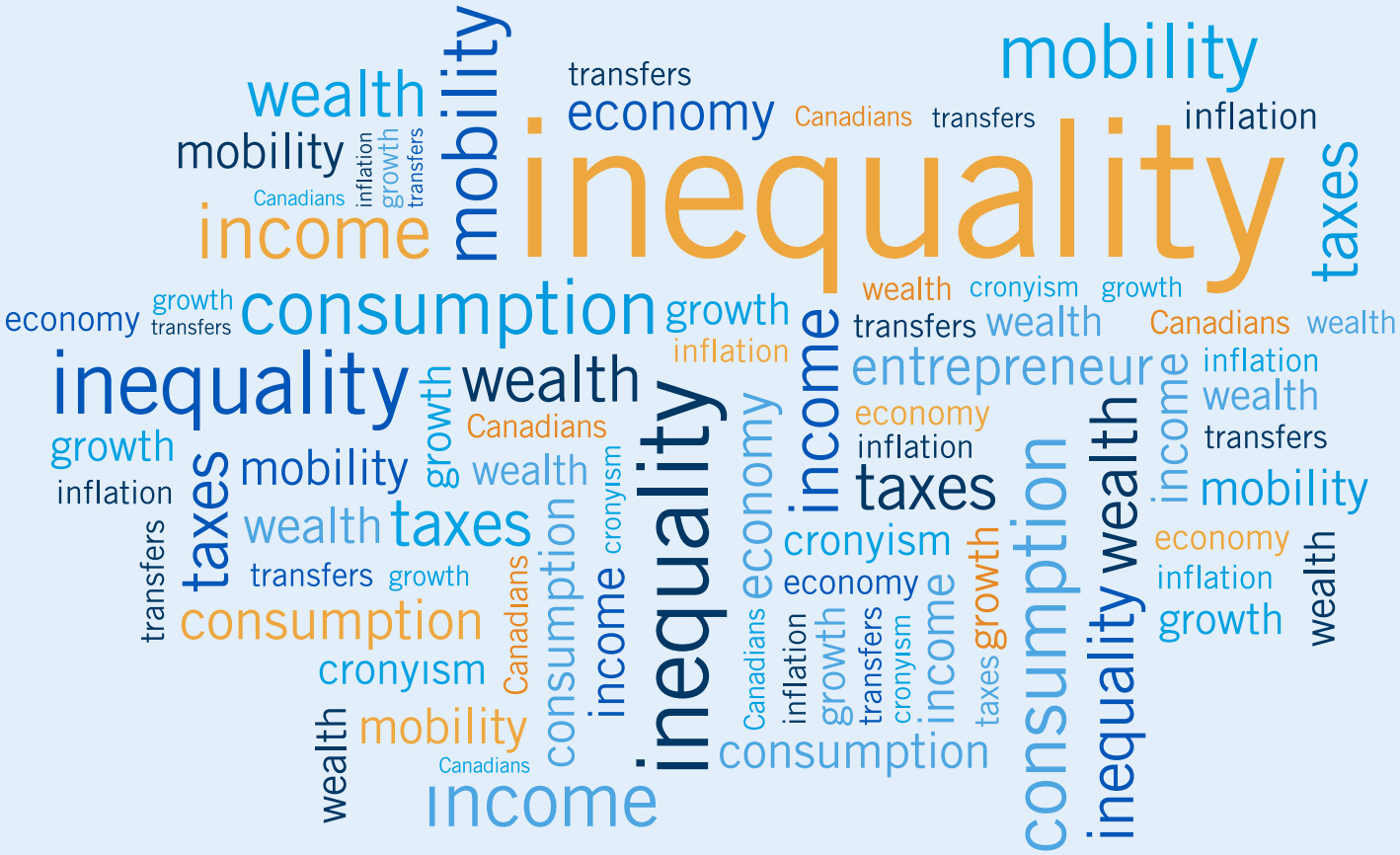
Towards a Better Understanding of Income Inequality in Canada

Edited by Charles Lammam



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Introduction

In recent years, income inequality has become one of the most animating—and unfortunately most misunderstood—economic and social issues of our time. Sparked by the 2008–09 recession, the well-deserved backlash against corporate bailouts, the Occupy Wall Street movement, and a deluge of reports pointing to a growing problem, income inequality has vaulted to the forefront of the public's concerns.

A recent sign of the popularity of the "growing income inequality" narrative is the success of the book *Capital in the 21st Century* by French economist Thomas Piketty, which became an international bestseller and is one of several analyses that conclude income inequality is rising, with increasingly larger shares of income being concentrated among the highest earners. Such conclusions, however, depend greatly on the data and assumptions being used to measure inequality. Indeed, many prominent international and Canadian researchers continue to use flawed and incomplete data and research methods to fuel concerns of a growing "income gap" and stagnating standards of living.

Given the continuous stream of media reports pointing to growing income inequality and stagnating average incomes, it is not surprising that many Canadians have been convinced of the veracity of this perceived problem. Without greater awareness and accuracy about the most important concerns surrounding inequality, policymakers may continue to pursue simple solutions that will ultimately reduce the economic dynamism Canadians have enjoyed, thereby limiting the ability of Canadians to move up the income ladder.

This is why we need a better understanding of the true nature of inequality and income growth, including whether inequality is necessarily harmful or can actually be a positive economic force, how challenging it is to measure inequality and how sensitive the inequality measures are to the underlying definitions, whether or not there really is a rapidly growing gap, and the state of income mobility, which is the ability of Canadians to rise out of their respective income group over time and avoid being permanently stuck in the same income groups year after year.

The chapters in *Towards a Better Understanding of Income Inequality in Canada* tackle these important and complex issues and fill a void in the public debate. Together, they offer a comprehensive analysis of income inequality.

The book begins by pointing out that individuals earn income and accumulate wealth in dramatically different ways. It is essential that this fact be taken into consideration in any understanding of the nature of income and wealth inequality. In **Chapter 1: How Income and Wealth are 'Earned' Matters in Understanding Inequality**, authors Jason Clemens, Taylor Jackson, and Megan O'Neill explain that when measuring inequality, we can't simply compare countries such as Canada, where typically businesses and entrepreneurs only prosper by benefiting society, to countries where cronyism and government-granted privileges are more widespread and rig the system to the benefit of elites.

In countries like Canada, we expect businesspeople to provide goods or services at prices that consumers are willing to pay. When business is conducted this way, the entrepreneur benefits of course, but more importantly, so does society at large. In other words, entrepreneurs are successful in these countries by satisfying the wants and needs of the population.

This situation contrasts markedly with that in other countries where people can amass great wealth while producing *negative* consequences for society. For example, in Mexico, "cronyism" and special privileges that government grants to individuals and businesses reduce competition and create monopolies. Consequently, some Mexican companies are able to charge higher prices for goods and services (telecommunications, for example) than consumers would see in a competitive market.

In Canada, some companies do receive special privileges and government subsidies, but inequality arises largely from the success that some businesspeople reap through their entrepreneurship, innovation, and hard work. This largely merit-based inequality serves not only the people who create the wealth, but also those who buy and use the goods and services. Before determining how much any society should worry about inequality, citizens should first understand that the way income and wealth are earned is a critical component of the discussion.

In **Chapter 2: Income Inequality Measurement Sensitivities**, authors Christopher Sarlo, Jason Clemens, and Joel Emes come to the conclusion that, when inequality is measured properly, income inequality has not been growing rapidly in Canada. Specifically, they find that in this country, between 1982 and 2010 (the latest year of comparable data), the share of income that the top 10 percent of Canadian families earned increased by 12.9 percent. That is a much more modest increase in inequality than has been suggested by other studies that tend to ignore the role of taxes and government transfers in mitigating income inequality.

When income inequality in Canada is measured improperly, discussions about it are incomplete and misleading. For example, earnings (wages and salaries) represent a narrow definition of income, yet many researchers use only earnings to measure income inequality. This measure of income ignores a number of critical factors including government transfers (welfare, Old Age

Security, etc.) to low-income families. Additionally, researchers who use earnings to measure income inequality ignore the effects of progressive taxation, which takes a larger percentage of income from high-income earners than it does from low-income earners. Ironically, some researchers use earnings as their sole measure of inequality, ignoring what government is already doing to close the inequality gap through transfers and taxes—and then call on government to take action by increasing transfers and/or taxes.

This chapter also addresses the question of who should be measured—individuals or families. Measurements of inequality that use only the incomes of individual Canadians will lead to a higher (and potentially misleading) level of inequality than measurements of family incomes. One example is the income of some stay-at-home parents, which, if measured in isolation, may appear relatively low, but when the incomes of the members of the entire household are factored into the equation, that same parent often moves up the income range. Therefore, the most accurate measurement for income inequality is after-tax income (which includes government transfers) adjusted for family size.

Professor Christopher Sarlo has come to a second reassuring and perhaps surprising conclusion: inequality in the standard of living of Canadians has barely changed in 40 years. In **Chapter 3: Consumption Inequality in Canada: Is the Gap Growing?**, Sarlo finds that consumption inequality—the difference in spending by different households—increased by a paltry 3.4 percent from 1969 to 2009 (the last year of available Statistics Canada data). This result contrasts starkly with the prevailing impression of a sharply growing gap and increasing polarization in Canada.

Consumption—compared to income—better reflects Canadians' actual economic well-being by measuring what people *do* buy to support a certain standard of living, and not what people *could* buy, based on their income. Compared to consumption, income can be quite volatile. For example, when people start a new business, take maternity leave, switch jobs, or even lose their job, their income drops. But during those times, people borrow, receive assistance from family, or draw down savings to maintain their standard of living before their income levels rise again. These resources are not included in income inequality studies, which is one reason a growing number of academics find consumption to be a preferred indicator. Another reason is that income is more likely to be underreported, particularly among lower income Canadians. Such underreporting means the gap between the highest and lowest income earners is generally overstated.

In **Chapter 4: Understanding Wealth Inequality in Canada**, Christopher Sarlo tackles an aspect of inequality that is intuitive, but too often ignored: wealth inequality in Canada is largely the result of people's age differences. Wealth accumulation is a process. It happens slowly and steadily over a long period. This fact runs counter to the narrative about growing inequality to which many people cling.

Wealth is different from income. It is measured by a household's net worth and includes the value of all assets—house, business, stocks, bonds, savings, etc.—minus all debts, such as the mortgage, a line of credit, and credit card debt. Consequently, most wealth inequality is explained by the normal and expected changes that take place in our economic situation as we age—the 25-year-old with no wealth today will most likely be a 65-year-old with a net worth close to $1 million a few decades from now. Sarlo has found that in Canada, between 80 and 87 percent of wealth inequality between people can be explained by the stage of their life—in other words, their age.

Most young Canadians have little or no wealth since they are in the early stages of their careers and likely have some debt offsetting any assets they may have. By contrast, older Canadians have very substantial wealth that has been accumulated over a lifetime, including a house and retirement savings with little debt. Canadians usually acquire the most wealth when they hit their peak earning years—between 55 and 69—just before retirement. When they retire, they start to draw down savings and, in effect, become less wealthy again.

What's more, wealth inequality in Canada has actually declined over the past four decades. Specifically, between 1970 and 2012 (the latest year of available data), the gap in net worth among Canadians shrank by 17 percent. In other words, by traditional measures of inequality, the gap between the wealthiest and the least wealthy among us has been declining.

Just as wealth is accumulated over the course of decades, so too is the level of income that Canadians earn each year. In **Chapter 5: Measuring Income Mobility in Canada**, authors Charles Lammam, Niels Veldhuis, Milagros Palacios, and Hugh MacIntyre point out that Canada's high level of income mobility means that very few Canadians remain stuck in low income. The vast majority of those in the lowest income group move up the income ladder over time, which is the mark of a dynamic economy.

The authors used data from Statistics Canada and divided nearly one million Canadians into five income groups of equal size (from lowest to highest) based on their income in 1993, then followed their progress after five, 10, and 19 years. Over all periods, they found very high levels of upward mobility. For example, within 10 years (1993 to 2003), nearly nine of every 10 Canadians (87.5 per cent) in the lowest income group moved to a higher income group. Upward mobility is even more pronounced when the time period is extended. For instance, one of every four who began in the lowest income group in 1993 reached the top income group by 2012. Indeed, not only did most low-income Canadians move up the income ladder, many rose to the very top.

These results demonstrate again the natural progression that most Canadians experience over the course of their lives. Most start out with relatively low incomes because they lack work experience and have limited education. Over time, incomes increase along with completed education and added work and life experience. Unfortunately, this positive dynamic of our economy

is often ignored when people debate inequality, poverty, and the nature of success.

A repeated claim in the inequality debate is that the middle class in Canada is stagnating. But this, too, is untrue. In **Chapter 6: The Myth of Middle-Class Stagnation in Canada**, Donald J. Boudreaux, along with Joel Emes, Hugh MacIntyre, and Charles Lammam, demonstrate that middle-class incomes are up dramatically in Canada since the 1970s.

Canada's middle class is often portrayed as not reaping any benefits from economic growth over the past few decades. But not only have middle-class incomes risen dramatically, the purchasing power of those incomes goes a lot further today than back in the 1970s.

Studies that claim that Canada's middle class is stagnating—or worse, falling behind—are based on incomplete analyses. First, they tend to examine income before taxes and government transfers (the GST credit, child benefit payments, etc.), failing to account for important changes in taxes and government transfers over time. What ultimately matters is how much a family has available to spend (and to save) after it has paid all taxes and received all transfers.

Second, too often analyses fail to account for the fact that the average family is smaller today than in the past. This matters because it means a family's income is now spread among fewer people. Any measure of economic well-being should account for the resources available to each family member.

Finally, there's a well-documented problem with the standard measure of inflation, which overestimates the increase in overall prices. Using the standard measure to adjust for inflation will understate the real value of current income relative to past income and give the appearance that median income is increasing less than it actually is. When properly measured, instead of stagnating, the median Canadian income increased dramatically—by as much as 52 percent from 1976 to 2011, the most recent year of readily available data at the time of writing.

Another telling indication that Canada's middle class is better off today than it was in the mid-1970s is that Canadians have to work fewer hours today in order to afford similar and often higher-quality household goods. For example, in 1976, a Canadian earning the average hourly wage had to work 109 hours to buy a microwave. Today, a much better microwave (given improvements in technology) costs only 10 work-hours. There are many other examples: a coloured television in 1976 cost the equivalent of 113 hours of work, and in 2011, just 12 work-hours. A simple clock-radio cost 5 work-hours in 1976, but less than 1 work-hour in 2011.

So much of the debate around income inequality revolves around perceptions of fairness. In the book's final chapter, **Chapter 7: Measuring the Distribution of Taxes in Canada: Do the Rich Pay Their 'Fair Share'?**, authors Charles Lammam, Hugh MacIntyre, and Milagros Palacios discuss

the frequently heard proposition that inequality could be solved if governments increased taxes on upper income earners. At first blush, this "solution" seems clear and simple. Unfortunately, it is also wrong. It is based, in part, on a mistaken impression that the country's top earners are paying relatively little tax. Governments—especially the current federal government—have fuelled this misperception by invoking "tax fairness" to justify higher taxes on upper earners.

Those advocating that taxes be raised on top income earners almost never define what constitutes a "fair share" of the tax burden. This chapter uses a definition of fairness based on the shares of taxes paid and income earned by various income groups (i.e., if the ratio of taxes paid to income earned across the various groups are equal, then taxes are being fairly distributed). It finds that the top 20 percent of income-earning families is the only group that collectively pays a greater share of total taxes (55.9 percent) than their share of total income earned (49.1 percent)—a 13.9 percent difference. The bottom 20 percent of income earners, meanwhile, pays 0.6 percent of all personal income taxes even though its share of total income is nearly six and half times larger (4.1 percent).

Canada's top income earners currently pay a disproportionate share of taxes relative to the share of income that they earn and that tax ratio gap has been increasing over time. The imbalance is primarily due to the progressivity of Canada's personal income tax system, which taxes higher levels of income at higher marginal tax rates. Those who advocate higher taxes on top income earners are, in effect, arguing that those earners should be paying taxes at a rate that is even more disproportionate. This raises the question of how much tax is enough from top income earners.

Taxes cannot be continually raised on top income earners without economic consequences. Higher tax rates would further erode Canada's tax competitiveness, discourage economically productive activity, hinder the country's ability to attract and retain top talent, and dampen the incentives for income mobility. Once that happens, everyone is hurt, particularly those, ironically enough, whom the misguided policies are intended to help.

Income inequality is a complex issue. The good news is that the problem of inequality isn't nearly as bad as people are sometimes led to believe. Canadians have less inequality than they might think, and are more able, thanks to opportunities of mobility, to get out of a low-income situation than they might fear. Middle-class incomes in this country are not stagnating, and most people can and do build wealth over the course of their lives. The bad news is that policies designed to address inequality might be doing more harm than good—exacerbating the situation and making it worse, not better.

1. How Income and Wealth are "Earned" Matters in Understanding Inequality

Jason Clemens, Taylor Jackson, and Megan O'Neill

This essay examines a missing piece of the inequality debate: the material differences in how income is earned and wealth accumulated that ultimately result in inequality. The essay addresses a fundamental conceptual issue related to concerns about inequality that is almost always ignored, namely how the underlying income was earned or the wealth amassed. It is the contention of the essay that the manner in which income is earned or assets are accumulated matters with respect to the degree to which citizens should be concerned about inequality.

The essay is organized as follows. The first section provides some basic background from which the following sections flow. The second section explores the general differences in how income and wealth are earned within the context of inequality and highlights these differences using specific case examples. The third section examines these concepts at the country level to further highlight why differences in how income is earned and wealth amassed matter when discussing inequality.

Background and Conceptual Issues

It is first worthwhile to consider the meaning of inequality. It is generally used to refer to differences or gaps between the living standards of particular groups, most normally the affluent versus low-income groups. While the principle interest in inequality debates is in differences in the standard of living, the most common measures of inequality pertain to differences in measured income or wealth.[1]

1. For a thorough discussion of the measurement and conceptual issues concerning inequality, see Chapter 2.

The core issue at the heart of this essay is that how one earns income and accumulates wealth matters in the debate regarding inequality.[2] Put simply, we can observe a variety of jurisdictions with comparable levels of inequality, but it would be a mistake to treat the observed inequality equally across the jurisdictions without understanding how the income was earned and/or the wealth amassed.[3]

More specifically, individuals and families can earn income, and more particularly earn great amounts of income and amass large-scale wealth, by providing citizens with goods or services they demand at a price they're willing to pay. Alternatively, individuals and families can also earn great sums of income and amass wealth by securing special privileges and protections from the government. In addition, there are cases where individuals and families have amassed incredible wealth by effectively stealing from their populations. This latter phenomenon is most often observed in the case of dictators.

All three scenarios reflect situations in which individuals and their families have earned large amounts of income and accumulated great wealth, which influences the level of inequality, but the manner by which these ends were achieved differs significantly. For instance, inequality that results from access to the public treasury for the family and friends of a dictator in a poor country is vastly different from inequality arising from individuals and firms that successfully innovate to provide citizens with new or improved products at prices consumers are willing to pay.[4]

For the sake of readability, this essay will differentiate between *merit-based inequality* and *crony* or *corruption-based inequality*. However, it is critically important to recognize conceptually that the resulting levels of inequality could be the same, irrespective of how the inequality arose.

"Merit" inequality refers to situations where individuals, entrepreneurs, and businesses have provided citizens with a demanded good or service at a competitive price in a competitive market over time. Note the caveats provided to this definition of "merit" inequality. One, the market for the good or service is open to competition and not protected by government intervention such as monopoly charters. Two, the successful firms are providing a good or service

2. It is important to understand the basic difference between income and assets. Income is earned through labour efforts, the sale of assets, and/or investing in productive assets. The flow of income earned is received by individuals and firms on a regular basis, whether daily, weekly, or monthly, etc. Wealth, on the other hand, is the accumulation of savings over time in the form of assets. For most people, the single largest source of wealth (i.e., an asset) is their home.

3. Interestingly, a recent paper published by the National Bureau of Economic Research (Gimpelson and Treisman, 2015) concluded that ordinary people across a wide spectrum of countries lacked basic understanding and knowledge about inequality.

4. In many ways, this conceptual approach to inequality mirrors the work of economists Daron Acemoglu and James A. Robinson on frameworks for understanding economic growth. Acemoglu and Robinson argue that inclusive political and economic institutions result in robust economic growth over time, while exclusive political and/or economic institutions result in poorer economic performance. For more information, see Acemoglu and Robinson (2006, 2012, 2015) and Acemoglu, Gallego, and Robinson (2014).

that is voluntarily purchased by citizens because they demand it. And three, the success of the firm is judged over time.

Alternatively, "crony/corruption" inequality entails situations whereby individuals and groups gain favours and special treatment from government that benefit them at the expense of the population at large. There are essentially two groups within this broad category. The first pertains to legal acts whereby individuals and firms gain special privileges from government, such as monopoly protection. Such privileges are not illegal, though the costs imposed on society for the benefit of a small group are large. We refer to this phenomenon as "crony capitalism."

There are also, however, illegal acts such as theft whereby individuals, normally dictators, effectively steal income and wealth from their citizens for their own benefit. This is referred to as "corruption." The next section of the essay provides a more detailed analysis including case studies of these conceptual issues.

How People Earn Income and Amass Wealth Matters for Inequality Concerns

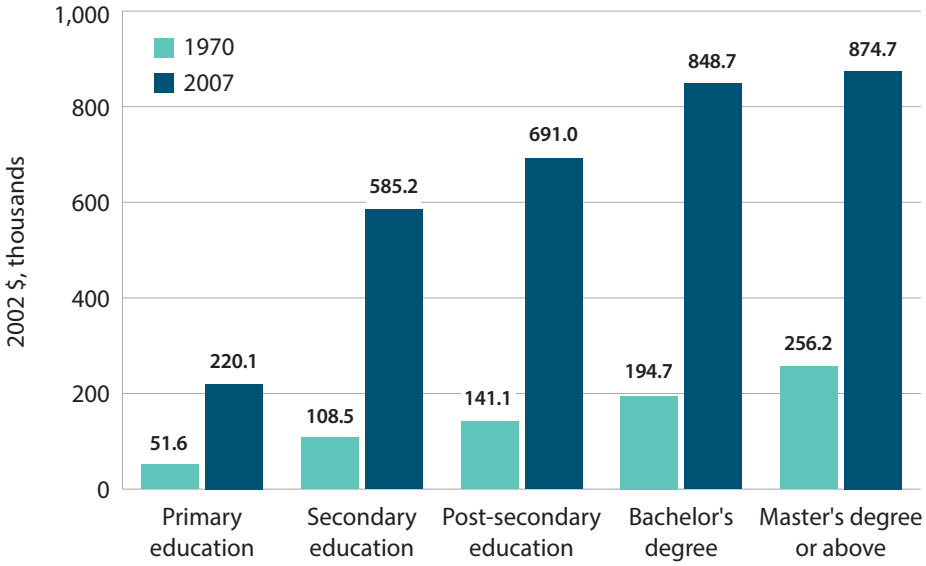
1) Merit-Based Inequality

In contrast to inequality that results largely from crony capitalism and/or corruption, inequality can also result from other factors, ones which many people might think wholly legitimate sources of inequality, such as differences in hours worked, differences in productivity, differing education attainment, and entrepreneurial risk-taking.

