pooled over two year intervals to smooth out random fluctuations associated with sampling variation. Nominal hourly wages are converted into real terms using the monthly CPI.

[6] Authors' calculations based on the public use files of the 2006 Census.

[7] See Finnie and Irvine (2006) for detailed evidence on the dynamics of earnings at the top end of the distribution. Consistent with the findings reported here, Finnie and Irvine show that women are much less likely to be at the very top end of the distribution.

[8] Table 1 reports the share of workers in the top 1 percent and the overall workforce for a selected number of industries and occupations. These industries and occupations are those with the highest share of workers in the top 1 percent. More detailed tabulations for all industries and occupations are available on request.

[9] Note that a tax targeting only the "super rich," for instance, the top 0.1 percent, may disproportionally affect executives and financiers. For instance, for the United States, Bakijia, Cole, and Heim (2012) find that 70 percent of the surge in the top 0.1 percent share is accounted for by increases to executives, managers, supervisors, and financial professionals.

[10] See Katz and Autor (1999), Acemoglu (2002), Lemieux (2008), and Autor and Acemoglu (2011) for surveys of this large literature.

[11] These effects, from 15 percent to 55 percent depending on the group of workers, were similar in magnitude to those found in DiNardo, Fortin, and Lemieux (1996) although not as large as those reported in Lee (1999), thus leaving room for alternative explanations.

[12] British Columbia was the only province lagging behind in this process of minimum wage increases. After almost a decade of fixed nominal minimum wage, a first increase was introduced in May 2011.

[13] There were 25,768,930 tax filers in 2009, of which 8,745,880 had returns that were non-taxable. See Canada Revenue Agency (2011).

[14] In general, the labour supply elasticity of men is thought to be quite low. (See Blundell and MaCurdy 1999). For high earners in particular, Moffitt and Wilhelm (2000) find very little hours response to changes in tax rates in the 1980s.

[15] In fact, Saez, Slemrod, and Giertz (2012) conclude that "in all cases, the response is either due to short-term retiming or income shifting. There is no compelling evidence to date of *real* responses of upper income taxpayers to changes in tax rates."

[16] These calculations make use of equation (5) on p.8 of Saez, Slemrod, and Giertz (2012). The value for the Pareto parameter in that formula is 1.7, as calculated in Milligan (2011) using data from Atkinson, Piketty, and Saez (2010).

[17] We do not incorporate consumption taxes here. Saez, Slemrod, and Giertz (2012, 14) point out that if the response to higher tax rates is through labour supply or other "real" channels, it will also affect consumption, meaning that consumption taxes should be included in this kind of optimal tax calculation. However, to the extent the response comes from tax shifting that affects the income tax base but not the consumption tax base, consumption taxes need not be included in the revenue-maximizing tax rate formula.

[18] See, for example, Milligan and Stabile (2007, 2011) for evidence on tax credits for children in Canada and the citations to the literature within.

[19] Campolieti, Gunderson, and Riddell (2006) estimate an elasticity of employment to a minimum wage change using Canadian provincial data of –.28 for teenagers and –.16 for youth aged 20–24, though the latter estimate is

not near statistical significance at conventional levels. They attempt to translate these into estimates of labour demand elasticities. However, the resulting estimates are extremely poorly defined and span a range from positive and small to negative and very large.

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BANQUE DU CANADA
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Lauréats de la Bourse de recherche et de la Bourse du gouverneur de 2012

La Banque du Canada a le plaisir d'annoncer que M. Jean-Marie Dufour, professeur à l'Université McGill, est le lauréat de la **BOURSE DE RECHERCHE** de la Banque pour 2012.

La Bourse de recherche est conçue pour encourager la recherche de pointe et développer l'expertise canadienne dans les domaines qui sont au centre du mandat de l'institution, soit la macroéconomie, l'économie monétaire, la finance internationale, les marchés financiers et les institutions financières, la stabilité et la réglementation financières, ainsi que l'économie du travail et la croissance économique.

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