Inequality that results from investment in human capital

Compensation is ultimately driven by productivity, that is, the ability of individuals and firms to transform inputs into useable outputs (Feldstein, 2008). Differences in productivity lead to differences in compensation, which are ultimately related to inequality. One aspect of merit-based inequality that is often either ignored or misunderstood is the level of inequality linked with differences in educational achievement. As Nobel laureate economist Gary Becker (1962) and many others since recognized, spending on education is an investment in one's future, since it increases skills, knowledge, and expertise, all of which increase one's productivity and thus compensation.

Figure 1: Average Lifetime Labour Income Per Person By Education Level, 1970 and 2007



Source: Gu and Wong, 2010.

Consider, for example, the lifetime labour (pre-tax) income per person in Canada (**figure 1**).[5] Someone who only completes elementary school would have lifetime labour earnings (in 2002 dollars), on average, of $220,100. Contrast this with the lifetime (average) earnings of someone who completes high school: $585,200, or more than two-and-a-half times higher than the person who did not complete high school.

This pattern of higher average lifetime earnings is consistent, as individuals complete more education. Someone with some post-secondary education will earn $691,000, on average; those with a bachelor's degree will accrue $848,700 worth of income; someone with a Master's degree or above will have total lifetime labour income of $874,700.

The point here is that the investment in education, which improves one's human capital and thus productivity, results in different levels of earnings over time and thus different levels of wealth accumulation. This type of differential earnings and ultimately wealth is categorized as one type of merit-based inequality because it is rooted in differing levels of productivity.

Inequality that results from entrepreneurship and business innovation

Beyond the general illustration of how investment in education can lead to inequality, examples abound of inequality that results from business acumen and entrepreneurial risk-taking. Two Canadian case studies demonstrate this conceptual argument.

5. We use lifetime labour income per person as it illustrates how the combination of higher education plus employment opportunities and subsequent earnings allow for total lifetime earnings to diverge.

Lululemon Athletica Inc.

The first Canadian example is that of Lululemon, founded in Vancouver by entrepreneur Chip Wilson. As the founder of snowboard company Westbeach, Wilson had experience in starting a retail company. Wilson recognized an emerging skateboarding and snowboarding market in the early 1980s and built a brand around a particular lifestyle. The company's success resulted in part from its significant investment in research and development and designing the best quality apparel using technical fabrics (Lululemon Athletica, 2014).

Wilson carried with him these strategies and lessons when he started Lululemon in 1998, focusing on a Vancouver market steeped in a culture of health and wellness. Lululemon delivered an innovative line of clothing products that were reinforced by a strong company culture and image. After the first store opened in the Kitsilano area of Vancouver in 2000, the company continued to grow and add new stores based on the strength of their customers' demand for their products.

As of 2006, Lululemon had 27 stores across Canada plus another nine abroad. While still a privately held company, its revenues doubled almost every year since the company's inception, reaching an estimated $120 million in 2006 (Bogomolny, 2006). At that juncture in the company's history, Wilson sold a minority stake (48 percent) of the company to private equity firms Advent International and Highland Capital Partners in order to continue to finance the rapid growth of the company.

Wilson had found a unique way to make yoga-inspired clothing and a targeted brand accessible to the masses. By expanding Lululemon's apparel to include street wear and menswear, the brand's status continued to increase and garner more recognition. Lululemon went public in 2007 through an initial public offering.

Early growth of the share price was mired by Wilson's brief departure from the company; however, upon his return, the share's price once again rose, reaching its to-date peak of US$81.43 in June of 2013 (Lululemon, various years).[6] The share price fluctuation, in part, reflects Wilson's value to the company and how his innovations and creative vision were drivers of Lululemon's achievements. In mid-2013, the company's employee count numbered over 7,600 worldwide, in 254 stores, with revenues of over $1.5 billion. As of 2015 filings, the company owned 302 stores and employed 8,628 people, with revenues of $1.8 billion (Lululemon, various years). The numbers tell the story of a growing company, yet Lululemon was so much more during those formative years. They maintained a strong Vancouver and Canadian identity, while allowing themselves to seek customers in other markets, delivering a product that people sought all over the world.

6. Financial information and annual reports are available from 2007 onward and help illustrate the growth of the company (Lululemon Athletica Inc.)

After years of building Lululemon from the ground up, Chip Wilson sold a major stake in his company to existing partner Advent International for US$845 million, contributing to his current estimated net worth of approximately $2.2 billion (Forbes, 2015). What Wilson's high net worth reflects is the value that Lululemon's customers place on his products. Lululemon pioneered an industry of technical fabric and athletic-styled street wear which people demanded and ultimately consumed, resulting in high returns for Wilson and Lululemon's shareholders. The important takeaway from the example of Wilson's far-from-equal wealth is that he was only able to attain this by offering a product in a competitive market that people chose to purchase.

Research in Motion and Blackberry

A second Canadian example is that of Research in Motion (RIM). RIM was founded in 1984 by Mike Lazaridis and Douglas Fregin of Waterloo, Ontario. Now known primarily for their BlackBerry Wireless Handheld product line, RIM had humble beginnings as a technology developer (RIM, undated). The company's focus on research and development and designing devices for business professionals helped them to attract fellow Canadian Jim Balsillie to the team in 1992 to be a co-CEO and the face of the company (CBC, 2014).

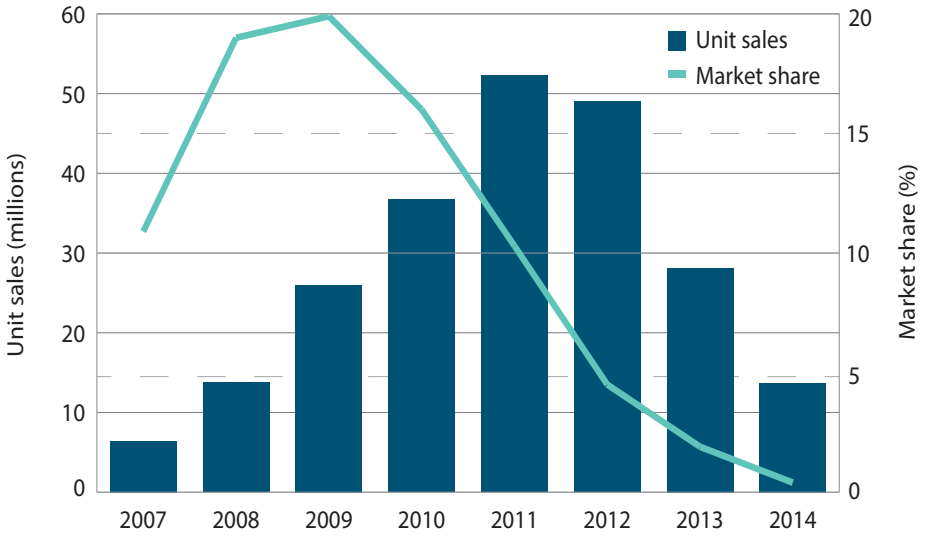
Balsillie's business acumen helped take the company public in 1997, in the wake of a successful year, gaining fame for their innovations. RIM continued to pave the way for mobile technologies and changed the way that people could conduct business, both in Canada and around the world. Countless product announcements throughout the early 2000's reflected the ongoing commitment to creating devices that enabled people to open a full web browser on a smartphone, and type emails and memos using a full keyboard, all backed by RIM's S/MIME Secure Network for government and corporate customers (RIM, undated).

RIM gained success and grew because they delivered a product demanded by consumers at a price they were willing to pay. By 2007, when RIM's share price reached its peak, BlackBerry achieved a market share of 10.9 percent in the telecommunications space (**figure 2**). By 2009, that figure had jumped to 19.9 percent and BlackBerry dominated the ever-expanding market base for wireless devices (IDC, 2015). Even as strong competitors such as Apple, Nokia, and Samsung flooded the marketplace with new devices, no one at the time could deliver what the business clientele wanted as well as Balsillie did with the BlackBerry.[7]

In order to reach this level of success, RIM had to hire new staff, invest heavily in research and development, and, critically, listen and pay attention

7. RIM was penalized for stock option backdating in 2007, resulting in Jim Balsillie stepping down as Chairman. While acknowledging this serious event, the fact remains that RIM achieved a level of success (wealth inequality) due to their merit and innovations during their formative years.

Figure 2: BlackBerry Unit Sales vs. Market Share, 2007–2014



Source: Research in Motion Annual Reports, 1998–2014; International Data Corporation, 2015.

to consumer demands and trends. Despite revenues of $19.9 billion peaking in 2011, capital markets started signaling concerns about RIM in the form of a significantly lower share price. As BlackBerry's market share declined to 8.1 percent in 2011, products such as Apple's iPhone and Samsung's Galaxy were growing significantly faster than RIM. These companies built on earlier innovations, some of which originated with RIM, to create better, more user-friendly products. While RIM's sales were still growing over this period, they were doing so at a much slower pace than the rest of the market because of the incredible demand for these newer products (IDC, 2015).

The case studies of Lululemon and RIM demonstrate that entrepreneurs who invent and innovate successfully based on consumer demands and preferences can earn incredible sums of income and accumulate wealth. However, the key principle of this illustration is that they only succeeded and amassed wealth by satisfying millions of customers with products and services they demanded at a price they were willing to pay. In other words, these entrepreneurs succeeded by making people better off.

2) Cronyism-Corruption Inequality

In contrast to the income earned and wealth amassed by the above examples of entrepreneurial individuals, this section explores two groups of people who generated income and wealth not by satisfying consumers in competitive markets, but rather by securing special privileges and protection from government—or through outright theft. The former may not be illegal but does impose large costs on society for the benefit of a few. The latter, however, *is* illegal, and these two types of inequality will be dealt with separately.

Cronyism

For readability we will refer to the large category of special treatments and privileges that can be secured by individuals and businesses through government as "crony capitalism." There are numerous other labels that have been used, including favoritism and corporatism. The essence of this category is that governments grant special advantages or privileges to individuals and firms through regulations that restrict competition and favour the firm over both existing and potential competitors. These special treatments or protections allow the firm(s) to charge higher prices than would otherwise be the case, invest less in research and development because of the absence of meaningful competitive threats, and/or pay less attention to their customers in terms of product development and service.

Consider one of the most high profile examples of an individual and his family benefitting from special government privileges: Carlos Slim. Slim is the second richest man in the world with an estimated net worth of US$77.1 billion. He benefited greatly from Mexican government policy that is conducive to regulatory barriers to entry in general and the telecommunications industry in particular (Forbes, 2015), making much of his fortune through Telmex, a Mexican telecommunications company (Forbes, 2015; Padgett, 2014).

As the OECD (2012: 12) noted, Mexico's telecommunications sector is "characterised by high prices, among the highest within OECD countries, and a lack of competition." Of course, it is precisely that lack of competition which leads to those high prices—the Mexican telecommunications market is dominated by a single company owned by Slim (Telmex) "with 80% of the fixed line market and 70% of the mobile phone market."

In addition, existing Mexican companies have an easier time blocking new entrants via the legal system. In Mexico, when regulatory authorities issue a ruling on the side of competition, it can be challenged by a company which has the most to lose. Mexican courts will then suspend the pro-competition directive while it is reviewed, thus extending the life of the cartel or monopoly in question. The OECD labels the role of the courts here as "one of the main barriers to competition," noting how "this system not only encourages legal challenges but provides financial gain for the incumbent." The OECD also points out that "profit margins of the incumbent [are] nearly double the OECD average" (2012: 11–12).[8]

Simply put, the barriers to competition in the telecommunications market in Mexico have allowed Slim and his companies to enjoy higher prices and higher market share than would have been the case in a competitive, open

8. One can argue that the Mexican government should have less regulatory apparatus to begin with, and thus fewer institutional barriers to cross for possible new entrants. However, the Mexican regulatory system is not the subject of this essay. The point is merely that the existing regulatory structure and court responses engender crony capitalism, i.e., favouritism by government, which leads to less competition and thus wealth concentration, which contributes to inequality.

market. These restrictions, therefore, have benefitted Slim and resulted in inequality at the expense of average Mexicans through higher prices for telecom services.

Corruption

Another contributor to inequality is corruption. Transparency International (2015) defines corruption in a general manner as "the abuse of entrusted power for private gain" with "grand corruption" consisting of "acts committed at a high level of government that distort policies or the central functioning of the state, enabling leaders to benefit at the expense of the public good."[9]

Actual corruption is hard to measure—those who are corrupt do not self-report such actions. However, Transparency International measures perceptions of corruption, and this can serve as a proxy to measure states or territories where it is more possible to profit from illegal activities.[10] That in turn means an increased potential for corrupt inequality to flourish.

Unlike crony capitalism—regulatory favours that protect or promote a particular sector or business, but which are transparent—corruption is usually illegal. It can occur in democracies, authoritarian regimes, or in dictatorships; the latter potentially allow for more corruption because there are few if any barriers to a dictator simply enriching himself, his family, and friends directly from the public treasury. A dictatorship by definition and design is a one-person or one-party rule state which brooks no opposition, and thus where institutional checks on power are weak or non-existent.

There is no one list of the world's most perceived corrupt authoritarian leaders and dictators, but various media and other organizations have investigated and attempted to uncover and estimate the personal fortunes of such political and military leaders. Transparency International published a report in 2004 (but not since) that attempted to quantify the ill-gotten gains of various national leaders, some of whom could be described as authoritarian at the very least, though others were democratically elected (**table 1**).

9. The full description of corruption from Transparency International (2015) is as follows: "Generally speaking as 'the abuse of entrusted power for private gain.' Corruption can be classified as grand, petty and political, depending on the amounts of money lost and the sector where it occurs. Grand corruption consists of acts committed at a high level of government that distort policies or the central functioning of the state, enabling leaders to benefit at the expense of the public good. Petty corruption refers to everyday abuse of entrusted power by low- and mid-level public officials in their interactions with ordinary citizens, who often are trying to access basic goods or services in places like hospitals, schools, police departments and other agencies. Political corruption is a manipulation of policies, institutions and rules of procedure in the allocation of resources and financing by political decision makers, who abuse their position to sustain their power, status and wealth."

10. Transparency International's corruption index is constructed based on perceptions of a country by analysts, business people and the general public. The methodology is detailed on their website (Transparency International, 2015).

Table 1: Examples of Alleged Political Corruption

Head of government	Position	Estimate of funds allegedly embezzled* (US$)	GDP per capita (2001 US$)
Mohamed Suharto	President of Indonesia, 1967–98	$15–$35 billion	$695
Ferdinand Marcos	President of Philippines, 1972–86	$5–$10 billion	$912
Mobutu Sese Seko	President of Zaire, 1965–97	$5 billion	$99
Sani Abacha	President of Nigeria, 1993–98	$2–$5 billion	$319
Slobodan Milosevic	President of Serbia/ Yugoslavia, 1989–2000	$1 billion	n/a
Jean-Claude Duvalier	President of Haiti, 1971–86	$300–$800 million	$460
Alberta Fujimori	President of Peru, 1990–2000	$600 million	$2,051
Pavlo Lazarenko	President of Ukraine, 1996–97	$114–$200 million	$766
Arnoldo Aleman	Presidentof Nicaragua, 1997–2002	$100 million	$490
Joseph Estrada	President of the Philippines, 1998–2001	$78–$80 million	$912

* Various years; not adjusted for inflation.

Source: Transparency International, 2004: 13.

A flagrant example of an authoritarian leader enriched by his time in office comes from Indonesia, governed by President Mohamed Suharto, *de facto*, from 1966 until he resigned in 1998. Suharto, an army officer, was head of the army's Strategic Command and, in response to an attempted 1965 coup by left-wing guerrillas, acted to crush the insurgency. By 1966, he was effectively the ruler of Indonesia and was officially appointed acting president in 1967 by the People's Consultative Assembly (the national legislature). In 1968, the Assembly appointed Suharto to a five-year term, and re-elected him every five years until he resigned in 1998 (The Economist, 1998). Transparency International (2004: 13) estimated that Suharto had embezzled between US$15 billion and $35 billion. Indonesia's per capita GDP was just US$695 (in 2001$).

Other examples abound. The 2004 report from Transparency International listed nine other examples of alleged corrupt political leadership, ranging from Joseph Estrada, president of the Philippines from 1998 to 2001, who allegedly embezzled $78 million to $80 million, to Ferdinand Marcos, also a Philippines president (1972–86), who allegedly stole between $5 billion and $10 billion

in public funds during his time in office. Insofar as Suharto, Estrada, or Marcos' pilfering of the public purse enriched them, then the gap between them and their citizens is an example of corruption-based inequality.

In considering inequality, it is critical to be clear about the very different sources for inequality and the substantive effect those sources have on citizens. Inequality that is sourced in crony capitalism results in a less competitive market and higher prices for consumers, as in the example of Carlos Slim. Inequality sourced in corruption, as in the case of Indonesia's Suharto, diverts tax dollars from government treasuries and from legitimate uses, such as hospitals, schools, and other infrastructure and services, in which governments are involved.

Crony capitalism and corruption are thus unlike another source of inequality, the entrepreneur who risks capital, caters to consumers in competitive market, and creates wealth and tax revenues. The end inequality in such cases results from wholly beneficial activity.

Country-Level Analyses

The source of inequality matters when trying to understand and discuss inequality. The contrasting origins of inequality can have significantly different impacts on the populations within a given country. Below, two different inter-country comparisons demonstrate this effect. The first compares two countries with similarly high levels of inequality, and the second looks at whether a more equal society is better off than one that is more unequal. These comparisons contrast different measures of well-being, including per-capita income, the level of economic freedom, a measure of corruption, and the level of human development within the country. The two comparisons help clarify why it matters whether inequality results from positive economic activity of the sort that creates wealth, employment, and shareholder value, or from activities that add little or nothing to opportunity for others.

Haiti and Hong Kong

One way to demonstrate why it matters whether inequality results from merit or cronyism-corruption is to compare jurisdictions that maintain similar levels of inequality but arrive at inequality very differently. Such a comparison illustrates how two jurisdictions with similar levels of inequality can be characterized by very different economic systems. In other words, the individual examples above, regarding different ways by which individuals can achieve wealth, can be extended to entire jurisdictions. In addition, these differing economic systems also influence the general prosperity of the respective jurisdictions.

The first comparison is between Haiti and Hong Kong. Like many poor and/or corrupt countries, data availability is quite limited for Haiti, and its integrity is questionable. One of the main methods by which to gauge inequality is the Gini Coefficient. The most recent year for which Gini Coefficient data is available for Haiti is 2001, when inequality there was 59.2 on the Gini scale (0 to 100), indicating a high degree of inequality. In comparison with other countries using more recent data (2010), Haiti would have had the third highest level of inequality, behind only Namibia and Botswana (World Bank, 2015a; CIA, 2015). In 2007, the year of data closest to Haiti's 2001 ranking, Hong Kong was deemed to have a fairly similar level of inequality: 53.7.

Given the similar levels of inequality, it is telling to compare the economic systems and economic performance of the two countries as an illustration of why the method by which people earn income and amass wealth matters when discussing inequality. One of the easiest and most accessible methods by which to gauge the countries' respective economic systems is to compare their economic freedom scores.[11] The annual ranking of economic freedom assesses the economic institutions of individual countries across a number of broad categories, including size of government, the security of its legal system and property rights, access to sound money, freedom to trade internationally, and the regulation of credit, labour, and business.

While data is available for 2013, it is prudent to examine 2001 data given the information available for inequality for Haiti. In the 2003 annual report, which contains data for 2001, Haiti tied for 77th out of 123 countries for economic freedom, with a score of 6.0 out of a possible 10.0. Hong Kong, on the other hand, ranked 1st with a score of 8.6 (**table 2**).[12] Hong Kong, therefore, maintained a comparatively open, competitive market economy while Haiti's was considerably less open and free.

Transparency International gauges corruption at the country level. Their Corruption Perception Index is a composite index which gathers data from 12 different sources including the Economist Intelligence Unit, Political Risk Services International, the World Bank, and the World Economic Forum (Transparency International, 2014). In 2002, the available year closest to the inequality data cited above (2001), Haiti ranked 89th out of 102 countries analyzed. It received a score of 2.2 out of 10, where lower numbers indicate higher levels of corruption. Hong Kong, on the other hand, scored 8.2 and ranked 14th, indicating a fairly low level of corruption.

In summary, while Haiti and Hong Kong maintained similar levels of inequality, the sources of that inequality were very different. According to the two measurements presented, Hong Kong maintained an open, competitive

11. See <https://www.fraserinstitute.org/economic-freedom> for more information on the Economic Freedom of the World project, its annual report, and the time series data.
12. In the most recent 2014 report, Haiti ranked 92nd (out of 152 countries) with a score of 6.7, while Hong Kong continued to rank first.

Table 2: Haiti and Hong Kong Compared

	Gini coefficient inequality score (100 = complete inequality; 0 = complete equality)	Perceived corruption (out of ten; lower score = perceived as more corrupt)	GDP per capita, PPP (current international $)	Economic freedom (score [rank])	Human Development Index (scores range between 0 and 1; higher score = greater human development)
Haiti	59.2	2.2	1,368	6.0 (77)	0.433
Hong Kong	53.7	8.2	27,528	8.6 (1)	0.810

Note: Due to data limitations, Haiti's corruption score is from 2002 and its Human Development Index scores are from 2000. Hong Kong's Gini is from 2007 due to data limitations. All other scores for Hong Kong are from the same years as Haiti's in order to ensure comparability.

Sources: World Bank, 2015a, 2015b; CIA, 2015; Transparency International, 2002; United Nations Development Program, 1980-2013; Gwartney and Lawson, 2003.

market economy with very little corruption while Haiti maintained a relatively un-free economy with high levels of corruption.

These structural economic differences resulted in real differences in the economic performances of the two countries. For example, the per-capita income of Haiti in 2001 was $1,368, while Hong Kong's comparable income was $27,528—over 20 times greater.

Another method by which to gauge the performance of the two countries is to examine their comparative Human Development Index (HDI) scores. The HDI measures a country's health and education outcomes as well as its standard of living as a method by which to gauge overall development (United Nations, 1980–2013).[13] In 2000, Haiti's HDI was 0.433, which indicates a fairly low level of development. In the same year, Hong Kong's HDI was 0.810, almost double Haiti's score, reflecting a relatively high degree of human development.

It is not only that the similar levels of inequality in Haiti and Hong Kong originate from very different activities—Hong Kong largely relies on merit for the receipt of income and accumulation of wealth, while Haiti is characterized by corruption and uncompetitive markets—but also that the two countries have experienced stark differences in economic performance because of these structural institutional differences.

13. The UN's Human Development Index is subject to a number of weaknesses, as noted in Emes (1998).

Canada and the Ukraine

It is also useful to examine two countries with differing levels of inequality to further illustrate the point that the source of inequality and the type of economic system matter. In 2010, no country in the world was more equal than the Ukraine based on its Gini coefficient score of 24.8. Comparatively, Canada ranked much further down the list at 33rd, with a Gini score of 33.7. The economic systems of these countries differ greatly, as does the prosperity of their citizens. However, it is not the inequality that is making people worse off, since Canada has higher levels of prosperity.

In 2010, Canada had a much higher level of economic freedom than did Ukraine. Canada's economic freedom score was 8.1, placing them 5th amongst a group of 123 countries (**table 3**). Ukraine, however, had an economic freedom score of 5.9, corresponding to a rank of 107th.

Similar disparities exist when corruption is examined. Canada performed much better than Ukraine with a score of 8.9 and a rank of 6th in 2010, based on Transparency International's Corruption Index. At the other end of the rankings was Ukraine, which ranked 134th with a score of 2.4, indicating a high level of perceived corruption.

The source of inequality in Canada appears to be similar to that of Hong Kong. It is based on competitive markets with low levels of corruption, whereas Ukraine appears to be plagued by poor economic institutions and high levels of corruption.

It is telling to examine the relative levels of prosperity between the Ukraine (comparatively equal) and Canada (less equal). In 2010, Ukraine's per capita income was $7,686, while Canada's was $40,055. In other words, Canada's per-capita income was more than five times greater than that of the Ukraine.

Table 3: Canada and Ukraine Compared

	Gini coefficient inequality score (100 = complete inequality; 0 = complete equality)	Perceived corruption (out of ten; lower score = perceived as more corrupt)	GDP per capita, PPP (current international $)	Economic freedom (score [rank])	Human Development Index (scores range between 0 and 1; higher score = greater human development)
Canada	33.7	8.9	40,055	8.1 (5)	0.896
Ukraine	24.8	2.4	7,686	5.9 (107)	0.726

Sources: World Bank, 2015a, 2015b; Transparency International, 2010; United Nations Development Program, 1980-2013; Gwartney et al., 2012.

The same differences are seen when comparing measures of human development. Ukraine's human development index score was 0.726 in 2010, placing it just above the classification level of medium human development. Contrast this to Canada, which had a very high level of human development in 2010 with a score 0.896. While Canada may be more unequal than Ukraine, this inequality, derived from merit and entrepreneurial undertakings, appears to have resulted in higher levels of prosperity for all Canadians.

Different sources of inequality—whether from merit and markets or cronyism and corruption—have divergent effects on a society's prosperity. More equal societies, such as Ukraine, are not necessarily better off than countries with higher levels of inequality. It is clear that not all inequality is equal, and nor are the outcomes of different societies predicated upon the level of equality within. What such comparisons demonstrate is the fundamental flaw in considering inequality as a simple measurement. The source of the inequality matters.

Conclusion

A simplified approach to comparing countries based solely on inequality ignores how the sources of inequality can be and often are vastly different in origin. On the one hand, most would agree that gaining wealth and thus furthering inequality through government favouritism or outright theft or corruption results in negative consequences for society. On the other hand, inequality can arise from entrepreneurship, innovation, and diligence that provide enormous benefits to society. This merit-based inequality serves not only the people behind the wealth, but also the consumers and people they are serving, who buy and use their goods and services.

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2. Income Inequality Measurement Sensitivities

Christopher Sarlo, Jason Clemens, and Joel Emes

This study focuses on the current state of income inequality, its change over time, and measurement issues relating to income inequality in Canada. Specifically, it calculates the current state of income inequality using a host of different income and economic unit definitions. In addition, the study quantifies changes in income inequality over time. Finally, the paper examines how different definitions of income, economic units (individual, family, or household), and the indicator used can all alter the measurement of inequality and its change over time. This latter point is critical to understanding inequality. Too often, improper measures of inequality are used to arrive at results supportive of an advocate's pre-existing position. This study provides a number of different measures of income inequality and demonstrates how each changes over time in order to highlight how these definitions influence the outcome of inequality measurement.

The first part of the paper explains the many definitional choices faced when measuring inequality. Definitions are provided, for example, for the different measures of income available as well as for the different economic units employed when measuring inequality. The second section provides a series of inequality measurements based on these different definitions. Critically, this section discusses how changes in the underlying definitions alter the level of inequality and its changes over time. The empirical section is followed by a discussion of various issues influencing the measurements. In addition, an expanded discussion of how changes in households over time affect income inequality is presented. The paper ends with some brief concluding comments. Appendices provide detailed results and robustness checks.

Definitions and Selected Measures

Changes in the definition of income, of the recipient of income (economic unit), or of the particular indicator of inequality all influence the measurement of inequality and its change over time. This section outlines and explains the different definitions of income and economic units available when measuring inequality. The main indicators available to gauge inequality are also discussed.

Measures of Inequality

Economic inequality refers to differences in living standards between persons, households, regions, and nations. Since the "standard of living" has a number of possible interpretations, proxies such as income or wealth (most often the former) are used to represent an economic unit's living standard.[1] A common way to look at economic inequality is to examine differences in the incomes of individuals, families, or households within a specified region in a specified time period, normally a year.

Income inequality itself can be measured in a number of ways. Arguably the most common methods employed are quintile or decile shares and the Gini coefficient.

Table 1 presents the most common approach to measuring inequality. This approach ranks every family's income from highest to lowest, and then separates the total number of families into five equal groups. This is referred to as a quintile share analysis. The result is a ranking of families, based on total income, from the lowest group (bottom 20 percent) to the highest group (top 20 percent). Sometimes the analysis is based on ten groups, or what is called a decile share analysis.

Table 1: Quintile Distribution of Total Income of Economic Families, Canada, 2010

Quintile	Share (%)
Bottom 20%	4.2
2	9.6
3	15.4
4	23.7
Top 20%	47.1

Sources: Statistics Canada, SLID microdata file, 2010; calculations by C. Sarlo.

1. This is not to suggest that income fully represents one's standard of living. There are of course a number of other aspects of living standards that would be important (consumption, wealth, and economic and personal security, for example); however, income is commonly used as a proxy for living standards and is used here consistent with the focus of this paper.

The data in table 1 are for families in Canada, based on total income in 2010.[2] It is important for readers to understand the number of choices underlying this data. First, families were selected rather than individuals or households. Second, total income was selected rather than other measures of income. It is these choices and their impact on measured inequality that are explored and analyzed in this paper.

To the extent that the information collected by the survey is accurate, the quintile distribution presented in table 1 illustrates income inequality in Canada.[3] Based on reported incomes, the top 20 percent of families in 2010 had 47.1 percent of the total income whereas the bottom 20 percent had 4.2 percent of total income. In other words, the top 20 percent had about 11 times the income of the bottom 20 percent, resulting in a quintile inequality ratio of 11.2.

Recent work, particularly Piketty's *Capital in the 21st Century* relies on a variant of the decile/quintile share ratios: the top decile share of income.[4] Rather than measure the *ratio* of the top 10 percent and the bottom 10 percent, the decile share measures the share of income received by the top 10 percent of individuals or families.

Most people are less familiar with the Gini coefficient, which is another common approach to measuring inequality, although largely used by academics and researchers. The Gini coefficient is based on the Lorenz curve, a plot of the cumulative share of income earned by a population ordered from lowest to highest income (**figure 1**).[5] The "line of equality" represents everyone in society having exactly the same income. The Lorenz curve represents the actual distribution of income; the further away the curve is from the line of equality, the less equal the distribution. Point Z in figure 1 shows that roughly 60 percent of the population earns about 20 percent of the income, so the income distribution in this society is quite unequal. In simple terms, the Gini coefficient

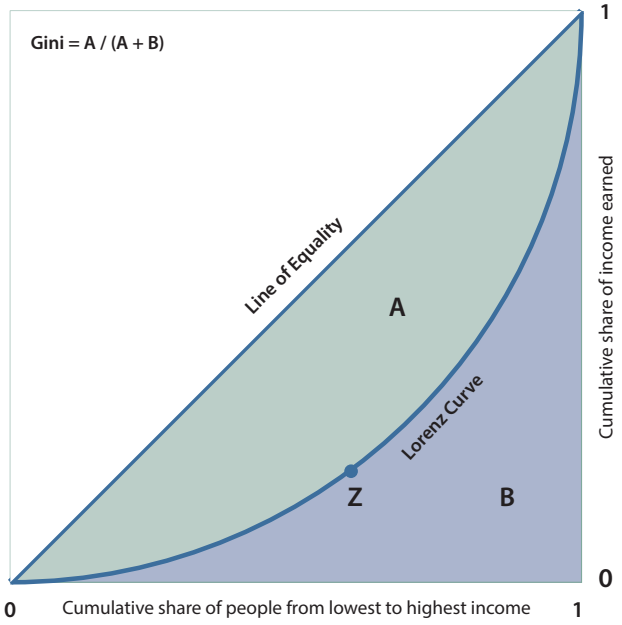
2. The data are from the Survey of Labour and Income Dynamics (SLID), which is an annual survey of roughly 17,000 households randomly selected based on demographic and economic characteristics including income. For further information on SLID please see <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3889>.

3. A number of studies have concluded that there is a problem with reported income in that it can depart from actual income as a result of tax evasion, misunderstandings of what constitutes income, hastiness, or failure to take the survey seriously. For example, Wolfson and Evans (1990) concluded that there was considerable underreporting of certain types of income such as employment insurance income (roughly 20 percent) and social assistance income (40 percent). Similarly, Schuetze (2002) examined non-compliance by self-employed Canadians in reporting income and found that between 12 and 24 percent of self-employment income was underreported.

4. A number of scholarly reviews of Piketty's book that have found fairly serious errors. See Cross (2014) and Magness and Murphy (2014).

5. There are a number of sources that explain the calculation of the Gini coefficient and its relation to the Lorenz curve. See for example <http://en.wikipedia.org/wiki/Gini_coefficient> and <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:20238991~menuPK:492138~pagePK:148956~piPK:216618~theSitePK:430367,00.html; and http://www3.nccu.edu.tw/~jthuang/Gini.pdf; https://www.youtube.com/watch?v=0Vv930-sDTI>.

Figure 1



distills this relationship into a single number between 0 and 1.[6] The value 0 represents a situation in which every single unit in society has exactly the same income—referred to as complete equality of income. The value 1 represents a situation in which a single unit in society has all of the income and every other unit has no income—referred to as complete inequality. All nations have Gini coefficients that are somewhere in between these two extremes.

The principal advantage of the Gini coefficient over tables displaying quintile or decile shares of income is that it captures in a single number the overall degree of inequality. It is relatively easy to understand and brief.

Table 2 presents the Gini coefficients for a select group of industrialized countries as well as several developing countries for the late 2000s, based on adjusted household disposable income. Specifically, income is defined as earnings, self-employment, capital income, and public cash transfers less income taxes and social security contributions paid. Household income is adjusted to reflect differences in needs for households of different sizes (i.e., the needs of a household composed of four people are assumed to be twice as large as those of a person living alone).[7]

6. Although actually determining the values for A and B can be complicated, the Gini is calculated as area A (bounded by the line of equality and the Lorenz curve) divided by the triangle given by the line of equality and the two axis (effectively A + B or 0.5).

7. For additional detail, see <http://www.oecd-ilibrary.org/docserver/download/3012021ec025.pdf?expires=1425420965&id=id&accname=guest&checksum=DACEF83390075FCD0E01FD20CE4D9AEE>.

Table 2: Gini Coefficients, Select Countries, Late 2000s

OECD countries	
Slovenia	0.24
Norway	0.25
Denmark	0.25
Finland	0.26
Hungary	0.27
Netherlands	0.29
Ireland	0.29
Germany	0.30
OECD	0.31
Canada	0.32
Spain	0.32
Italy	0.34
United Kingdom	0.34
United States	0.38
Mexico	0.48
Chile	0.49
Non-OECD countries	
Indonesia	0.37
India	0.38
China	0.41
Russian Federation	0.42
Brazil	0.55
South Africa	0.70

Notes: Data used here were provided by national experts applying common methodologies and standardised definitions. In many cases, experts have made several adjustments to their source data to conform to standardised definitions. While this approach improves comparability, full standardisation cannot be achieved.

For non-OECD countries, Gini coefficients are not strictly comparable with OECD countries as they are based on per capita incomes, except India and Indonesia for which per-capita consumption was used.

Source: OECD, 2013.

Canada's Gini coefficient was 0.32, indicating a relatively more equal distribution of income compared to the United States at 0.38 and a less equal distribution than Norway at 0.25.

This study employs two indicators of income inequality—the top share (both quintile and decile), and the Gini coefficient. Each tells us something a little different about what is happening to the distribution of income, and it will be helpful to measure both.

Economic Units

Economic units refer to the recipient of income. The measurement of inequality requires that a recipient unit be specified. In Canada, the economic unit can be an individual, a family, or a household.

An individual is fairly self-explanatory in that it refers to a single person. An economic family refers to 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. A couple may be of opposite or the same sex. Foster children are included.

A household refers to a person or group of persons who occupy the same dwelling and do not have a usual place of residence elsewhere in Canada or abroad. The dwelling may be either a collective dwelling or a private dwelling. The household may consist of a family group such as an economic family, of two or more families sharing a dwelling, of a group of unrelated persons, or of a person living alone.

Typically, studies of income inequality focus on either households or families, not on both. This study relies on family units rather than households because changes in family structure such as size, composition, and other characteristics explain some of the observed changes in income inequality over time.

It is also important to recognize that individual incomes should not be confused with the incomes of unattached individuals who are not members of families. Individual incomes include the incomes of all individuals whether they live alone or not. It is simply an accounting of everyone who has an income source.

We expect individual incomes to be less equal than family incomes because we have considerable pooling of incomes within families. This pooling of income pulls a lot of low and high incomes together and tends to compress (make more equal) the range of family incomes relative to the incomes of individuals. Consider for example an affluent married couple where most of the income is earned by one of the partners while the other works part-time and cares for the couple's children. If the two partners are considered as individuals, one would be categorized as living in low income while the other would be considered to be earning high income. The reality is that the income of the working partner is shared by the entire family, which means the appropriate recipient unit is the family.

It is important to understand the levels and trends of inequality for both individual and family incomes. The former has the potential to reveal aspects of inequality masked by the pooling of incomes that happens with the latter. In keeping with the principle that more information is better than less, this study calculates and presents measures of both family and individual income inequality.

Definition of Income[8]

There are a variety of income definitions that can be used when gauging inequality. Four are used in this analysis: (1) earnings, (2) total income, (3) after-tax income, and (4) adjusted after-tax income.

The measures defined below are all reasonable measures of income but will result in different perceptions of the state of inequality and its change over time. As with the choices among different indicators and recipient units, the key is deciding which income definition is the most appropriate.

Earnings refers to the sum of employment income, which includes wages and salaries, net farm income, and net income from non-farm unincorporated business and/or a professional practice. A number of recent studies noting a sharp

8. This section relies heavily on Statistics Canada's Income Reference Guide, National Household Survey (2011). Indeed, in several cases the definition was extracted directly from the reference guide. See <http://www12.statcan.gc.ca/nhs-enm/2011/ref/guides/99-014-x/99-014-x2011006-eng.cfm>.

rise in income inequality have used a measure focused on market income,[9] which is a broader definition than earnings. It adds investment income (largely capital gains, interest, and dividends) and private retirement pension income to earnings.

We favour **total income**, which captures all of the sources of income flowing into a household, and is most often used in studies of income inequality. Total income is more complicated because it includes a much broader array of sources of income. Technically, it refers to the sum of certain receipts (in cash and, in some circumstances, in kind) of the reporting unit (individual, family, or household) during a specified reference period. It refers to monetary receipts from certain sources, before income taxes and deductions. It includes active employment income from wages, salaries, tips, commissions, and net income from self-employment (for both unincorporated farm and non-farm activities). It also includes income from employer and personal pension/retirement sources such as private pensions, and payments from annuities and RRIFs. Income from investment sources such as dividends and interest is also included in total income. Other regular cash income such as child support payments, spousal support payments (alimony), and scholarships are included too.

Total income also includes income received from government sources such as social assistance, child benefits, employment insurance, Old Age Security pensions, Canada or Quebec pension plan benefits, and disability income.

A number of payments that are deemed one-time in nature are excluded from the definition of total income. These include lottery and gambling winnings, cash inheritances, lump-sum insurance settlements, capital gains, and RRSP withdrawals. Capital gains are excluded because they are not by their nature regular and recurring. It is further assumed that they are less likely to be fully spent in the period in which they are received, unlike income that is regular and recurring. Also excluded are employer's contributions to registered pension plans, Canada and Quebec pension plans, and employment insurance. Finally, voluntary inter-household transfers, imputed rent, goods and services produced for barter, and goods produced for own consumption are all excluded from the definition of total income.

What total income ignores, of course, is that fact that the recipient unit (household, family, individual) does not get to spend all of their total income. People pay taxes out of total income and so, if we want a better guide to the actual standard of living (the spendable purchasing power) of the unit, we need to consider **after-tax income**. After-tax income is often referred to as "disposable income" and is a better gauge of living standards than pre-tax or total income. It refers to total income from all sources minus federal, provincial, and territorial income taxes paid.

9. See for example Fortin (2012), Broadbent (2012), Milligan (2013), Heisz (2007), and Baker et al. (2003).

One concern with after-tax income is that it does not account for the number of people being supported by that level of income. The living standard of five people in a household with $50,000 in after-tax income will be different from that of a single person with the same $50,000 in after-tax income.

A method to adjust income so that the size of the household is accounted for is needed to make comparisons reasonable. Clearly, making a straight per-capita adjustment is not appropriate. Income of $50,000 for five people in a household does not provide the same standard of living as $10,000 for one person. It's higher. There are economies of scale that occur when a number of people live together. They share accommodation, appliances, television and cable service, furnishings, utilities, and often a family automobile. Those economies of scale mean that additional persons in a household do not cost as much as the first person, and succeeding persons cost even less.

Economists have found a mechanism for making adjustments in household income to account for household size. It involves the use of what are called equivalence scales. Equivalence scales are a set of numbers that show how much more income households of two or more people need to have in order to maintain the same (equivalent) standard of living as a household of one person.

One of the most common equivalence scales in use in studies of poverty and inequality (and the scale used in this study) is the Square Root Scale: the square root of household size is the adjustment factor for equating living standards. Specifically, the first person in a household is assigned a value of 1, two people require 1.4142 (the square root of 2) times the income of the first person to be as well off as the first person, three people require 1.7321 (square root of 3) times the income of the first person, and so on. While it may seem to be an odd and arbitrary choice, the Square Root Scale appears to be close to other scales that are based on research of poverty situations. **Table 3** displays the square root equivalence scale values by household size.

Adjusted after-tax income (or adult-equivalent after-tax income) refers to after-tax income, as defined above, adjusted by a factor that accounts for family size. The adjustment factor takes into account the lower comparative needs of additional family members compared to a single person living alone.

Whatever the household's income, we divide it by the square root of household size to get the adjusted (or "equivalized" or "adult equivalent") income for that household. In the study this is referred to as AE_Income. This allows households of different sizes to be reasonably compared with each other.

Table 3: Square Root Equivalence Scale Values

Household size	1	2	3	4	5	6
Scale symbolically	√1	√2	√3	√4	√6	√6
Numerical value	1	1.4142	1.7321	2	2.2361	2.4495

Clearly, the different kinds of incomes will each have their own distributional characteristics and therefore will have a different level of inequality. Broadly speaking, earnings are likely to be more unequally distributed than total income because a substantial portion of the population have zero earnings (many students, retired persons, stay-at-home spouses, social assistance recipients, etc.) whereas almost every household and every adult within a household will have some source of income.

Furthermore, we expect that earnings inequality would increase over time if more households had zero earnings and if there were more high earners. In fact, this is exactly what has happened over the past three decades. In 1982, about 18 percent of households had zero earnings but less than one percent had zero (or less than zero) total income. As well, by 2010, 22 percent of households had zero earnings. And, by 2010 the proportion of high earning households had increased 10 fold.[10]

Similarly, we would expect after-tax income to be less unequal than total income due to the effect of a progressive income tax (which takes a greater percentage of income as one's income increases). And finally, we expect that adult-equivalent incomes would be even more equally distributed as household size is accounted for.

The next section presents calculations of income inequality based on different measures of income and different units of account to illustrate how these different definitions influence the level of and changes in inequality over time.

Measures of Income Inequality with Varying Definitions

The main premise of this study is that measuring income inequality is not a simple matter and involves a number of definitional choices by researchers. These choices have a real and important impact on the results. Indeed, choices made about the definition of income and the recipient unit will fundamentally change the level and trend of income inequality. So there is a concern about naiveté and simplification in the measurement process.

This section briefly explains the process used in the study to calculate the level and trends in income inequality in Canada over the past several decades. The main data source for this study is Statistics Canada's Survey of Consumer Finances (SCF) and Survey of Labour and Income Dynamics (SLID). Statistics Canada has microdata files containing information on individual income and its components dating back to the 1970s. We chose 1983 (using 1982 incomes) as the starting point of the empirical research for this study because 1983 was the first year they produced separate files for both family

10. This assumes a high-income threshold of $100,000 in 1982 and the constant dollar equivalent in 2010.

and individual incomes. The SCF was no longer produced after 1996 and was replaced by the Survey of Labour and Income Dynamics (SLID).

The Survey of Labour and Income Dynamics (SLID) was discontinued in 2011, meaning the most recent data available from the SLID is for 2010. It was replaced by the Canadian Income Survey (CIS), which is a new cross-sectional survey developed to provide information on the income and income sources of Canadians, along with their individual and household characteristics. Its first release was based on annual income information for the 2012 reference year. The CIS reports on many of the same statistics as the SLID. However, due to methodological differences between the two surveys, the results of the Canadian Income Survey should not be compared to those produced by SLID.

The study employs a fairly long time period, 1982 to 2010, to ensure that changes in inequality resulting from short-term economic fluctuations are properly accounted for. Four individual data points were used: 1982, 1990, 2000 and 2010. The data presented are based on the Survey of Consumer Finances for 1982 and 1990, and on the Survey of Labour and Income Dynamics for 2000 and 2010.

Three income definitions—earnings, total income, and after-tax income—are used to examine income inequality for individuals. These three plus adult-equivalent after-tax income are used for family income inequality. Two separate inequality indicators are used for this study: top share (both quintile and decile shares), and the Gini coefficient.[11]

Top Share Measures of Income Inequality

The first measure of income inequality is the share of income received by the top 10 percent (decile share) and the top 20 percent (quintile share). The top share indicator is increasingly preferred and used by economists concerned with inequality.

Families

Table 4 shows data for the top decile and quintile shares of income for families over the 1982 to 2010 period. Four income measures are presented for both the decile and quintile shares of income—earnings, total income, after-tax income, and adult-equivalent after-tax income.

There are three analytical aspects of interest: (1) level of inequality, (2) changes in inequality over time, and (3) the range of results generated by the differing definitions of income employed. It is the latter observation that will be stressed in the analysis, since the main exercise of this paper to demonstrate how these different definitions influence the analysis of income inequality.

11. The top share indicator appears to be increasingly common in studies measuring inequality. Recent examples include Veall (2012), Milligan (2013), Saez (2014), Piketty (2014), and Armour et al. (2014), to name just a few.

Table 4: Top Decile and Quintile Shares for Economic Families, 1982–2010

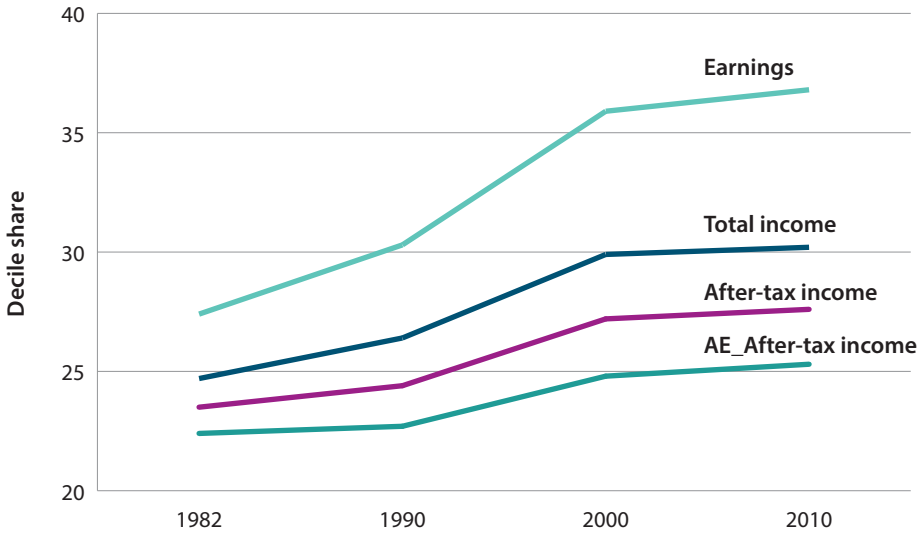
	Earnings		Total income		After-tax income		AE_After-tax income	
	Top decile	*Top quintile*	*Top decile*	*Top quintile*	*Top decile*	*Top quintile*	*Top decile*	*Top quintile*
1982	27.4	46.1	24.7	41.4	23.5	39.7	22.4	38.2
1990	30.3	49.4	26.4	43.0	24.4	40.6	22.7	38.1
2000	35.9	55.8	29.9	46.7	27.2	43.8	24.8	40.3
2010	36.8	57.0	30.2	47.1	27.6	44.2	25.3	40.7
Change, 1982–2010	34.2%	23.7%	22.1%	13.6%	17.3%	11.2%	12.9%	6.5%

Source: Statistics Canada, various years.

In 2010, the latest year of data included in the analysis, income inequality, as measured by the share of income received by the top 10 percent of Canadian families (decile share, **figure 2**), ranges from a low of 25.3 percent for adult-equivalent after-tax income to a high of 36.8 percent for earnings. The top 10 percent of families received 36.8 percent of earnings, 30.2 percent of total income, 27.6 percent of after-tax income, and 25.3 percent of adult-equivalent after-tax income.

By changing the definition of income used to measure income inequality from adult-equivalent after-tax income (total income after accounting for income taxes and normalizing for the size of the household) to a narrower measure of income, namely earnings (basically employment income), measured income inequality increases by 45.5 percent in 2010.

Figure 2: Top Decile Shares for Economic Families, 1982–2010



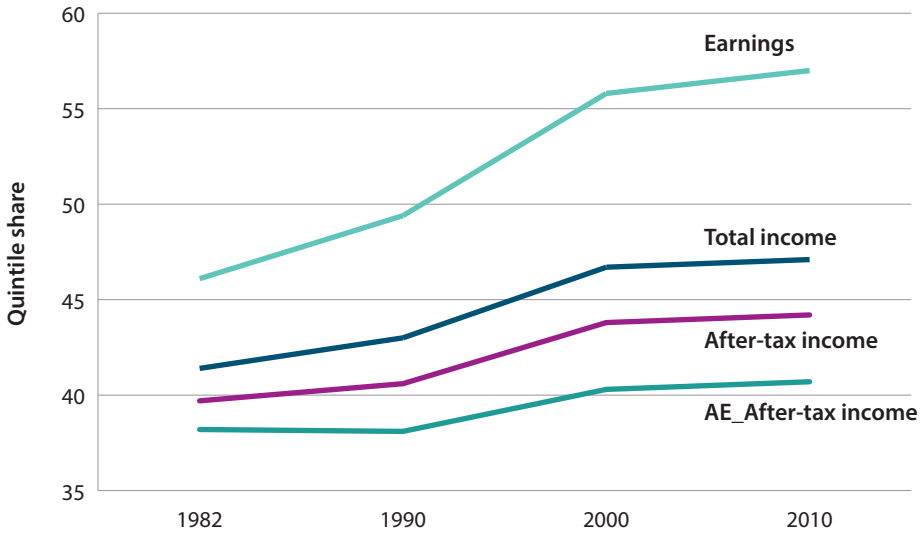
Source: See Table 4.

The top-decile share of family income, when defined as earnings, increased sharply (34.2 percent) between 1982 and 2010. This is not surprising, as mentioned earlier, given that many more families now have no earnings and that, at the same time, there are many more multiple-earner families.

The share of total income and after-tax income received by the top 10 percent of families has also increased, but by less: 22.1 percent and 17.3 percent, respectively, over this period. This lower level of increase when the definition of income is broadened from earnings to total income or after-tax income suggests that the tax and transfer system is, at least temporally, equalizing income. Finally, when we adjust for family size (using the square root equivalence scale), the rise in the share of adult-equivalent after-tax income received by the top 10 percent of families is a more modest 12.9 percent over the period. Put differently, the growth in the share of income received by the top 10 percent of families between 1982 and 2010 is 165.6 percent higher if we use a narrow definition of income than it is if we use a broad one.

The results for the quintile analysis (**figure 3**), which measures the share of income received by the top 20 percent of families, are similar to those for the decile analysis. In 2010, the share of income received by the top 20 percent of Canadian families ranged from 40.7 percent for adult-equivalent after-tax income to 57.0 percent for earnings. Again, changing the definition of income from adult-equivalent after-tax income to the narrower earnings makes measured income inequality higher—in this case, 40.0 percent higher.

Figure 3: Top Quintile Shares for Economic Families, 1982–2010



Source: See Table 4.

The share of income received by the top 20 percent of families increased over time (figure 3), but by less than the increases observed for the top 10 percent of families (figure 2). This suggests that much of the increase in the incomes of the top 20 percent of families is due to increases received by the top 10 percent of families. It is important to note that it is not necessary to be a business, sports, or entertainment superstar to be in that top 10 percent category. Entry into that club required a total income of roughly $140,000 in 2010. Many professionals would be in that income category, as would many mid-level managers and successful small business owners. Critically, it would also include a large number of two-income families.[12]

The increases in income inequality over time, as measured by the share of income received by the top 20 percent of families, range from a low of 6.5 percent for adult-equivalent after-tax income to 23.7 percent for earnings. In other words, the growth in income inequality in this case changes by a factor of 2.6 depending on what definition of income is used.

Individuals

This section applies to individuals the same analysis completed above for families. **Table 5** presents the top decile (10 percent) and quintile (20 percent) shares of income received by individuals between 1982 and 2010 for three different measures of income: earnings, total income, and after-tax income.

Figure 4 illustrates the data from table 5 for the top 10 percent of individuals and the income they received between 1982 and 2010. Their income shares in 2010 vary from a low of 30.0 percent when after-tax income is used to a high of 41.7 percent when income is defined as earnings. Put differently, the level of income inequality, as calculated using the share of income received by the top 10 percent of individuals, increases by 39.0 percent when the definition is changed from a broad measure of income, namely after-tax income, to a narrow measure of income, namely earnings.

The growth in income inequality on this measure also varies considerably depending on what definition of income is used. The growth in the share of income received by the top 10 percent of individual Canadians between 1982 and 2010 is a mere 2.2 percent when after-tax income is used, but income inequality increases by 13.2 percent when earnings are used to define income. The growth in income inequality in this case can be increased by a factor of 6 depending on the definition of income. It is worth noting again that after-tax income is the measure of income that most closely indicates living standards.

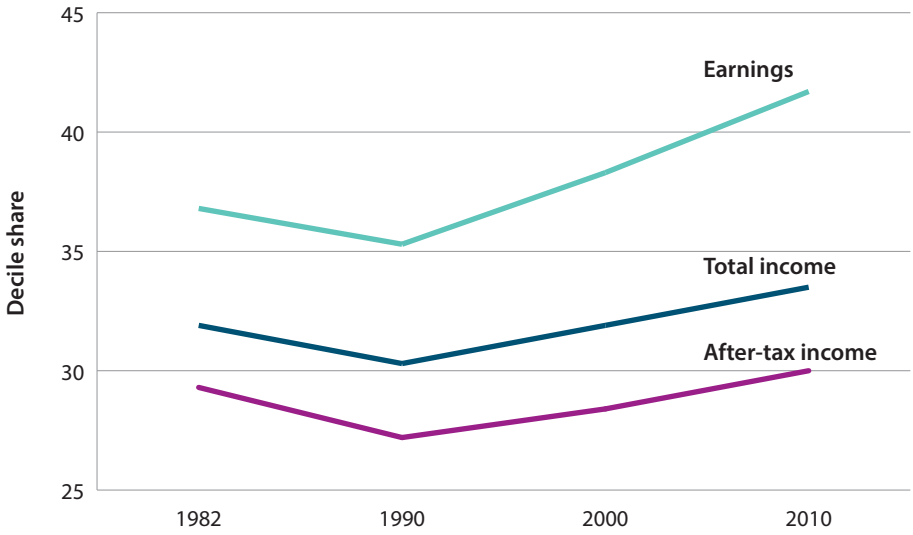
12. For example, in most cases, two school teachers would be in the top 10 percent of family incomes.

Table 5: Top Decile and Quintile Shares for Individuals, 1982–2010

	Earnings		Total income		After-tax income	
	Top decile	*Top quintile*	*Top decile*	*Top quintile*	*Top decile*	*Top quintile*
1982	36.8	59.7	31.9	51.6	29.3	48.4
1990	35.3	56.8	30.3	48.7	27.2	44.9
2000	38.3	59.5	31.9	49.7	28.4	45.7
2010	41.7	63.2	33.5	51.1	30.0	47.2
Change, 1982–2010	13.2%	5.9%	5.0%	-0.9%	2.2%	-2.4%

Source: Statistics Canada, various years.

Figure 4: Top Decile Shares for Individuals, 1982–2010



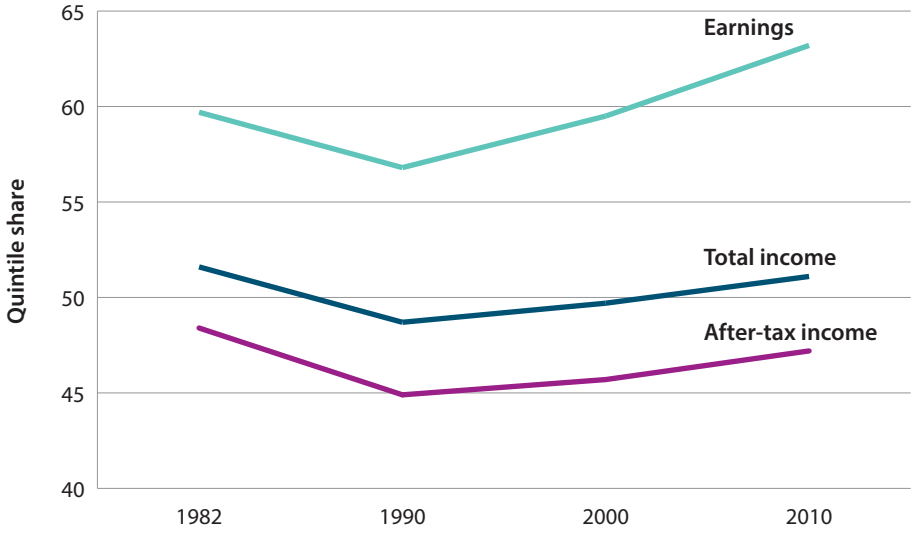
Source: See Table 5.

Similar results are observed when the top share is calculated on a quintile (top 20 percent) basis (**figure 5**). The share of income received by the top 20 percent of individuals in 2010 ranges from a low of 47.2 percent when after-tax income is used to a high of 63.2 percent when income is defined as earnings. The level of income inequality in this case increases by 33.8 percent when the definition is changed from a broader (after-tax income) to a narrower (earnings) measure of income.

The change in income inequality between 1982 and 2010 also varies considerably depending on the definition of income used. Income inequality increased by 5.9 percent if a narrow (earnings) definition of income for individuals is used. On the other hand, income inequality actually decreases by 2.4 percent if the definition of income is switched to the broader after-tax income measure. Indeed, income inequality in this case also decreased during this period, albeit marginally (0.9 percent), if total income is used to define income. On the basis of top quintile shares of individual income (total and after-tax), it would be impossible to make a case that income inequality was decreasing over the specified time period.

As with the previous section that examined the top shares of income for families, large variances are observed in the level of income inequality and the growth in income inequality for individuals depending on what definitions are employed. These large differences in calculated income inequality illustrate the importance of the underlying definition of income.

Figure 5: Top Quintile Shares for Individuals, 1982–2010



Source: See Table 5.

Income Inequality According to the Gini Coefficient

The Gini coefficient is arguably the most popular and the single most important summary indicator of inequality, though it is largely used by academics and researchers. This is because it does not just focus attention on the top share (decile or quintile) of incomes. Rather it considers the entire distribution of income. In that sense, it is a comprehensive indicator and that undoubtedly explains its popularity.

Table 6 contains the results for the Gini coefficients for Canada for 1982, 1990, 2000, and 2010 for both individuals and families. Four measures of income are used to calculate the Gini coefficients for families: earnings, total income, after-tax income, and adult-equivalent after-tax income. The first three of those measures are used to calculate the Gini coefficients for individuals. This section focuses on three aspects of these results: the level of income inequality in 2010, the change in income inequality between 1982 and 2010, and finally how the results vary when different measures of income are employed.

Table 6: Gini Coefficients for Economic Families and Individuals, 1982–2010

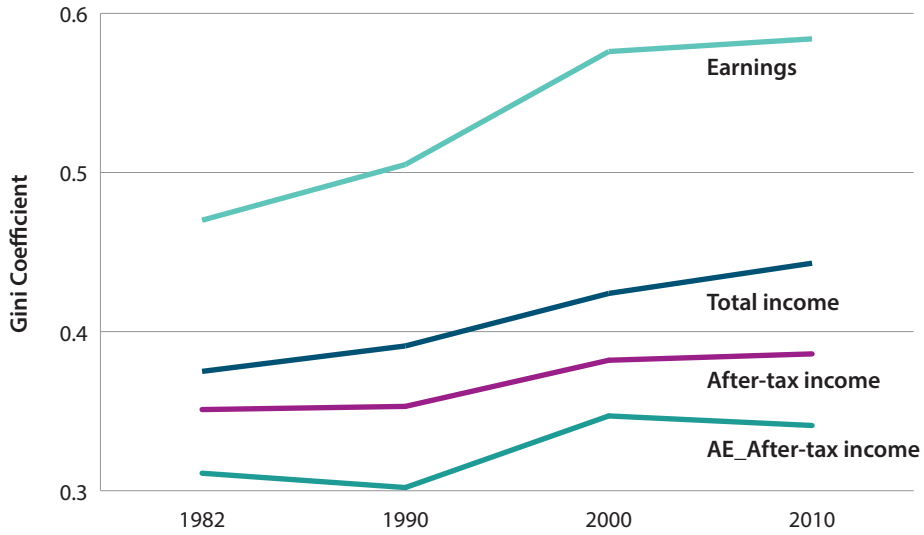
	Earnings		Total income		After-tax income		AE_After-tax income	
	Families	*Individuals*	*Families*	*Individuals*	*Families*	*Individuals*	*Families*	*Individuals*
1982	0.470	0.625	0.375	0.519	0.351	0.489	0.311	n/a
1990	0.505	0.594	0.391	0.479	0.353	0.437	0.302	n/a
2000	0.576	0.607	0.424	0.482	0.382	0.435	0.347	n/a
2010	0.584	0.665	0.443	0.489	0.386	0.468	0.341	n/a
Change, 1982–2010	24.4%	6.4%	18.3%	-5.9%	10.2%	-4.2%	9.6%	n/a

Source: Statistics Canada, various years.

Figure 6 illustrates Gini coefficients for families in Canada. In 2010, these ranged from 0.341 (when income is defined as adult-equivalent after-tax income) to 0.584 (when just earnings are used to define income). In other words, the value of the Gini coefficient in this case can increase by 71.3 percent—implying greater inequality—depending on what definition of income is used.

Between 1982 and 2010, growth in income inequality for families, based on the calculation of Gini coefficients, also indicates great variability depending on the measure of income used, ranging from a low of 9.6 percent (adult-equivalent after-tax income) to a high of 24.4 percent (earnings). In other words, the growth in income inequality based on the Gini coefficients for families increases by a factor of 1.55 when the definition of income is changed from a broad measure that adjusts for household size to a more narrow measure.

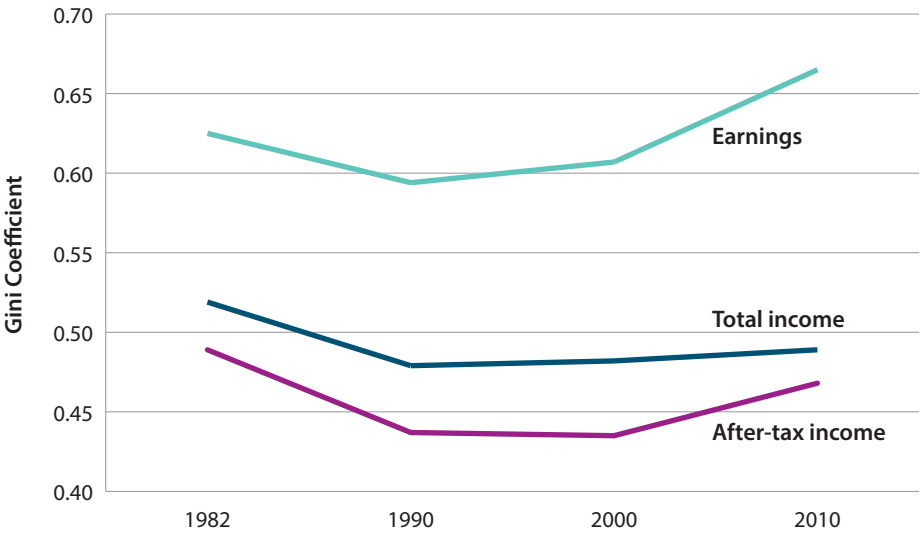
Figure 6: Gini Coefficients for Economic Families, 1982–2010



Source: See Table 6.

Similar results are observed when the Gini coefficients are calculated for individuals rather than families. **Figure 7** depicts the Gini coefficient results from table 6 for individuals in Canada. In 2010, the Gini coefficient for individuals ranged from 0.468 when income is defined as after-tax income to 0.665 when just earnings are used. The value of the Gini coefficient increased by 42.0 percent simply by changing the definition of income.

Figure 7: Gini Coefficients for Individuals, 1982–2010



Source: See Table 6.

Similar results are again observed when the growth in Gini coefficients are examined. Income inequality for individuals *drops* by 4.2 percent between 1982 and 2010 when after-tax income is used, and by 5.9 percent for total income, but *increases* by 6.4 percent when just earnings are used. Only the narrowest definition of income results in an increase in income inequality based on Gini coefficients for individuals.

This section clearly illustrates the sensitivity of income inequality results to decisions about whether to measure individuals or families (receiving unit) as well as what measure of income to employ (earnings, total income, after-tax income, or adult-equivalent after-tax income). The range in the level of income inequality as well as the variability in changes over time are significant. Great care needs to be taken when analyzing and discussing income inequality to ensure that proper measures are employed based on the questions being asked.

Other Considerations

As interesting and important as these results are, there are other considerations that have not been accounted for but which are likely to impact on the extent of income inequality. While most of these considerations are difficult or impossible to accurately quantify, they nevertheless bear mention in the discussion of the empirical results.

Equivalence Scales

While the square root scale is by far the most popular choice for studies of this type, there are other alternatives worth consideration—and it is not at all clear that the same equivalence scale is relevant or valid at all income levels. The square root scale (and others with similar values) was designed for low-income situations. Is it the case that in middle and upper income households a second person would add about 40 percent to costs and a third person another 30 percent in order to maintain the same standard of living as the first person? It can certainly be argued that a scale with lower values might be more appropriate for higher income families where households (and most facilities, furnishings, and appliances therein) are typically already in place.[13]

Sarlo (2008) briefly considered whether these alternatives would materially and meaningfully change the inequality results. Inequality results were

13. For example, Browning (1992) specifically rejected the idea that the same scale could be applied across the board at all levels of income. Browning (1991) developed a scale designed to be applied to middle income, intact families living in Ontario only. If we take the approximate averages (for the various family situations considered by Browning), his 20/10 scale means that the first child in an intact family costs an additional 20 percent, and the second child about an additional 10 percent, of the two parents' costs. As well, Gray and Stanton (2010) examined the range of equivalence scales using a variety of approaches. While the estimated scales vary widely, a significant number lie in the range of 20/10.

determined to be somewhat but not strongly sensitive to changes in equivalence scales. Two different equivalence scales were used to estimate poverty in Canada; while one produced results that were consistently higher, the differences were not sharp and the trend was broadly the same.[14]

However, this is a study of income inequality and a single scale is expected to reflect economies of scale in living across the full distribution of income and not just at the poverty level. It is a valid question as to whether a single scale can adequately represent economies of scale at different income levels. Perhaps two or more scales should be employed at different income ranges. The difficulty is that there is little guidance in the research as to exactly where those adjustments ought to be made. Any choice would be quite arbitrary, defeating the purpose of having a more careful and precise process. The alternative, one that most researchers choose, is to use a single scale across the board.

The biggest advantage of a single scale is computational simplicity. In that regard, the square root scale is ideal. A single transformation tied solely to family size (without regard to living standard, age, gender, or location) certainly makes the calculations easier and avoids the problem of having to make a number of arbitrary choices (instead of a single one). And, as mentioned, the square root scale does resemble the values generated by some other scales used in the study of poverty.

The Problem of Unreported Income

The measurement of inequality relies on accurate information about income (and its components) collected from surveys. In recent years, a high proportion of respondents to Statistics Canada's surveys allow the use of their tax returns as a source of information. Ideally, this should increase the accuracy of the data, assuming that the proportion of the population who misrepresent their income on their personal tax return is stable.

Sarlo (2001: 41–42; 2009: 11–14) addressed the issue of unreported and underreported income, presenting evidence that showed underground economic activity increasing during the 1980s and 1990s and that it could be as high as 15 percent of GDP.[15] The studies further suggested that, overall, the bias was at the lower end of the distribution because of the industries where this activity is more common (service sector, sex business, trades, and crime) and because of the absence of a paper trail with cash transactions. To the extent that incomes, especially those at the lower level, are understated because of unreported income and to the extent that the problem is growing, this would mean that measured income inequality is overstated and increasingly so over time.

14. The square root scale was compared to a scale developed by the US National Research Council.
15. This evidence was drawn from scholars who did original research on aspects of the underground economy, e.g. Wolfson and Evans (1990), Giles and Tedds (2002), Schuetz (2002), and Tedds (2005).

But is the problem of income underreporting only at the lower end of the distribution? What about high income earners who are able to cheat or find legal loopholes to understate their true income? A recent paper by Wolfson et al. (2014) examines this question particularly in the context of "tax planning" and (legal) funds transfers using private corporations by wealthy individuals, effectively lowering their reported incomes. The authors conclude that true income inequality is understated because of this consideration. This new line of research is interesting and important. It clearly bears on the question of the adequacy of reported incomes in measuring inequality. Conclusions about the net impact of underreporting (at both ends of the distribution) must await a more comprehensive study. In the meantime, it is best to reserve judgment about the likely net bias of unreported and underreported income on income inequality.

Different Surveys

Different Statistics Canada data generate different estimates of income and its components. Ideally, if the surveys that produce the data sets are random and if the execution and editing phases of the process are at a high standard, then different surveys of the same population at the same time should generate broadly similar results in terms of key indicators. However, that clearly does not always happen. Sarlo (2008) used two different Statistics Canada data sources for income over the same time period (early 1970s to 2005) and found that the trend in poverty sharply differed by data source. While each data source had a different focus, both surveyed income (and its components) and both claimed to be random surveys representing Canadians across the country. The resulting differences in poverty rates and poverty trends were of sufficient magnitude that this at least raises suspicion that they might generate different inequality results as well.

Data Coding

Some researchers "bottom code" their raw data. This simply means that they either eliminate non-zero values altogether or they "edit" those values to positive numbers. Some researchers also "top code" the data to take out extreme outliers and to make the data comparable to other data sets.[16] While Sarlo has experimented somewhat with both top and bottom coding and is persuaded that the resulting inequality values (for the Gini coefficient, for example) are only modestly different, it does open the possibility to data adjustments leading to different results. For this study, the authors did not "code" the data in any way but did do some coding experiments after the main research was completed.

16. Heisz (2007: 15) describes the process of top and bottom coding (which he employs in his study of inequality in Canada) and attributes the idea to the Luxembourg Income Study (LIS) researchers who use the process routinely in their international studies of inequality.

Other Compensation and Benefits

Is it possible that income itself (even assuming it is accurately reported) is less and less an adequate reflection of people's true living standard? Are there certain benefits that clearly improve the individual's living standard but that are missing if we just look at income? This possibility is particularly germane when discussing measures of income inequality in the United States. For example, Don Boudreaux and Mark Perry point out that measured income excludes fringe benefits (such as various types of insurance, health benefits, and pensions) which now amount to about 30 percent of total compensation (in the US). Including these benefits may serve to increase inequality if taken into account (and added to income). That is because they are connected to employment and are typically unavailable to people who do not work. Moreover, much low wage and part-time work carries with it little or no fringe benefits. On the other hand, if such benefits largely impact the middle class, then including fringe benefits could potentially reduce inequality by increasing the income of the middle groupings.

However, there is a more important omission that, if included, would clearly be equalizing. Fitzgerald (2008) and Burkhouser et al. (2012) examined the impact of including health insurance benefits on the measured well-being of middle class Americans. But this inclusion is far more important in the Canadian context because health insurance is provided to all Canadians equally by government[17] and funded by general tax revenues. As of 2015, government spending on health care totals about $215 billion, or about $6,000 per Canadian resident.[18] If this spending is an adequate proxy for the average value flowing to Canadians of this benefit, then including that value for every person would lower the level of inequality.[19] To the extent that the value of this benefit has increased over the past several decades, such inclusion would be increasingly equalizing.

Changing Nature of Households

There have been important cultural, social, and demographic changes to Canadian households over the past several decades that have impacted income and income inequality. Rising divorce rates, increasing female participation in the labour force, increasing participation in post-secondary education, increasing numbers of multiple income families, falling family size, increasing longevity, and an increase in the reach and scope of government welfare all have potential effects on income inequality.

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17. This is not to say that there are not significant issues with Canadian health care, its universality, and its accessibility.

18. <https://www.cihi.ca/en/health-spending>

19. Adding a constant dollar amount to everyone's income reduces the dispersion of incomes and reduces measured inequality.

In some cases, the impact of these changes on income inequality is fairly easy to predict. For example, the increase in the number of multiple earners in a family in combination with assortative mating is likely to increase inequality as those families without multiple earners are left behind.[20] The rise in the female participation rate in the labour force has a similar impact.

The rise in divorce rates is likely to increase inequality in two ways. First, it results in more single parents who typically have lower than average incomes. Second, it tends to decrease the incomes of both parents, at least in the short term, as both adjust to one of life's most jarring traumas. The often substantial decrease in incomes tends to stretch out the distribution of income and increases inequality.

The increase in participation in post-secondary education will increase income inequality for two reasons. While they are still students, people largely live on their own with little or no reported income.[21] And over time, those people who graduate tend to do much better in the modern labour market, leaving the less educated further behind.

The decline in family size, except to the extent that it is a symptom of increasing lone-parent families, is likely to have an ambiguous impact on income inequality. In any case, an equivalence scale adjustment should, if carefully done, account for such changes in family size as we are then only comparing equivalized incomes.

The rise in the number of seniors could increase measured income inequality because seniors have traditionally had lower incomes. However, that may change as more well-pensioned baby boomers retire into the middle of the income distribution.

The increase in the reach and scope of government welfare could be equalizing to the extent that it lifts recipients up off the bottom to higher living standards. However, to the extent that it increases dependency and keeps people at a lower level than would have been the case without the assistance, it may, in fact, tend to increase inequality over time.

The point here is that many of the dramatic changes in society, even in the past few decades, tend to increase income inequality. The increase in multiple-earner families, the rise in lone-parent families, and the increasing population of students is particularly noteworthy here.

In terms of family compositional changes, in 1981, 16.6 percent of families with children were lone-parent families. By 2006, that proportion had reached 25.8 percent. According to the Survey of Labour and Income Dynamics (SLID), the average income of lone parents (mostly female headed) in 1982 was about

20. Assortative mating refers to the long observed tendency for people to marry within their own socioeconomic class.

21. Student loans do not formally count as income even though they count as part of the student's resources used to cover expenses.

$18,700 or $41,910 in 2010 constant dollars. This was about 56 percent of the average income of all intact families.

By 2010, lone-parent incomes had risen to about $48,000, about 51 percent of the $93,600 figure for all intact families. As well, by 2011, lone parents had more than twice the rate of low income as Canadians in general.[22]

According to the Survey of Consumer Finances, the portion of intact families with two earners in 1982 was 58 percent. By 2010, using the SLID survey, it had reached 77.5 percent. Heisz (2007) has specifically focused on dual earner families as a "probable driver" of the rise in earnings inequality since the late 1970s.

In terms of post-secondary participation, in 1982, the rate for young people aged 20–24 was about 29 percent (both college and university). By 2010, the rate had risen to about 37 percent. In total, there are now about 2 million students enrolled full-time at a post-secondary institution in Canada. While some of them do live at home with parents, a significant proportion live on their own with little or no income. The rise in the proportion of students would tend to increase income inequality.[23]

Robustness Checks

While the empirical work in this paper is largely concerned with the impact of making different choices among inequality indicators and income definitions, there are other choices made along the way. The square root equivalence scale is not the only scale that could have been used, although it is clearly the most popular one. As well, the choice not to code the data prior to estimating the various inequality measures stands in contrast to some research on income inequality (notably much of the LIS work on the subject). Finally, researchers are aware that different software programs have the potential to yield different results using the same raw data. This study performed several experiments to test the robustness of the results to changes in scale: the addition of coding and the employment of other (independent) software routines calculating the inequality measures. These robustness checks are discussed and reported in Appendix 2.

22. Sources for the data in this paragraph include Statistics Canada (various years), <http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2060042&pattern=Canadian+Income+Survey&tabMode=dataTable&srchLan=-1&p1=1&p2=50>, <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/famil21a-eng.htm>, and calculations by C. Sarlo.

23. Sources for post-secondary participation and enrolments include <http://www.statcan.gc.ca/pub/11f0019m/11f0019m2003210-eng.pdf>, <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/educ71a-eng.htm>.

Conclusion

While there are no "true" definitions of income, there are certainly some definitions that make more sense in a particular context. For example, if one wanted to look at the inequality of family living standards, then the preferred income definition would clearly be after-tax income adjusted for family size, rather than just earnings. It is essential that those interested in the issue of inequality understand both the complexity of the issue itself but also its sensitivity to different underlying definitions of income and economic units.

There are a great many choices facing researchers who wish to measure inequality. With each choice there is significant scope for variation in results. For example, income can be defined in a number of ways and each will produce different results. The choice of income recipient (the family or the individual) will lead to variations in results as well, as we saw in our tests.

The empirical results show that there is a fundamental difference in the trend in income inequality if we compare economic families to individuals. Over the almost three-decade period of the study, family (adjusted after-tax) income inequality increased between 5 and 10 percent depending on the inequality indicator used. However, the inequality of individual incomes actually declined over the same period. The decline was also quite modest, in the range of 2 to 6 percent, depending on the indicator, but is very important and is consistent with results using US data.

The many inequality studies of families or households that focus on narrow measures of income like earnings, market incomes, or even total income present an incomplete picture of levels and trends in income inequality. The story they tell is flawed because they do not take account of the equalizing role that taxes play and they do not account for differences in family size. After-tax income is a much better representation of the living standards of families and so is a fairer and more reasonable indicator for comparative purposes.

Furthermore, unless family size is accounted for, we ignore economies of scale in living conditions and miss something important in making comparisons. Unless adjustments are made to consider taxes and family size, we will be overstating the degree of income inequality in our society.

At the very least, the results of the analysis in this study suggest that inequality studies need to be somewhat more cautious with claims about income inequality, at least for Canada.

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Appendix 1: Raw Results of Decile and Quintile Shares

Table A1: Decile and Quintile Shares, 1982–2010: Economic Families

	Earnings				Total income				After-tax income				AE_After-tax income			
	1982	*1990*	*2000*	*2010*	*1982*	*1990*	*2000*	*2010*	*1982*	*1990*	*2000*	*2010*	*1982*	*1990*	*2000*	*2010*
Decile shares																
Top 10%	27.39	30.27	35.90	36.75	24.72	26.39	29.90	30.18	23.49	24.39	27.24	27.55	21.98	22.29	24.80	25.26
2	18.67	19.17	19.89	20.25	16.70	16.65	16.84	16.89	16.22	16.19	16.57	16.61	15.57	15.20	15.51	15.45
3	15.17	15.15	15.08	14.98	13.74	13.40	13.26	13.14	13.49	13.27	13.22	13.23	13.07	12.81	12.79	12.68
4	12.55	12.25	11.49	11.30	11.56	11.15	10.73	10.56	11.55	11.22	10.92	10.81	11.28	11.13	10.89	10.84
5	10.23	9.76	8.55	8.20	9.72	9.32	8.69	8.52	9.85	9.55	9.05	8.89	9.79	9.69	9.36	9.34
6	7.99	7.29	5.79	5.43	7.98	7.65	6.95	6.87	8.25	8.05	7.45	7.36	8.47	8.39	8.02	7.96
7	5.54	4.62	2.93	2.74	6.32	6.05	5.47	5.46	6.71	6.55	6.07	6.01	7.20	7.16	6.76	6.70
8	2.44	1.55	0.50	0.43	4.65	4.53	4.10	4.17	5.14	5.12	4.69	4.69	5.81	5.94	5.58	5.44
9	0.08	0.00	0.00	0.00	3.08	3.16	2.78	2.85	3.53	3.69	3.32	3.29	4.45	4.75	4.29	4.22
Bottom 10%	-0.05	-0.06	-0.11	-0.07	1.52	1.69	1.28	1.36	1.77	1.98	1.48	1.56	2.38	2.64	2.02	2.11
Quintile Shares	1982	1990	2000	2010	1982	1990	2000	2010	1982	1990	2000	2010	1982	1990	2000	2010
Top 20%	46.06	49.44	55.78	56.99	41.43	43.04	46.74	47.07	39.71	40.58	43.81	44.16	37.55	37.49	40.31	40.71
2	27.73	27.40	26.57	26.28	25.30	24.56	23.99	23.70	25.04	24.49	24.14	24.04	24.35	23.95	23.68	23.52
3	18.21	17.05	14.34	13.63	17.70	16.97	15.64	15.39	18.10	17.60	16.49	16.26	18.25	18.08	17.37	17.30
4	7.98	6.17	3.43	3.17	10.97	10.58	9.57	9.63	11.85	11.67	10.76	10.70	13.01	13.10	12.34	12.14
Bottom 20%	0.02	-0.06	-0.11	-0.07	4.60	4.85	4.06	4.21	5.30	5.67	4.80	4.84	6.83	7.38	6.30	6.32
Gini coefficient	0.4696	0.5054	0.5763	0.5844	0.3745	0.3906	0.4235	0.4432	0.3505	0.3527	0.3823	0.3864	0.3114	0.3019	0.3474	0.3412

Table A2: Decile and Quintile Shares, 1982–2010: Individuals

	Earnings				Total income				After-tax income			
	1982	*1990*	*2000*	*2010*	*1982*	*1990*	*2000*	*2010*	*1982*	*1990*	*2000*	*2010*
Decile shares												
Top 10%	36.83	35.29	40.82	41.68	31.89	30.28	33.47	33.50	29.34	27.17	29.70	29.98
2	22.87	21.50	21.37	21.53	19.66	18.39	17.82	17.60	19.06	17.77	17.35	17.25
3	16.81	16.21	15.43	15.25	14.98	14.27	13.58	13.30	15.01	14.37	13.76	13.58
4	12.09	12.16	11.00	10.66	11.53	11.32	10.65	10.57	11.91	11.72	11.20	11.11
5	7.40	8.36	6.93	6.66	8.62	8.91	8.33	8.30	9.28	9.48	9.07	8.99
6	3.40	4.80	3.63	3.46	6.13	6.79	6.28	6.33	6.95	7.56	7.17	7.09
7	0.75	1.73	1.06	0.91	4.29	5.06	4.71	4.77	5.04	5.92	5.61	5.51
8	0.00	0.07	0.00	0.00	2.44	3.44	3.26	3.45	2.88	4.18	3.98	4.02
9	0.00	0.00	0.00	0.00	0.54	1.54	1.75	1.94	0.63	1.90	2.14	2.25
Bottom 10%	-0.13	-0.11	-0.23	-0.14	-0.07	0.00	0.13	0.24	-0.08	-0.06	0.01	0.20
Quintile Shares												
Top 20%	59.70	56.80	62.19	63.21	51.55	48.67	51.29	51.10	48.40	44.94	47.05	47.23
2	28.91	28.37	26.43	25.91	26.51	25.59	24.24	23.87	26.93	26.10	24.96	24.69
3	10.79	13.16	10.57	10.12	14.75	15.70	14.62	14.63	16.22	17.04	16.25	16.09
4	0.75	1.80	1.06	0.92	6.73	8.51	7.98	8.22	7.91	10.10	9.59	9.53
Bottom 20%	-0.13	-0.11	-0.23	-0.14	0.46	1.54	1.88	2.18	0.54	1.82	2.15	2.45
Gini coefficient	0.6252	0.5942	0.6496	0.6652	0.5192	0.4786	0.5150	0.4886	0.489	0.4373	0.4337	0.4684

Appendix 2: Robustness Checks and Experiments

Do changes in the choices made to adjust the data make any difference in the results for income inequality? For example, would the degree of measured inequality, using the Gini coefficient for example, change if we use a different equivalence scale, or if we perform some bottom or top coding? Some modest experiments along these lines were made in the course of this research and the results are presented and discussed below.

A different equivalence scale

It was noted earlier that a range of equivalence scale values have been estimated and used in other studies. Many of those assigned a lower value to a marginal person (or child) in a household than the square root scale, which can be considered to be on the higher side of most scales in use.

A "double square root" scale could be an elegant, easy-to-employ alternative to the prevailing square root scale. It would simply take the square root of family size and then take the square root of the result as the scale. Clearly this scale assigns much lower values to marginal persons, however, it would

be broadly similar to a 20/10 scale that some researchers have utilized (see Stanton, 2010). And it may be viewed as more relevant to middle and upper income families where the marginal cost of an additional person might be lower.

Double Square Root Equivalence Scale Values

Household size	1	2	3	4	5	6
Numerical value	1	1.19	1.32	1.41	1.50	1.57

The result of employing this alternate equivalence scale is that there are only very minor changes in the Gini coefficient. In three of the four cases the Gini coefficient increased modestly (by less than 4 percent); in the fourth case it decreased, again very marginally. Therefore, based on this experiment, it appears that a fairly significant change in the equivalence scale will have only a slight change in measured inequality.[24]

Coding

A number of researchers "code" their data prior to running their inequality routines. Bottom coding refers to a process of eliminating some of the records at the bottom of the distribution, largely to remove negative (or zero) incomes. Top coding is similar, but involves the removal of records at the very top. Heisz (2007) points out that the LIS protocol (and one that he employed in his own study) is to top code by removing any records above ten times the median income and to bottom code by removing any records that are below 1 percent of mean. Other researchers use milder versions of this kind of coding. Sarlo (2008: 16) used the LIS protocol and found only minor differences in measured inequality as a result. For this paper, a more modest bottom coding experiment (eliminating all negative and zero incomes) was conducted and, again, the differences in measured inequality were very minor. Specifically, bottom coding of the economic family data (removing any values of total income that are zero or negative) in 1982 resulted in a Gini coefficient of 0.3211, compared to 0.3114 when the data is not bottom coded. This is a difference of about 3 percent. In 2010, the difference was less than 1 percent.

What about top coding? Would there be a significance difference in the Gini coefficient if we lopped off the very top incomes? Since the top 1 percent of the income distribution is a much discussed component, a small experiment was done with total incomes in 2000. The top 1 percent was removed and the new Gini coefficients determined for the top-coded distribution, for both personal and economic family total incomes (**table A3**).

24. This more or less confirms the results in Sarlo (2009: 9–11).

Table A3: Top Coding the Data for the Year 2000 (Removing the Top 1 Percent)

File	Variable	Top Coded	Not Coded	Difference (%)
Individual incomes	Total income	0.4592	0.4819	**4.71**
	After-tax income	0.4176	0.4337	**3.71**
Economic families	Total income	0.3963	0.4235	**6.42**
	After-tax income	0.3620	0.3823	**5.31**
	AE_After-tax income	0.3243	0.3474	**6.65**

This experiment shows that a top coding (removing the top 1 percent of total incomes) results in small differences in measured inequality in the order of 4–7 percent. At least 93 percent of the inequality remains after removing this top component of the distribution. Perhaps one tentative conclusion of this exercise is that the top 1 percent is clearly not the key to explaining observed inequality. Most of the explanation lies elsewhere.

Verifying the calculations

Handling large databases is complicated. From the access point, often requiring conversion, all the way to the calculations of shares and Gini coefficients, there are many places where errors can creep in. In addition, different computer programs can interpolate differently and can handle weights differently. Finally, all databases with the same name can contain some differences.[25]

Given these challenges and the scope for potential error, the author engaged in some modest verification of the results. Once the final (correct) databases were in place, the raw data was given to two other researchers (both very familiar with inequality research) to check the results. During the first pass of this exercise, the programs calculating the inequality measures (decile and quintile shares and Gini coefficents) were run without the weights (assuming every weight was equal to 1). In that case, all the values of the Gini coefficients and all share values were verified in every single case. However, because different programs handle weights differently, small differences occurred once the weights were part of the calculations (**table A4**). While the results were not identical with each other, they were acceptably close and the trends were the same. The Statistics Canada results for some comparable variables (using their own, unedited databases) are included in table A4 as well.

25. Attempts to replicate Statistics Canada results may encounter issues because the agency has access to and uses the full database, whereas most researchers only have access to the "public use" version which is edited to ensure confidentiality. As well, Statistics Canada has made changes in the weights associated with a file but not revised the existing documentation for the public use files. In the course of this research project, this happened with one of the files and was only caught, late in the process, because of the validation process described here.

Table A4: Verifiying the Calculations: Gini Coefficients Calculated by Three Researchers

Year	File	Researcher	Earnings	Total income	After-tax income	AE_After-tax income
1982	Economic families	1	**0.4696**	**0.3745**	**0.3505**	**0.3114**
		2	0.4830	0.3857	0.3598	0.3441
		3	0.4709	0.3733	0.3479	0.3217
	Individual incomes	1	**0.6252**	**0.5192**	**0.4890**	
		2	0.6297	0.5230	0.4924	
		3				
	Statistics Canada results [CANSIM 202-0705]			0.38	0.351	
1990	Economic families	1	**0.5054**	**0.3906**	**0.3527**	**0.3019**
		2	0.5135	0.3903	0.3591	0.3349
		3	0.5089	0.3855	0.3519	0.3147
	Individual incomes	1	**0.5942**	**0.4786**	**0.4373**	
		2	0.5968	0.4771	0.4402	
		3	0.5952	0.4746	0.4344	
	Statistics Canada results [CANSIM 202-0705]			0.395	0.357	
2000	Economic families	1	**0.5461**	**0.4160**	**0.3718**	**0.3474**
		2	0.5708	0.4201	0.3859	0.3395
		3	0.5499	0.4122	0.3774	0.3267
	Individual incomes	1	**0.6072**	**0.4819**	**0.4348**	
		2	0.6369	0.4853	0.4450	
		3	0.6195	0.4791	0.4356	
	Statistics Canada results [CANSIM 202-0705]			0.431	0.392	
2010	Economic families	1	**0.5844**	**0.4432**	**0.3864**	**0.3412**
		2	0.5767	0.4165	0.3820	0.3308
		3	0.5861	0.4292	0.3941	0.3448
	Individual incomes	1	**0.6652**	**0.4886**	**0.4684**	
		2	0.6432	0.4788	0.4401	
		3	0.6502	0.4893	0.4493	
	Statistics Canada results [CANSIM 202-0705]			0.431	0.395	

3. Consumption Inequality in Canada: Is the Gap Growing?

Christopher Sarlo

Much has been written about economic inequality in recent years. Most of the academic studies and news stories deal with income inequality. Income inequality, of course, looks at differences in "potential" living standards. Income, especially after-tax or disposable income, measures the capability of a family or individual to afford a particular standard of living—if they spend all of that income. However, we know that people generally do not spend all of their income. For example, people save. They may use some of their income to repay debt. Finally, some people use a part of their disposable income as a gift to others. The most obvious example is parents giving money to their children at various stages, to assist them with education and living expenses. Charitable giving is another important example. Gifts can be any transfer of income or wealth that benefits others. All of these things (saving, debt repayment, and gift giving) reduce the ability of the income recipient to afford that living standard potential represented by their income.

There is a case to be made that consumption inequality is at least as important and interesting as income inequality. Consumption better reflects people's actual living standards because it represents, for the most part, the choices that people make about the goods that bring them enjoyment.[1] Consumption is tied to income, of course, but not completely. People can expand their consumption choices by borrowing and they can consume less than their income by saving.

This paper argues that, in many ways, consumption is a preferred indicator for the measurement of economic inequality. The next section explains the role that consumption and income play over the course of a person's lifecycle. Then the case for consumption as an indicator for the measurement of inequality is

1. All references to consumption in this paper refer to individual and household level spending and not to aggregate consumption as a component of GDP.

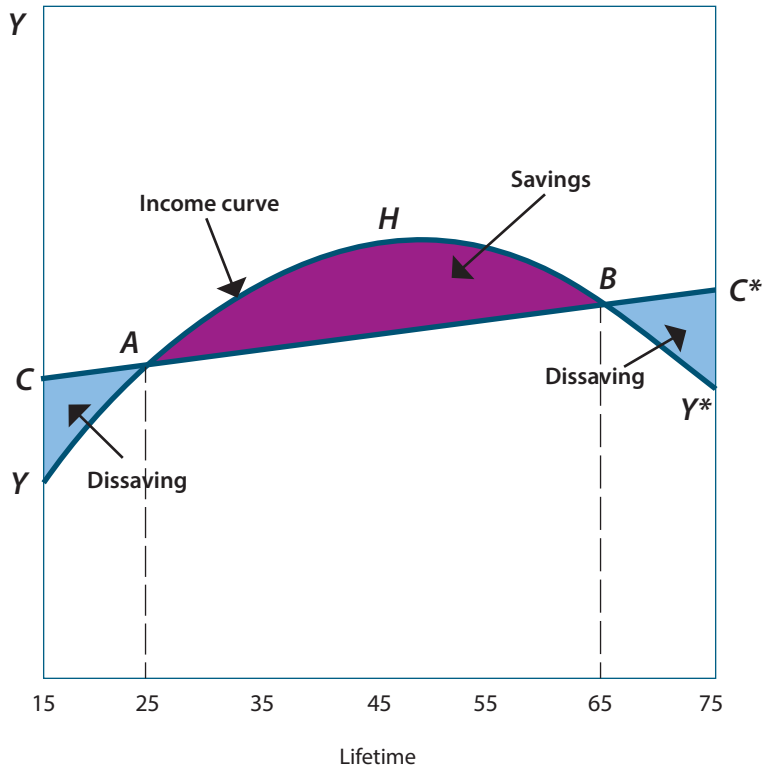
examined. After dealing with some methodological and data issues, the paper then takes a fresh look at consumption inequality in Canada over the 40 year period between 1969 and 2009. It focuses on two sets of measures. The first is the traditional Gini coefficient, which is the most popular comprehensive measure of overall inequality. The second is the ratio of top-to-bottom shares (both decile and quintile) in the distribution of consumption. Finally, consumption inequality is placed alongside income inequality to provide a more complete picture of the longer term trend in inequality in Canada. The results show that while income inequality has increased modestly (by about 11 percent) over the 40 year period, consumption inequality is only 3 percent higher than it was in 1969.

Understanding Consumption and Income: The Lifecycle Model

Age plays a very important role in explaining patterns of consumption and income. Young people, say those under 30, are either still in school or are starting out in the labour market. Typically, their consumption will exceed their income as they borrow to help finance spending related to their education, or to acquire of some durables (like autos, furnishings, appliances, etc.) related to starting their own households. During their middle years, say 30 to 60, their incomes are usually higher and their spending needs lower, at least in relative terms. This is the period in life when most people begin to save and put money away for retirement. During this phase of the lifecycle, income typically exceeds consumption. After this period, it is common for people to begin to dissave by using monies accumulated in earlier periods to finance their post-employment needs. Because income normally drops substantially in this phase of life and people try to maintain an appropriate level of consumption (given their situation), consumption often exceeds income once again. This pattern of income and consumption is captured in the familiar "lifecycle" graph (**figure 1**).

There is substantial empirical evidence supporting this pattern. Consumption is higher than income during some periods and lower during other periods. While the graph does not fully show this, we observe that consumption is generally smoother and less volatile than income. Income is subject to a number of shocks during one's lifetime. Situations like unemployment, promotions, illnesses, and marriage or divorce can and do have important impacts on income. Through it all, people generally try to maintain a fairly stable level of consumption.

Figure 1: Lifecycle Theory of Consumption



Why Measure Consumption Inequality?

The near-singular focus on income inequality is misplaced. There are several reasons why measuring consumption inequality might be preferred when examining the extent of economic inequality.

Less likely to be underreported

A significant concern with the measurement of income inequality is that income is substantially underreported. The latest study of underreporting, by Bank of Canada economists Dunbar and Fu (2015), indicates that underreporting is far more of a problem at the bottom of the income distribution. Tax evasion and tax avoidance are the main reasons. This means that, using reported income data, measured income inequality will be overstated. While reported consumption is not perfect and suffers from some of the same problems as income (e.g., low response rates, respondent errors), there is not the same underlying motivation to understate consumption. So consumption data is likely to be more accurate.

More closely connected to people's actual living standards

Economists frequently argue that consumption (actual expenditures) is a better reflection of a family or individual's standard of living than disposable income. Because people can consume more than their income (via borrowing and dissaving) or less than their income (when they save), the aggregate level of consumption better represents economic well-being than income. On a disaggregated basis, consumption reflects the specific choices that people make to improve their well-being, whereas income merely represents purchasing power or stored potential. Consumption is one step closer than income to people's actual living standard. "Furthermore, consumption is what ultimately generates well-being—consumption, not income, is typically the argument of utility functions in economic models" (Norris and Pendakur, 2015: 2).

Less volatile

Income is subject to a wide variety of exogenous shocks and influences over a person's lifetime. For many people, current income has substantial variability because of such events as unemployment, job change, promotion, retirement, marriage, and divorce. Consumption, on the other hand, is more stable than income as people try to smooth out the vagaries of income by maintaining, as far as possible, a "normal" level of consumption that reflects their situation (short and long term). In combination with the previous rationale, this suggests that measuring consumption inequality is a preferred way to examine economic inequality.

For these reasons, consumption inequality should be measured and compared to income inequality. It is, at least, a useful complement to measures of income inequality. And there are practical reasons why it might be preferred over income inequality. Having said that, income is a very important indicator as well. Income not only represents potential consumption (and the utility that is generated from that consumption), but also generates utility directly. People derive a psychic benefit from the power and potential that income represents, and this includes the utility derived from saving or gifting a portion of that income.

The problem with income, of course, is that the term covers a large number of somewhat related concepts. Depending on the definition of income used in empirical work, we can get different (and sometimes substantially different) results. Market income (largely earnings), total income, after-tax income, and adjusted after-tax income have all been used in various studies of inequality, and cases have been made for the relevance of the particular definition used in each. For further discussion of the multiple conceptions of income and the different inequality results obtained, please see Chapter 2. However, despite this complication, it would be hard to conclude that consumption is a superior indicator. It would be better to state that, for the measurement of differences in actual living standards, there are some good reasons to prefer consumption inequality.

Conceptual, definitional, and measurement issues

What does consumption include?

Defining consumption is not a simple matter. Current expenditures on food, clothing, household items (including supplies, utilities, and personal items), transportation, entertainment, and so on are obvious inclusions. But what about gifts? And for home owners, what about mortgage interest? Should the latter be included as part of consumption of current services or should it be classified as debt repayment?[2]

What about durable assets?

Perhaps more challenging is how to include durable assets that yield a stream of services over time. Owner-occupied housing is the most obvious example, but autos, many furnishings, appliances, and electronic devices also qualify. For households that own their own principal residence, mortgage payments are, on average, the largest shelter-related expenditure. In Canada in 2009, mortgage payments comprised about half of total shelter spending for home owners. However, about 45 percent of homeowners were mortgage-free. Clearly there is a wide variation in mortgage payments and in overall shelter costs for homeowners. Yet the stream of services (the value of consumption) of housing is not nearly as variable and is not adequately represented by actual spending on housing.

There are techniques to estimate the equivalent rent for owner-occupied housing using relevant observable variables. This imputed rent is designed to capture the consumption flow of services of housing for owners. In a recent paper, Norris and Pendakur (2015) employ a method to estimate imputed rent for homeowners. They argue that this is an important correction which can affect measured consumption inequality.

Even if there exists a reliable way to impute rent (flow of consumption) for homeowners, what do we do about the many other durable assets (like cars, furnishings, major appliances, and computers) that households acquire and that have consumption flows over a longer period of time? The household purchasing a $40,000 vehicle in 2015 would have roughly the same stream of services from that vehicle in 2016 but records zero spending on that item in that year. There is a similar concern with other durable assets. Finding a reliable and practical method to account for flow of consumption from durable goods may be impossible. However, unless there are fundamental changes over time that would be likely to drive unadjusted consumption inequality in a particular direction, the naive, unadjusted approach to measurement may be reasonable.

2. Statistics Canada, in its measurement of consumption, has struggled with these questions and has changed how it treats such items in the past. They now include both items as consumption. See the SHS 2009 Users Guide, p. 14 and p. 70.

What about prices?

Some studies examining consumption inequality over time adjust (or deflate) raw consumption expenditures for price changes. If the goal is to measure the amount of consumption, then expenditure amounts driven by price changes will mask the underlying quantity changes. By taking prices out of the picture, we should ideally be left with the focus of our interest, which is "real" consumption (quantities). As well, if there are different prices and price patterns regionally, a single, national estimate of consumption inequality will not capture potentially interesting regional differences.

Finding the appropriate price indexes for the various categories of expenditures could be a challenge. Generally, agencies that collect consumption data also use this data for the construction of price indexes, so that many of the categories should match. But not all categories of consumption have corresponding price information so the list constituting (measured) consumption must shrink and could be an issue.

There is also a real concern about the relevance of just capturing raw price changes but not any substitutions that will naturally occur. This is a long-standing issue with price indexes. For example, if poorer-than-average people do more "price searching" and spend less money purchasing the same items than better-off people, there will be an improvement in their living standard. People who make substitutions based on relative prices changes do so to make themselves better off. And if this is true, measures of consumption inequality (unadjusted) will overstate consumption inequality.

Other technical considerations

It is well known that income data is underreported.[3] What about consumption data? Are there any reasons why consumers might either deliberately or inadvertently understate or, at least misrepresent, their consumption? Since most consumption spending surveys rely on self-reporting, do people naturally underestimate how much they are spending? And if so, is that underreporting likely to occur more at one tail of the distribution than the other? Some evidence along these lines is presented in the next section. However, unlike the case of income, there does not appear to be any obvious motivation behind underreporting of consumption.

What is known about consumption surveys is that there is typically a low response rate. This is likely due to the fact that most surveys ask people to keep a consistent log of purchases over a period of time. The question is whether certain groups are more likely to underrespond to such surveys and whether that could lead to some bias in the results (in the consumption data) unless appropriate adjustments are made. In the next section there is some evidence presented on this matter as well.

3. For some detail on the nature and magnitude of this underreporting, see Sarlo (2001: 41–42), Clemens (2012: 18–21), and especially Dunbar and Fu (2015).

Studies of Consumption Inequality

Research on economic inequality has been dominated by income inequality largely because of data availability but also because income seems to be a more popular point of comparison. However, that is changing. More and more, economists are emphasizing the advantages of consumption as an indicator of economic well-being, and as new data has become available we are seeing more studies of consumption inequality. In the US, Cutler and Katz (1991) were among the first to measure consumption inequality and compare it to income inequality. They found that "trends in income and consumption inequality closely parallel each other during the 1980s" (p. 9). Krueger and Perri (2006), using US data to 2001, found that, in contrast to rising income inequality, consumption inequality has been relatively flat after a modest rise in the early 1980s. This result supported an earlier study by Slesnick (2001), which concluded that "the widely reported u-turn in inequality in the United States is an artifact of the inappropriate use of family income as a measure of welfare. When well-being is defined to be a function of per equivalent consumption, inequality either decreased over the sample or remained essentially unchanged depending on the choice of equivalent scale" (p. 154).

Attanasio and his colleagues have produced a more recent series of studies of consumption inequality in the US. In the latest paper, Attanasio et al. (2012) found that consumption inequality in the US rose between 1980 and 2010, at a rate comparable to the rise in income. A similar result was found by Aguliar and Bils (2011). However, in a more recent study of consumption inequality over the period 2000–2011 in the US, Meyer and Sullivan (2013) find that while income inequality clearly rose over this period, consumption inequality displayed a much different pattern.[4] It rose from 2000 to 2005 and then fell after that and ended up slightly lower than it was in 2000.

Hassett and Mathur (2012) examine consumption inequality in the US over the period 1984–2010 and make the case that consumption is strongly preferred for making living standard comparisons. They use both flow consumption data and the ownership of key household durables (like dishwashers, home entertainment devices, air conditioning, and computers) to show that the living standard gap in America has narrowed over time. While income inequality has increased, measured consumption inequality has been flat and the ownership of household durables, facilities, and services (like internet)

4. Meyer and Sullivan (2013) articulate a particularly strong case for using consumption in the measurement of inequality. "For example, consumption better reflects long-run resources. Income measures fail to capture disparities in consumption that result from differences across families in the accumulation of assets or access to credit. ... there is (also) empirical evidence that consumption provides a better measure of well-being than income" (p. 178). They cite some of their earlier work in this regard, and state that "other measures of material hardship or adverse family outcomes are more severe for those with low consumption than for those with low income" (p. 178).

has been strongly equalizing in the sense that the gap between lower income households and higher income households has narrowed. They point out that the data ignores such things as quality improvements in some important durables (like electronic devices and autos) which benefit lower income consumers more. They adjust the consumption data for household size and they also present evidence which shows that consumption data in the US (the CEX file) is substantially underreported.

Crossley and Pendakur (2003) were among the first to examine consumption inequality in Canada. They used a shortened list of nondurable consumption items and added an estimate of the consumption flows from owned accommodation (based on the opportunity costs of home equity). The shorter list of nondurables was determined by the availability of price data for matching categories. They used this price data to deflate family consumption levels and then further adjusted "real" consumption with the use of an equivalence scale to convert to equivilized (or individual) consumption levels. Their empirical results showed that consumption inequality in Canada had declined slightly over the thirty years up to the late 1990s.

Sarlo (2009) examined inequality of income, consumption, and wealth in Canada over the period 1969–2004. In terms of consumption, he looked specifically at the consumption of Canadians in various income groupings (i.e., top 20 percent, top 5 percent, top 1 percent, bottom 10 percent, etc.) and, on an adult equivalent basis, found no change over the entire period. Bottom income groupings had increases in consumption at about the same rate as top income groupings. In addition, he found that the acquisition of key household facilities (like freezers, air conditioning, washers, dryers, and dishwashers) from 1985–2004 was faster at lower income quintiles than higher income quintiles. Aside from adjustments to account for family size (using an equivalence scale), Sarlo employed no other adjustments to the consumption data acquired from Statistics Canada.

Clemens (2012) looked at consumption inequality as part of his examination of inequality in Canada. Adjusting only for family size using an equivalence scale and using a decile ratio, he found that consumption inequality increased only marginally over the past 40 years to 2008.[5]

Norris and Pendakur (2015) examined a shorter time period (1997–2009) and made a number of adjustments to the raw consumption data. First, they used a selection of consumption categories which covered about 84 percent of all current consumption. The exclusions were either because they could not find satisfactory price data for the category or because the items were too durable (like vehicle ownership). Next they added in imputed rent for home owners and used a deflator to get values for real household consumption. They used an equivalence scale to derive individual level real consumption values.

5. The decile ratio is the ratio of the share of the top decile to the share of the bottom decile.

It is noteworthy that they excluded "subsidized renters and others whose reported rent is not informative" (p. 8). This exclusion is significant as the authors point out that "22% of rental tenure households report either reduced/subsidized rent or payment via in-kind."

They measured income inequality as well. Using the Gini coefficient as their inequality indicator, they find that while household income inequality is essentially flat over the period 1997–2009, both household and individual consumption inequality displays a hump shaped pattern—rising during the early part of the period and falling afterwards.

In the discussion of their methodology, they pay special attention to possible non-response bias. They argue that certain groups (like aboriginals, poor households, young people, and the rich) are more likely not to respond to the survey. While Statistics Canada does adjust for this possible non-response bias in a number of ways that researchers in this area will be familiar with, the authors clearly regard this as insufficient and suggest an alternative way to adjust the data based on the expected nature of the true distribution.

Estimating Consumption Inequality in Canada, 1969–2009

Data Issues

In order to estimate the changes in consumption inequality over time, we need data. But, while the data drawn from Statistics Canada's household expenditure surveys is the best we have, it certainly is not perfect. The issues with the data are largely due to the difficulty of collecting accurate consumption data, not to StatsCan deficiencies. It is important that readers be made aware of the data limitations so that they can make an informed judgment as to the validity of any results drawn from this data. It is this author's view that, often, researchers gloss over the issue of data quality, creating the illusion that clear and definitive results can be drawn.

Given the diversity of the readership, a very brief list of issues with the data is presented here. A more detailed list of data concerns is presented in the Appendix.

As discussed earlier, reported consumption has some of the same issues as reported income. Low response rates, respondent reporting errors, imputation of missing data, changes in the nature of the survey (interview vs. diary method), and changes in the definition of certain key variables are some of the more important concerns. As well, spending on major durable goods, especially homes, does not adequately capture the consumption flow of services of the asset. And changes in household size and in prices may have important implications that raw consumption data does not account for.

Methodology

The purpose of this paper is to track consumption inequality in Canada over the period from 1969 to 2009 and to compare it to the path of income inequality over the same period. The raw data (for both income and consumption) is drawn from two Statistics Canada surveys—the FAMEX survey prior to 1997 and the SHS survey from 1997 onward. During the period when FAMEX surveys were conducted, they were done only occasionally—about every four years, on average. However, this is sufficient to capture the long term trend in both income and consumption inequality. For this paper, occasional data points (usually every two or three years) were gathered as well even though, after 1997, the surveys were done more frequently. The availability of raw consumption data for Canada that could be used to determine consumption inequality effectively ended in 2009.

After-tax income is the most reasonable income measure for comparison purposes. This measure is used in the bulk of academic studies because it represents the income that people can make choices about. It is a useful proxy for a standard of living—one step removed from consumption. However, the author notes that a small number of recent reports continue to use pre-tax (or total) income, unadjusted, in measuring inequality.[6] Using pre-tax income results in higher levels of measured inequality which is, undoubtedly, the intended purpose. For comparison purposes, this study also shows calculations using pre-tax income in table 2.

For the present study, it was decided to limit the adjustments to comprehensive and easily explained changes that would clearly and reliably improve the quality of the data. For sure, the raw data is not perfect. However, there is always a risk of making it more imperfect with incomplete and somewhat heroic adjustments.

Therefore the only significant change in the raw data for this study is to account for household size by using an equivalence scale. The scale employed is the common square root scale. This scale has been used in a multitude of inequality studies and purports to capture the approximate economies of scale that happen when people live together and share accommodation and a number of durable goods (like appliances, TV sets, and internet services). Questions can be asked as to whether this scale is appropriate for both high and low income households and whether it is equally valid for small families and very large families. Nevertheless, size of household clearly matters to the measurement of consumption inequality and some reasonable account must be taken of it. Specifically, for this study, both after-tax income and consumption have been adjusted by dividing them by the square of household size for all of the data points utilized.

6. See for example OECD (2014) and Klein and Yalnizyan (2016).

A serious blow to researchers: The end of the SHS

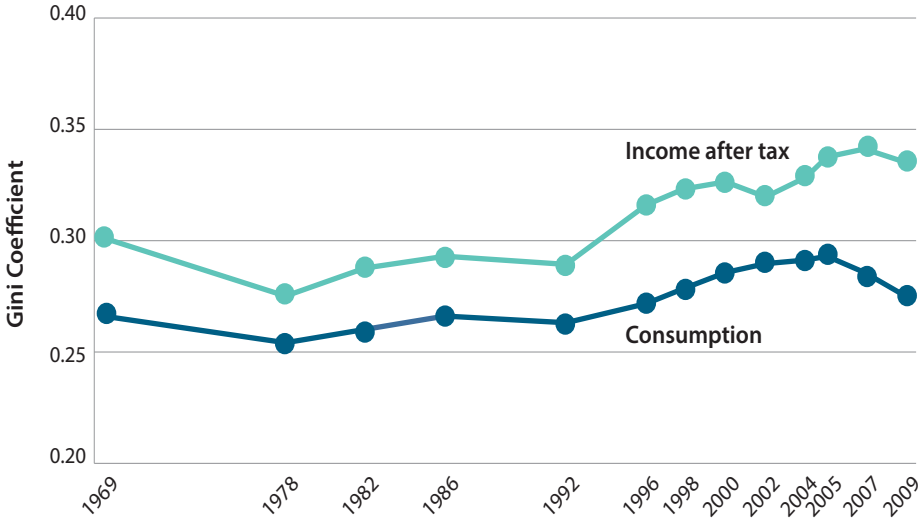
It is a serious problem for researchers in this area that the public use files for consumption are no longer being provided by Statistics Canada—the last file was for 2009. The decision to fundamentally change the nature of the SHS survey so that annual consumption data will no longer be collected is also a very serious blow to the many academics who use this very valuable socio-economic data. It brings to an end a great many important projects involving consumption poverty and inequality, food security, housing adequacy, detailed living standards comparisons, estimation of various implicit elasticities, and equivalence scales, to name just a few.

Results

Figures 2, **3**, and **4** display the results for three common indicators of inequality (the Gini coefficient, the decile ratio, and the quintile ratio) on adult equivalent (after-tax) income and consumption over the period 1969 to 2009 (see **table 1** for data). For all three measures of inequality, consumption inequality is below income inequality. This is not surprising given the smoothing that occurs with consumption. This is an expected pattern.

What is somewhat surprising is the fact that while income inequality has increased over the past 40 years (by between 11 percent and 16 percent depending on the indicator used), consumption inequality has essentially been flat. Using the Gini, 2009 consumption inequality is only 3 percent above where it was 40 years earlier. Based on this evidence, it would be hard to make a case that living standards are more unequal in 2009 than they were in 1969.

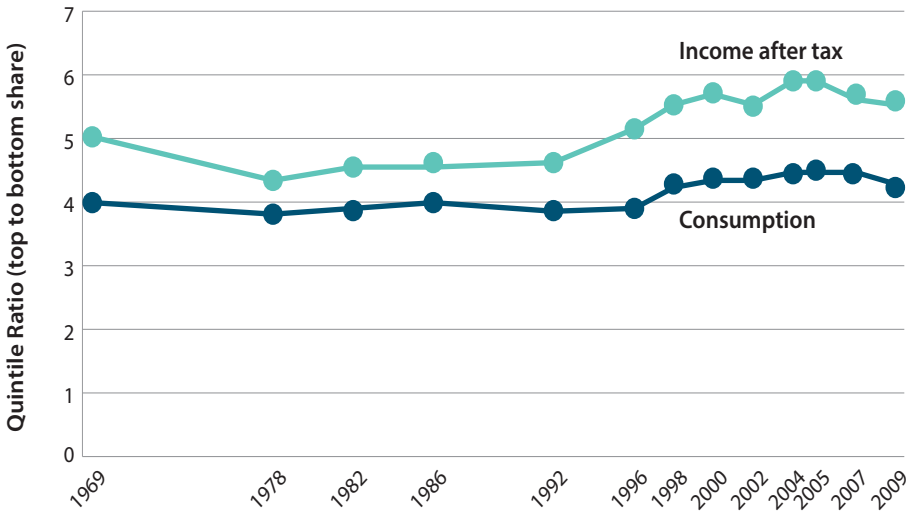
Figure 2: Inequality of (adult Equivalent) Income and Consumption, Gini Coefficient, 1969–2009



Notes: Income and consumption data has been adjusted for household size using the square root scale. Both income and consumption data are drawn from two Statistics Canada surveys, which were conducted only occasionally, not every year. Consequently, the data in the figures are from the particular years listed only. (See the methodology section for full details.)

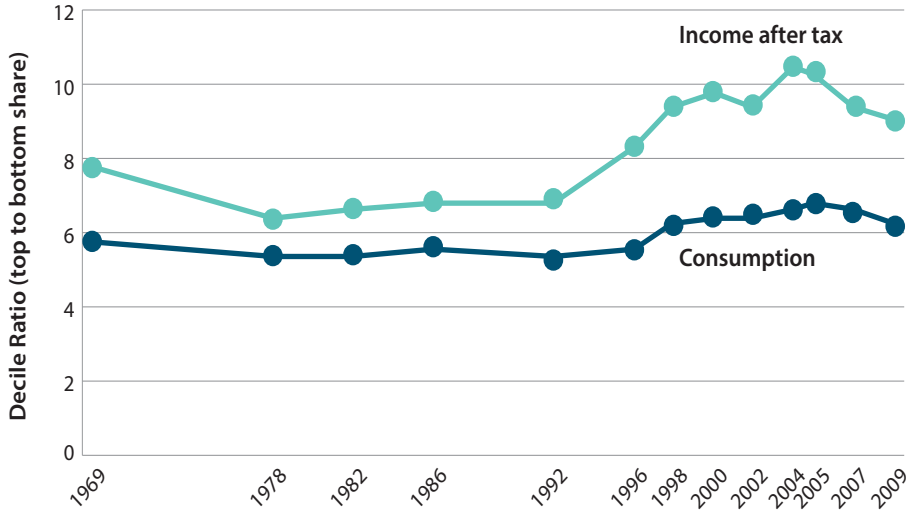
Sources: Statistics Canada, Family Expenditure in Canada and Survey of Household Spending microdata files, various years; calculations by author.

Figure 3: Inequality of (Adult Equivalent) Income and Consumption, Quintile Ratios, 1969–2009



Notes and sources: See figure 2.

Figure 4: Inequality of (Adult Equivalent) Income and Consumption, Decile Ratios, 1969–2009



Notes and sources: See figure 2.

Table 1: Household After-Tax Income and Consumption, Adjusted Adult Equivalencies, 1969–2009

		Gini		Quintile ratio		Decile ratio	
		Income after tax	*Consumption*	*Income after tax*	*Consumption*	*Income after tax*	*Consumption*
1969	*Famex*	0.3009	0.2662	5.01	3.99	7.77	5.74
1978	*Famex*	0.2765	0.2543	4.34	3.81	6.32	5.36
1982	*Famex*	0.2880	0.2594	4.52	3.86	6.60	5.42
1986	*Famex*	0.2927	0.2657	4.59	3.97	6.83	5.56
1992	*Famex*	0.2894	0.2627	4.61	3.84	6.88	5.31
1996	*Famex*	0.3160	0.2718	5.15	3.89	8.33	5.51
1998	*SHS*	0.3227	0.2780	5.53	4.24	9.37	6.24
2000	*SHS*	0.3262	0.2853	5.70	4.35	9.75	6.43
2002	*SHS*	0.3192	0.2891	5.52	4.38	9.41	6.45
2004	*SHS*	0.3285	0.2910	5.91	4.45	10.43	6.61
2005	*SHS*	0.3370	0.2931	5.92	4.50	10.28	6.77
2007	*SHS*	0.3418	0.2836	5.66	4.45	9.37	6.58
2009	*SHS*	0.3355	0.2752	5.58	4.25	8.99	6.22

Note: Income and consumption data has been adjusted for household size using the square root scale.

Sources: Statistics Canada, Family Expenditure in Canada and Survey of Household Spending microdata files, various years; calculations by author.

This result stands in sharp contrast to the prevailing view that economic inequality is rising and "getting worse." There have been scores of media stories (*Toronto Star, Globe and Mail,* CBC, CTV, etc.) about the alarming rise in inequality in Canada. While these are based on studies of income inequality, usually from left-wing think tanks like the CCPA, the Broadbent Institute, and the Conference Board, they create the clear impression that the gap between the rich and the poor is widening and we are becoming a much more polarized society. And with these studies, of course, come renewed demands for the government to "fix" the problem with more redistributive actions.

Income inequality can be especially overstated using pre-tax income instead of after-tax income. **Table 2** displays the results using total pre-tax income—both unadjusted and adjusted. It is noteworthy that measures of inequality using pre-tax income follow a somewhat similar pattern as that for after-tax income, but at a much higher level. Further, the rise in inequality using pre-tax income has been sharply higher. The increase in inequality for unadjusted pre-tax income over the 40 year period was about 23 percent using the Gini. For pre-tax income adjusted for household size, the increase was about 10 percent, again using the Gini coefficient. All of the income inequality measures (pre-tax and after-tax) declined initially but increased after the late 1980s or early 1990s. This rise, which coincided with the rapid growth of the welfare state and with it poverty and dependency, is in contrast to the pattern of consumption inequality.

Table 2: Household Pre-Tax Income, Adjusted and Unadjusted Adult Equivalencies, 1969–2009

	Gini		Quintile ratio		Decile ratio	
	Adjusted	*Unadjusted*	*Adjusted*	*Unadjusted*	*Adjusted*	*Unadjusted*
1969	0.3322	0.3281	6.03	7.57	9.63	13.68
1974	0.3008	0.3294	5.06	6.48	7.94	11.33
1978	0.3067	0.3305	5.28	6.64	7.89	10.94
1982	0.3204	0.3466	5.62	7.07	8.43	11.58
1986	0.3276	0.3696	5.76	7.62	8.78	12.31
1992	0.3341	0.3694	5.90	7.61	9.07	12.46
1996	0.3589	0.3963	6.58	8.47	10.77	14.35
2000	0.3816	0.4159	7.37	9.85	12.99	18.17
2005	0.3674	0.4110	7.54	10.12	13.42	19.05
2009	0.3667	0.4035	7.14	9.50	11.85	16.73

At the very least, this study of the long term trend in consumption inequality—and the result that differences in living standards have barely changed since the late 1960s—should give pause. To the extent that consumption (adjusted appropriately for household size) is a preferred indicator for the examination of economic well-being, this paper shows that inequality of well-being in Canada has been pretty stable over a long period of time. Regrettably, we cannot bring the analysis right up to the present due to the unavailability of the relevant data.

This result is particularly important given the recent confirmation that incomes at the bottom end of the distribution are substantially underreported, resulting in overstated income inequality. The study by Dunbar and Fu (2015) effectively undermines previous studies of poverty and inequality using income data. They further suggest that policies based on such studies risk having "unwelcome, and regressive, social efficiency costs." To the extent that consumption information is much less likely to be misreported, the evidence that consumption inequality has barely changed in forty years is especially important.

Clearly, a lot has changed over the intervening four decades. Dramatic changes in demographics (especially the aging of the population), divorce rates and the proportion of single parent families, the rapid rise in female participation in the labour force, structural changes in the economy (fewer factory and industrial jobs and more service sector jobs), the rise in university and college participation, and the sharp increase in two earner families—all would have some impact on economic inequality. So it is, in fact, surprising that there has been such a small impact on consumption inequality.

This result stands in contrast to that of Norris and Pendukur (2014). They made a number of adjustments to the data[7] and find that over the period 1997 to 2009, income inequality was essentially flat and consumption inequality increased, although by a fairly modest 5.2 percent.[8] This compares with a 6.2 percent increase in income inequality and a 1.3 percent increase in consumption inequality over the same period in the present study. While the differences are not huge, they are somewhat surprising because of the different direction of the trends. The fact that there is no increase in income inequality over the period differs from the results of other studies.[9]

Clearly, the differences in the results, even over the more limited time period for which the SHS survey data was available, is due to the adjustments in the data—especially the use of price indexes, the smaller list of consumption items, and the imputation for homeowners. It is noteworthy that the adjustments result in a completely different trend in both consumption inequality and in income inequality than is found with unadjusted (or modestly adjusted) data.

Regrettably, the data for this study stops in 2009. Normally, by now, we would have had data up to about 2013. However, Statistics Canada's decision to cease doing the household spending survey in the prior manner and making it available in public-use form to researchers means that the study is incomplete to that extent.

Fortunately, in the US, the data on consumption continues to be produced. And results using US data appear to be similar to the results here—at least as far as they go. The most recent study of consumption inequality in the US (Meyer and Sullivan, 2013) shows a distinct "hump" shape since 2000, peaking around 2005 (for both adjusted and unadjusted data)—a result that mirrors the Canadian picture.

Conclusion

Using the raw consumption data drawn from two Statistics Canada surveys (the FAMEX and the SHS) and adjusting for household size, consumption inequality (using what is arguably the most comprehensive indicator, the Gini coefficient) has increased by about 3 percent over the past forty years. This remarkably small change is noteworthy, given all of the substantial changes

7. They use price indexes for categories for which price information is available; they impute consumption flows for homeowners; for individual level consumption, they adjust for household size using the square root scale; and they employ a further adjustment to remedy the non-response problem.
8. The authors do not specify what definition of income is used in their determination of income inequality.
9. These include Walks (2013), Corak (2012), Conference Board of Canada (2013), and Chapter 2 of this book.

in society and in the economy over that period. When compared to income inequality, which has itself risen a fairly modest 11 percent (again using the Gini as an indicator), consumption inequality in Canada has effectively been flat.

The results of this study stand in contrast to the prevailing impression of a sharply growing gap and increasing polarization in Canada. The virtual torrent of media stories about the "alarming" rise in inequality have been effective in creating an image of a far more economically divided society.[10] When we use consumption as a proxy for economic well-being, we find that the inequality between households in Canada has barely changed in 40 years.[11] And these observed differences in living standards may, in fact, be overstating the gap.

This result ignores such things as quality improvements (which likely benefit lower income households more) as well as price searching and substitution behaviour, which is likely to be equalizing. While this is certainly not the final word on the trend in consumption inequality in Canada, it does suggest that living standards are not more unequal now than was the case several decades ago. It might be premature to claim, at least in Canada, that the gap between the rich and the poor is growing.

Care must be taken not to overstate these results. The data is far from perfect and the adjustments made, although fairly standard in this type of research, are limited in scope. More work needs to be done on such things as the treatment of durable goods, the role that deflators might (or might not) play, the impact of price searching and substitutions on measured consumption inequality, and whether non-response and underreporting might be issues of sufficient importance to warrant further adjustment.

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10. In fairness, almost all of the media commentary about rising inequality refers to income inequality, which has increased somewhat over the past 40 years. All of the studies, including this one, show income inequality increasing over time—although the extent of the increase varies substantially depending on the definition of income and the indicator used. Here, income inequality is shown to increase by about 11 percent over the period 1969–2009, using the Gini coefficient on adult equivalent after-tax income for households.

11. It is important to underline that this result for Canada is broadly similar to the outcomes of recent studies using US data. As well, a very recent paper examining consumption inequality in New Zealand (Ball and Creedy, 2015) finds that, for the 30 year period from 1984–2013, consumption inequality in that country has declined somewhat.

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Appendix: Data Issues and Adjustments

Data issues can be divided into two categories. First, there are concerns about the actual survey, data collection, and imputation. Second, there are concerns about the interpretation of the data and the fact that researchers may wish to adjust the raw data to try to get more meaningful results.

Survey, Data Collection, Editing, and Imputation

- The data is collected using surveys (personal interviews before 1997 and diary survey beginning in 1997). The quality of the resulting data is dependent on the diligence that respondents apply to the task and the accuracy of their memory or personal records. Sloppiness, impatience, spotty records and files, and deliberate misinformation are potential sources of inaccurate data.

- Low response rates: Consumption surveys, in Canada and in the US, apparently have lower than average response rates and certain populations (the poor and the wealthy) have disproportionately lower response rates. This would suggest that both tails of the distribution might be undercounted. However, Statistics Canada does, through its imputation and editing process, attempt to adjust for that. However, imputation is never a perfect substitute for missing data. Whether they are able to adequately account for these differential response rates is an open question.

- The 40 years between 1969 and 2009 saw a change in the nature of the survey. The FAMEX survey (1969–1996) was replaced by the Survey of Household Spending (1997–2009). Changes included the reporting of mortgage interest and other loan payments. As well, spending on gifts was not included in consumption prior to 1997.

Interpretation and the Need for Adjustments

- Over time, both absolute and relative prices change and people (especially those with budget constraints) make corresponding changes in their expenditures. They do this in two ways. They do price searching, particularly with major purchases like furnishings and appliances, and are sometimes prepared to postpone purchases until they find a satisfactory price. Second, and perhaps more importantly, they make substitutions based on relative prices. These critical savings strategies are not captured by conventional consumer price indices. Indeed, if a lower income household used price searching and substitutions to pay a lower price for a comparable basket of goods, their nominal consumption might appear to fall giving the appearance that they are less well-off and creating more measured inequality than is in fact the case.

- For a variety of reasons, households are smaller than was the case 30–40 years ago. Thus, a given household income or consumption level is now spread among fewer people, which suggests that just comparing household consumption levels (even "real" levels) will not accurately reflect the changes in living standards. A common adjustment in the data is to determine adult-equivalent income or consumption using an equivalence scale.

- Spending on major durable goods, especially homes, does not adequately capture the consumption flow of services of the asset. With homes, for example, operating costs (like heat, electricity, maintenance, and repairs) are fine but mortgage payments vary widely for homes with the same flow of services. This problem occurs, to a lesser extent, with a whole range of durable goods (furniture, major appliances, automobiles, computers, etc.).

- People who have rent-subsidized accommodation or who live rent-free will have reported consumption that does not adequately reflect their true consumption flow of services for housing. Their lower reported consumption belies (and significantly understates) their true living standard.

- Prices, overall, vary by region and also over time. Consumer price indexes can be used to adjust nominal consumption in order to try to uncover real consumption changes and regional differentials in those real values. However, it is important to recognize that such adjustments ignore price search and substitution behaviour by individual households as they attempt to improve their living standards.

Adjustments

In terms of adjusting the raw data, several considerations were at play. First, not all of the issues discussed above are capable of being reliably handled by adjusting the data in some way. As well, not all authors of papers on the subject of consumption inequality employ the same set of adjustments. Second, some adjustments are not as transparent as others. For example, Statistics Canada itself tries to account for low response rates by certain groups by an imputation process, editing, and changing weights. Some authors have pointed out that users cannot easily see what has been done. If studies employ several layers of econometric estimation and imputation this may also present transparency concerns for many readers.

The question of the role that prices potentially play in inequality measurement is worthy of further comment. Using a price index to deflate nominal consumption is certainly valid. It can get at real changes in consumption and, if used regionally, it can uncover geographical differences in consumption. However, a more important question is this: Is it possible to use price information and price indexes to capture such things as distributional differentials

and substitution behaviour? Gordon and Dew-Becker (2008) argued that there had not been (up to that time) any systematic study of price index bias by income class. However, their view, based on the available evidence, is that for the bottom half of the income distribution relative prices have declined, while for the top income classes (top decile, for example) relative prices have been rising. If that is the case and no (reliable) account is taken of it, measured consumption inequality will exaggerate the actual living standard differential between different economic classes.

Making adjustments is never a straightforward business. Sometimes, the list of consumption items has to be reduced because no price information is available for some categories. And, as mentioned, price indexes (or sub-indexes) cannot take account of normal economic behaviour like price searching and substitutions. Imputation transparency is an issue and it is up to the researcher to demonstrate clearly the nature of the imputation, the method of determination, and the advantage bestowed. A potential concern of relevance here is a partial imputation, for example, with some durable goods but not all.

No Database is Perfect

It is important for researchers and readers to understand that all databases are flawed. The problems largely stem from the intrinsic difficulties in collecting reliable data from households using survey or diary methods. There are a range of issues. Some databases exclude some components of income. For example, the Survey of Labour and Income Dynamics (SLID) excludes realized capital gains but includes taxes on capital gains. As well, it was discovered after the fact that the SLID underrepresents very low and very high income households (Frenette et al., 2013). This understatement of the tails of the distribution has potentially important implications for the measurement of inequality and poverty. However, underreporting of income also has important implications in the other direction. Additional issues having to do with prices and substitutions, as well as the concerns expressed in the previous section, can influence measured inequality. Some studies take the data as is and make estimates with little or no qualification. Others make significant adjustments to try to make the data more reliable. Whether all adjustments succeed in improving the quality of the data is an open question. Ideally, data should be improved at the source—by the relevant data collection agent. Until that happens, it is best to be as transparent as possible and to be cautious about making any definitive conclusions based on a set of estimates using imperfect data.

4. Understanding Wealth Inequality in Canada

Christopher Sarlo

The distribution of wealth in Canada is unequal. The top 20 percent of households own about 67 percent of the total wealth and the bottom 20 percent of households own less than 1 percent. What are we to make of that information? Are those numbers a signal that something is fundamentally wrong with our economic system? Should we assume that, regardless of what lies behind these numbers, this outcome is unfair? There are certainly many people who believe that this is the case.

The purpose of this study is not merely to measure the level and trend of wealth inequality in Canada but also to try to explain the economic and demographic forces that help determine wealth and therefore wealth inequality. Before we draw any conclusions about "fairness", it is prudent to more fully understand the story of personal wealth—a story that the raw numbers simply do not reveal.

What is "Wealth"?

For this study, Statistics Canada's definition of wealth is employed. Specifically, wealth is defined as household net worth. Its composition is: the sum of all of the assets of the household (including the market value of the home and other real estate; the value of any business; any financial assets like stocks, bonds, and savings instruments; pensions valued on a termination basis, and any durable goods) minus all liabilities of the household (including mortgage debt; small business debts; line of credit, and credit card debt). The terms "household wealth" and "household net worth" will be used synonymously here.

We frequently see references in the media (and sometimes even in academic studies) to "the wealthy" when, in fact, it is income and not wealth that is being examined. Income, of course, is a flow of cash that one receives per time period (often a year), most often from wages but also from small business profits, investments, and government transfers. Income represents the *potential* living standard of a household in the sense that the use of income produces satisfaction. Both spending on goods and services and saving (additions to financial security and

the ability to give gifts) generate utility for the household. Of course, a household can borrow and have a standard of living above actual income. For this reason, consumption is sometimes preferred to income as an indicator of well being.

The conversion of income into wealth needs some discussion. Income can be converted into wealth when it is spent on durable goods (such as a home, automobile, furnishings, and appliances) and on financial assets (anything from savings accounts to stocks and bonds). On the other hand, any income spent on non-durable goods (food, personal services, and other "consumables" are examples), does not add to wealth. Wealth can grow in a number of ways: the market value of the assets can increase; we can add to wealth by devoting more income to the purchase of durables and financial assets; we can reduce our liabilities by paying down debt. So, it is imprecise to refer to high income earners as the wealthy. Simply put, wealthy people (households) have high levels of net worth.

Is this Definition of Wealth too Narrow?

A comprehensive examination of wealth would go beyond just personally owned financial and durable assets. For example, why do we include items like the value of private pension plans and RRSPs but not the implicit value of government entitlements like Old Age Security (OAS) and Canada Pension Plan (CPP)? The latter two are just as certain sources of income in retirement as the former two. And, if we were able to include these entitlements in personal net worth, it is very likely that wealth inequality would decrease.

In fact, a study by Shamsuddin (2001) looked at this question. He was able to obtain data from several sources including the 1984 *Survey of Financial Security* (SFS) that allowed him to estimate the present value of public pension plans. When he included these amounts into the distribution of wealth, he found that wealth inequality was indeed reduced.

This is a useful exercise. It helps us understand the complexity of the concept of "wealth". When we think more deeply about wealth, we know there are many things that could be included to give us a comprehensive perspective of wealth in general. However, for practical purposes, we want a conception that is reasonably measurable and comparable over time. So, we can identify several aspects that must normally be in place before an item will qualify as "wealth". To be included in wealth (personal net worth), an item must be personally owned; it must be capable of generating income now or in the future; it must be capable of being converted into cash within a short time frame; and it must be measurable in some reasonably accurate way. This is admittedly a narrow, "economist's" way of looking at wealth. It excludes human capital and other special skills and talents that are capable of yielding both income and great happiness (including social benefits). It also excludes the value of expected inheritances, no matter how certain they may be. Inheritances are included only once they are received. This narrow definition is employed in this and most other studies of the distribution of wealth.

Popular Impressions of Wealth Inequality

There is a widespread view that wealth inequality is increasing and that it is a significant problem. The relentless media attention given to economic inequality in general both feeds and confirms this impression. Political leaders, such as former President Obama, inform us that economic inequality is the defining issue of our time. *Scientific American*, normally a thoughtful journal of science, reported in 2015 that wealth inequality is "far *worse* than you think" (emphasis added) (Fitz, 2015). Articles and media stories routinely express surprise and concern that the top 20 percent of households own almost 70 percent of wealth and the bottom 20 percent own no wealth (Beltrame, 2014). Every year we have a flurry of headlines screaming that a small number of billionaires have as much wealth as half the world's population (*Guardian*, 2016; Mullany, 2017). And, these stories often contain reminders that a number of organizations have called for remedial measures (higher taxes for the rich; enhanced social programs for the poor) to correct the "problem". There does not appear to be any interest in explaining how wealth inequality happens. It is as if wealth inequality is an obvious "bad" not requiring any clarification.

It is hard to escape the conclusion that major media, in their choice of stories, in their commentaries, and in their lack of balance help to feed this common impression. Popular culture also tends to reinforce the view that great wealth is a serious problem and that the level of wealth inequality is simply not fair. A significant recent contributor to popular views on wealth is a short and very slick 2012 video that 20 million people have now viewed (Politizane, 2012). Undoubtedly, most readers of this paper have seen the video. It presents in a visually appealing way a distinction between what American apparently think *should be* the distribution of wealth and what is the actual distribution. They conclude that Americans would like the distribution of wealth to be more equal than it is and so the existing distribution is obviously unfair. It is sufficient to say that the producers of the video have a clear agenda and truth is not on that agenda. There are several seriously deceptive points made in the video and, as well, it misrepresents Sweden as having a more equal wealth distribution than America (it doesn't; a fuller discussion and critical examination of the video can be found in Appendix D).

It is easy to dismiss biased stories and movies as the result of propaganda emanating from the progressive left. But, in fact, suspicion of the wealthy and a general disdain for economic inequality seems to be widely shared. Interestingly, it even appears to be shared by some who are themselves very wealthy. What is it, exactly, about great wealth and substantial differences in wealth that has so many people upset? This is an important question. Clearly, popular views and perspectives have an influence on public policy. The concern here, of course, is whether public attitudes and biases are correct and consistent with empirical evidence. There is further discussion of this important issue in the commentary section of the paper. First, however, it is essential

to understand how wealth is acquired; how important inheritance is in the wealth equation; what role "age" (the so-called life-cycle effect) plays in the distribution of wealth; and what is the empirical evidence relating to trends in wealth inequality over time in Canada.

Measures of Wealth Inequality

There are several ways to measure inequality of wealth. The most obvious way is to rank all of the households in Canada by their wealth and either divide that distribution into five (or ten) equal groupings to examine the quintile (or decile) shares or to summarize the level of inequality into one number, such as the Gini coefficient.[1] For example, the quintile shares distribution of household wealth in Canada in 2012 (the latest year for which we have data) is as shown in **table 1**.

Table 1: Distribution of Net Worth in Canada by Quintile, 2012

Quintile	Share of Wealth (%)
Top 20%	67.42
Second	21.47
Third	9.03
Fourth	2.23
Bottom 20%	-0.14
Total	*100*

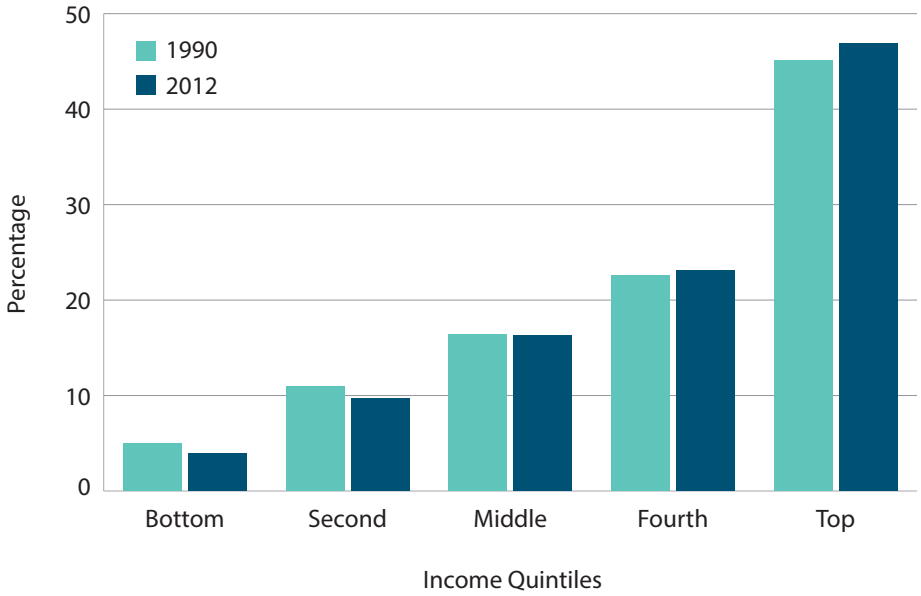
Source: Uppal and Larochelle-Côté, 2015b; calculations by author.

Another way to look at wealth inequality is to examine the amount of wealth going to each of the *income* quintiles. This is an approach favoured by Statistics Canada in recent years. Their chart (**figure 1**) shows the wealth shares by income quintile for 1999 and 2012 and their commentary emphasizes that the share of wealth held by the top income quintile has increased from 45 percent to 47 percent over the period, while the share going to the bottom income quintile has decreased (Uppal and Larochelle-Côté, 2015b).

There are additional ways to measure wealth inequality. These range from tracking the share owned by the top 10 percent, 5 percent, or 1 percent; comparing the share of wealth owned by the bottom 50 percent with the share going to the top 5 percent and tracking that over time; as well as the share of wealth owned by the top few households or individuals.[2]

1. The Gini Coefficient is one of the leading measures of inequality. There is a detailed explanation of the Gini and its calculation in Appendix A. It is sufficient to say here that it is a number between 0 and 1 with higher values representing a higher level of inequality.
2. The latter measure always generates considerable media attention. In 2015, Oxfam reported that the top 80 billionaires had more wealth than the bottom half of the world's population (Oxfam, 2015) and, predictably, a flurry of news stories followed.

Figure 1: Share of Wealth (or Net Worth) Held by Each Income Quintile, 1999 and 2012



Sources: Uppal and Larochelle-Côté, 2015b; Statistics Canada, Survey of Financial Security, 1999, 2012.

How is Wealth Acquired?

There are essentially three ways that wealth can be obtained. Wealth can be stolen; it can be inherited; or it can be earned.

Stolen Wealth

Stolen wealth is any wealth that is obtained from others by force or fraud. This does not include any wealth that is acquired through exchange of value, even if the commodity itself is illegal to exchange. What would be included here would be any outright theft of property using force or threat of force; any use of deceit, trickery, fraud, or misrepresentation to acquire the property of others; any bid-rigging, bribery, influence peddling, or other examples of cronyism that take the property of others. In nations with effective and accountable legal systems as well as transparent and accountable government agencies, the proportion of wealth gained by theft should be relatively small.[3]

3. In a recent essay (2016), Clemens, Jackson, and O'Neill argue that the way in which income is earned or wealth amassed matters in any discussion or debate about economic inequality. The authors make a clear distinction between wealth accumulated from protected markets and special treatment by the state and wealth that is legitimately earned. Wealth derived as a result of special deals with the state (whether legal or not) is not legitimate. The corruption and cronyism involved is harmful to the economy and to society. This, the authors argue, is in contrast to wealth generated honestly through hard work, entrepreneurship, and innovation, which is beneficial to the society.

Inherited Wealth

Inherited wealth has the potential to be much more significant. Anyone familiar with the Forbes list of wealthiest Americans will know that many very wealthy people have simply inherited all of their wealth. The heirs to the Walmart fortune, who between them have a net worth in excess of $100 billion, would be an example. However, Forbes (2014) has recently been assessing the sources of wealth of America's billionaires on a 10-point scale (from 1 = inherited all of their wealth, to 10 = earned all of their wealth) and have found that only about 30 percent of the people on their list inherited some or all of their wealth while 70 percent are entirely self made (Fontevecchia, 2014). They also found that the proportion of self-made super rich in 2014 is up substantially (from 50 percent) 17 years earlier.[4]

Inherited wealth, which includes both *inter vivos* (while the giver is alive) tranfers and bequests, does not appear to be as important for the high end of the wealth distribution in America (and Canada) as it is in many other nations. A study by Wai and Lincoln (2015) found that countries like Austria (50 percent) and Sweden (44 percent) lead in terms of the share of wealth that is inherited with the United States, the United Kingdom, and Canada well down the list in the range of 12.5 percent. Indeed, it is notable that all of the "egalitarian" nations of northwest Europe (Norway, Denmark, Netherlands, Belgium, Switzerland, Germany, and Sweden) have inheritance rates of 20 percent or higher.

In his review of economic inequality in America, Michael Tanner uses a survey by US Trust that revealed that 70 percent of wealthy Americans grew up in middle-class or lower-income households: "Even among those with assets in excess of $5 million, only a third grew up wealthy" (Tanner, 2016: 9). As well, according to Tanner, the role of inheritance appears to have diminished over the last generation. He points to studies by Kaplan and Rauh (2013) and Arnott, Bernstein, and Wu (2015) to support this claim.

Are we sure that inheritances, in fact, contribute to wealth inequality? A recent study by Edward Wolff, arguably the dean of US inequality economists, shows that wealth transfers actually tend to be equalizing. The explanation for this result is that poorer households tend to transfer more "as a proportion of their current wealth holdings" than wealthy households (Wolff and Gittleman, 2011: 23).

In Canada, there are far fewer studies of wealth acquisition and wealth inequality, largely because of limited data. However, Morissette and Zhang (2006) revisited wealth inequality and also looked at the role that inheritances might play in contributing to wealth inequality. They draw on the 2005 *Survey of Financial Security* (SFS), which asks questions about the value of inheritances.[5]

4. Freund and Oliver (2016), in a recent study of US billionaires, found that fewer than 30 percent of them acquired their wealth through inheritance.

5. It is important to note that the 2005 SFS *public use* microdata file and the accompanying documentation do not contain any reference to inheritances. So, while Statscan researchers obviously had access to the full data, this author had no access to inheritance information.

In their econometric analysis of the wealth data, they controlled for the value of inheritances using various assumptions and specifications and found that inheritance consistently accounts for less than 5 percent of the wealth gap between the bottom and top fifths of the distribution. This means that, in Canada, at least 95 percent of the wealth gap is not explained by inheritance.

Various financial institutions do their own surveys of personal wealth, largely to gather useful information for their wealth management business. CIBC (2016) surveyed Canadians about the bequests they had already received and then forecast expected future inheritances by adjusting for (predictable) demographic changes. Based on their analysis, they estimate that, in the coming decade, there will be an inheritance boom (about 50 percent more than the previous decade) received by Canadians. The report then suggests that a large proportion of this is expected to go to high-income Canadians and that is likely to "exacerbate" wealth inequality. While this conclusion does not appear to be unreasonable, the bank provides no evidence for either conjecture.[6]

Earned Wealth

The third and most compelling way that we acquire wealth is by earning it. Earned wealth is most often accomplished through a slow and steady process of saving, wise investment, and patience. Investment may involve the purchase of financial assets (like mutual funds, stocks, bonds); the purchase of non-financial assets (like a home or other durable assets, including collectibles); or by purchasing or starting up a business. In most cases, wealth is accumulated over a long period of time—over a lifetime of work, saving, and investment. So, it is not at all surprising that wealth has a strong age pattern. Indeed, one of the dominant theories in economics involves the life pattern of income, saving, and wealth accumulation. It is referred to as the Life-Cycle Hypothesis and any analysis of wealth and wealth inequality wisely starts there.

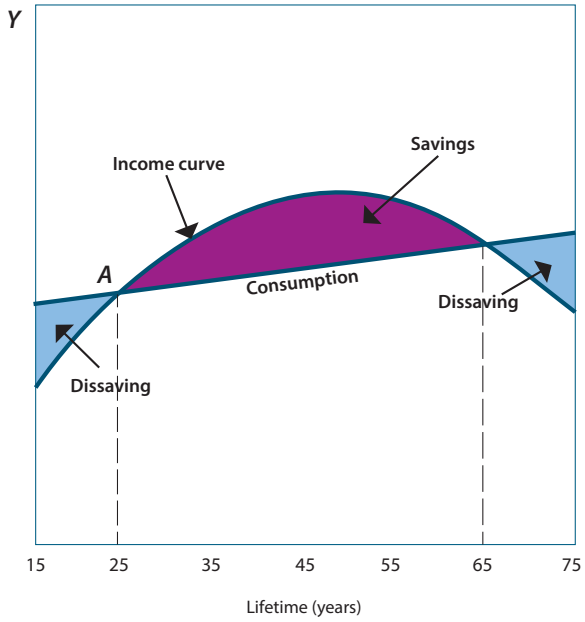
The Life-Cycle Hypothesis

Modigliani and Brumberg (1954) outlined a new approach to understanding consumption, saving, and wealth accumulation that was grounded in the long-standing marginal utility theory.[7] Setting aside the technical details, they suggested that people in their peak earning years will save some of their income and accumulate it for later use during retirement when they are not working. This implied that people, in general, are rational and forward thinking and will not simply consume all of their income as it is earned. Further refinements

6. The full CIBC report provides no information about their survey methods, coverage, definition, specific questions, or the nature of the sample. The report appears to treat bequests and inheritances as if they were the same.
7. Milton Friedman's work on permanent income (1957) contributed significantly to this literature as well.

of the basic theory by Modigliani and his collaborators as well as substantial testing has given us the dominant approach to the understanding of wealth accumulation that we have today. The Life-Cycle hypothesis can be illustrated by the simple graphic in **figure 2**.

Figure 1: The Lifecycle Theory of Income, Savings, Consumption, and Wealth Accumulation



In the first phase of the life cycle, when people are young and just starting their work years (or still in school), there is little opportunity to save. For those employed full-time, income is typically much lower than it will be during the peak earning years. Consumption typically exceeds income as young individuals and couples acquire the range of durables (housing, automobiles, appliances, etc) that are part of modern life, most often by borrowing against expected future income. Some will be having children, which, again, often involves some significant initial costs. For those still attending a post-secondary institution, income will be very low and, often, student debt will be rising. Even once they graduate, those debts may be high enough to outweigh the value of any (non-human capital) assets they have acquired. So, for many in this first phase of the life cycle, it would not be surprising to see zero (or even negative) net worth. While the graphic in figure 2 has the first phase of the life cycle ending around age 25, for many individuals and young couples, it will extend until they are in their late twenties or early thirties. The important characteristics of the first phase is that people will typically consume more than they earn; they will often be borrowing from the future (borrowing from parents or having student loans, for example); they are unlikely to be in a position to save any of their income; and there will be little or no wealth accumulation. Net worth for the typical person in this phase is likely to be zero or even negative.

During the second phase, income begins to exceed consumption because two things happen at about the same time. First, income has increased sufficiently that consumption can be financed without adding to debt. Second, later in this phase, expenses will likely decline (in relative terms) as many of the key durable goods (home, automobile, appliances, furnishings) have already been acquired. Slowly, steadily, saving and wealth accumulation begin to happen. If the wealth fund is invested wisely, then wealth will begin to increase slowly at first and then more rapidly as the power of compounding and regular additions (savings) take hold. It is later in this phase that children in the family typically become adults and (it is hoped) become independent, thus freeing up more disposable income for possible wealth accumulation. People typically reach their peak earning years during this phase.

The first versions of the life cycle had the third (retirement) phase as a period of dissaving as wealth is drawn down systematically to cover the consumption needs of people who no longer earn money from employment. However, empirical evidence demonstrated that there is not a lot of dissaving by typical retirees and, in fact, wealth may still grow for a period of time. Modigliani argued that such behaviour could easily be consistent with the overall theory. Uncertain length of retirement and the desire to leave bequests can account for the possibility of stable or even growing wealth during retirement (Modigliani, 1986; Deaton, 2005).

The briefest expression of the Life-Cycle Hypothesis can be stated as "the very young have little wealth, middle aged people have more, and peak wealth is reached just before people retire" (Deaton, 2005: 1). Of course, this pattern describes most people in most situations. There will certainly be cases that depart, sometimes substantially from the pattern in the Life-Cycle Hypothesis. There will be people who are delayed in being able to accumulate wealth because of accident, illness, disability, or other personal predicament. There will some who, for whatever reason, are never able to acquire wealth. These exceptions do not refute the theory. The Life-Cycle Hypothesis provides a reliable and testable approach to understanding the patterns of income, consumption, saving and wealth accumulation that are typical in society.

An important implication of the theory is that consumption will be less volatile (smoother) than income. People strive to maintain a fairly consistent (or target) level of consumption and use saving and borrowing to smooth out the vagaries of unpredictable changes in income. It is also an implication of the theory that people will adjust their "prudent" saving rate during the second phase of life in the light of state programs that promise to provide income during retirement. Most of the adjustment is likely to occur with people who are most affected by the benefits of these forced retirement programs, that is, poorer and middle-income households. To the extent that households where wealth is below average reduce saving and wealth-accumulation efforts because of these programs means that the government may, by itself, tend to increase wealth inequality.

The "life-cycle effect" then is simply a recognition that age is a critical determinant of income, saving, and the level of wealth. The twenty-five year old at the bottom of the wealth distribution with zero (or even negative) wealth is likely to be, in 25 or 30 years, a top quintile or even top decile wealth holder. So, the inequality of wealth *within one's own lifetime* is going to be, in most cases, very large.

In his landmark paper "The Distribution of Wealth and the Individual Life-Cycle", Anthony Atkinson notes that the distribution of wealth is unequal "simply because people are at different stages of the life-cycle; the top 10 per cent may own more than their share because they are older and have saved more for old age" (Atkinson, 1971: 239). As a life-long socialist, Atkinson spent his career drawing attention to inequality and has advocated for significant redistribution of income, a tax on inheritances, and other "social justice" causes. He states, however, that "this lifetime view of equity is clearly more appropriate if our concern is with unequal 'life chances', and has the merit of treating an individual's lifetime as a whole rather than considering each year in isolation" (Atkinson, 1971: 239).

In order to show the importance of the life-cycle effect on wealth inequality, Atkinson constructs a simple model of a society where only the life cycle matters. Every other factor that could influence wealth inequality is excluded. So, his model is that of an egalitarian society where everyone has an identical life path of income and everyone makes identical choices relating to saving, investing, and retirement. Everyone is the same and has an identical lifetime income and wealth yet we have, at any point in time, substantial inequality of wealth. Whenever we choose to take a snapshot of this society, a high percentage of wealth is held by older people (who make up much of the top quintile and decile) and very little wealth is held by the young.

Apparently independently, Paglin (1975) argued that our measures of inequality, like the Lorenz curve and Gini Coefficient,[8] misrepresent the true level (and trend) of inequality because they ignore the life-cycle effect. With the Gini coefficient, our reference point is the line of perfect equality which, in terms of wealth, means that every household, regardless of age, would have exactly the same net worth. Paglin argues that not only is this unrealistic but, in many ways, it is patently unfair. It would mean that no one could (or be allowed to) save and accumulate funds for use in retirement. It is sufficient, he argued, to define equality as equal lifetime wealth and use that as a basis of comparison for a revised Gini. Using an expected average age-wealth profile (as a proxy for the life-cycle effect), he constructs an adjusted Gini and shows that wealth inequality in the United States (in 1962) was about 50 percent less than the unadjusted Gini.[9]

8. An detailed explanation of the Lorenz curve and the Gini Coefficient is provided in Appendix A.
9. Paglin provides insufficient information about the precise nature of the adjustments he has made. There is concern that using the "average age-wealth profile" derived from US data may not be a good proxy for the life-cycle effect because the average age-wealth profile may be influenced by non-life-cycle factors (like skill differentials, preference, and choice differences).

A Simulation—Examining the Influence of the Life Cycle on Wealth

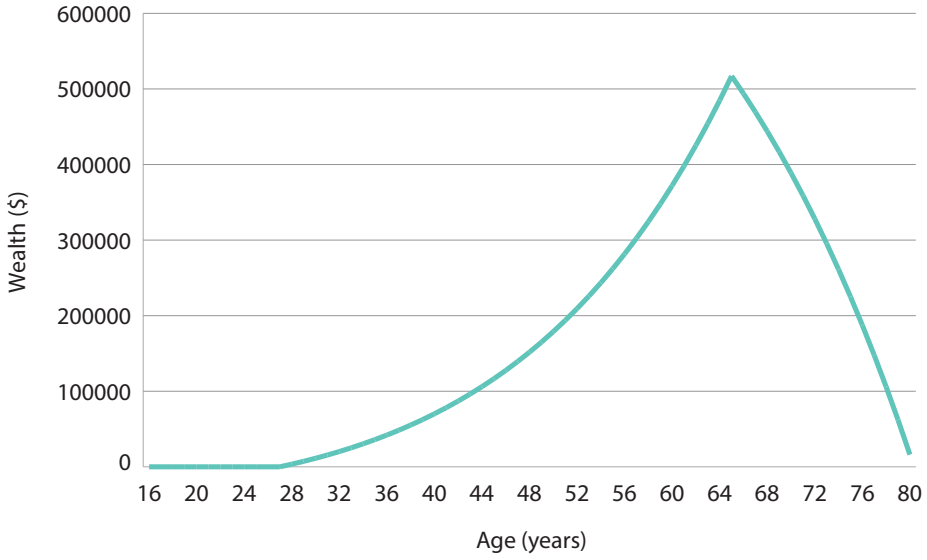
Following Paglin, Sarlo (1992) attempted to show the impact of the life cycle on income inequality by constructing a simple simulation model of an egalitarian society with perfectly equal lifetime incomes, savings rates, and implied wealth that is fully used up in retirement so that no inheritance remains. In such a society, where everyone is equal over a lifetime and so only the life-cycle effect prevails, there is still substantial inequality of income. Extending that simulation exercise to explicitly include wealth is equally informative. While the details of the exercise are outlined in Appendix B, it is sufficient to state that the results (quintile shares) are robust for a variety of different assumptions about annual income growth rate, savings rate, rate of return on wealth, and the interest rate that applies to annuities (see table 8 and related commentary). The result of the life-cycle simulation in Appendix B is displayed in **table 2** and the simulated age-wealth profile is in **figure 3**.

Table 2: Egalitarian Society Wealth Distribution, Part 01

Quintile	Share of Wealth (%)
Top 20%	51.03
Second	30.59
Third	14.38
Fourth	3.96
Bottom 20%	0.03
Total	*100*

Source: Model constructed by author.

Figure 3: Simulated Age-Wealth Profile (Life-Cycle Effect)



Source: Model constructed by author.

It important to remember that this is the distribution of wealth in an egalitarian society with no inheritance. Everyone has exactly the same lifetime income; everyone has exactly the same time preferences and the same work-leisure preferences; everyone is subject to the same rates of growth and rates of return. There are no differences between people and yet we nevertheless have substantial inequality of wealth at any point in time. This is the point that both Atkinson and Paglin were making and attempting to show in their own way. This exercise helps us appreciate that the life-cycle effect is potentially a dominant driver of wealth inequality.

Of course, we don't live in an egalitarian world. Indeed, we live in a world where differences among people are significant. People differ in terms of skills and abilities; in terms of preferences; in terms of the constraints that they face; and in terms of the luck they encounter along their life path. Each of these differences is likely to influence wealth inequality. Let's take, for example, a difference in time preference—specifically, that some people tend to prefer future to current consumption while others have a preference for current consumption. This difference will manifest itself in terms of differential saving rate. We can modify the simple model, which assumes that everyone has an equal saving rate (of 10 percent), so that now half of society saves at 5 percent and the other half saves at 15 percent. The results of that simulation are displayed below in **table 3**. In comparison to Part 1 (table 2), the differential saving rate has the effect of pushing up the share going to the top quintile and reducing the second and third quintile shares. This stretches out the wealth distribution and increases measured inequality.

Table 3: Egalitarian Society Wealth Distribution, Part 02

Quintile	Share of Wealth (%)
Top 20%	61.22
Second	24.13
Third	11.52
Fourth	3.11
Bottom 20%	0.02
Total	*100*

Source: Model constructed by author.

It is important to stress that this is still an egalitarian community in the sense that everyone has identical incomes from employment through their working years and everyone faces the same rate of return. The only difference is that people make different choices about the level of saving based on their different time preference. The lower savings group will have substantially more consumption during their younger, working years than the folks who decided to defer some of that consumption by saving more. The latter group ends up

with higher pension income and greater consumption post retirement. Yet, despite the fact that everyone is equal except for their time preference, we end up with a quite remarkable level of wealth inequality.

It is important to emphasize that, in this egalitarian society, there are none of the differences and life events that we often point to as contributing to economic inequality. There are no skill differentials: everyone is the same and does the same job. There are no sports, entertainment, and entrepreneurial superstars who are able to amass fortunes based on the their elite skill level. There is no unemployment, no illness, no disability, no divorce, no inheritances; and everyone has the same work-leisure preferences. Nevertheless, at any point in time, there is significant wealth inequality driven by the life-cycle effect and, possibly, by different choices about savings.

The results of this simulation exercise depend, to some extent, on the basic assumptions used. However, the assumptions about rates of growth of income; age at which saving begins; rate of return on investment; no inflation; and rates of saving are all broadly similar to assumptions made in the Atkinson and Paglin analyses or are well in the range of actual values in the Canadian economy. Modest changes in these assumptions do not produce substantially different results as we see in the empirical section (table 8).

To the extent that the life-cycle effect (age) is an important (and arguably, *the most* important) explanation of wealth inequality, we would expect that demographic changes in society will produce changes in the level of wealth inequality. For example, as the baby-boom generation moved through into their twenties in the 1970s and 1980s (and the concomitant surge in attendance in post-secondary educational institutions), we might have expected an increase in wealth inequality, other things equal, due to that demographic bulge. And now, as that baby-boom bulge moves into retirement (peak wealth age), we might expect, again other things equal, a rise in wealth inequality.

Empirical Evidence

What has been the pattern of wealth inequality in Canada over the past several decades? Is wealth inequality getting "worse" as some journalists and a few economists claim?[10] And if wealth inequality is increasing, what does that mean? Is it automatically a sign that the "system" is unfair and that the deck is stacked against upward mobility and opportunity? As well, to what extent is wealth inequality explained empirically by the life-cycle effect? What other factors play a role in explaining the level and trend in the inequality of household net worth?

10. It is interesting to note that the normative phraseology of the social activist has crept into journalistic and even some academic commentary about inequality.

This section presents the empirical evidence relevant to these and other questions relating to wealth inequality in Canada. The data used includes four public-use microdata files produced from the Statistics Canada occasional *Survey of Financial Security* (SFS). Those four files, for 1984, 1999, 2005, and 2012, contain information on assets, debts, net worth, after-tax incomes as well as basic descriptive and demographic information for each of the records in the database.[11]

The Trend in Wealth Inequality in Canada, 1970–2012

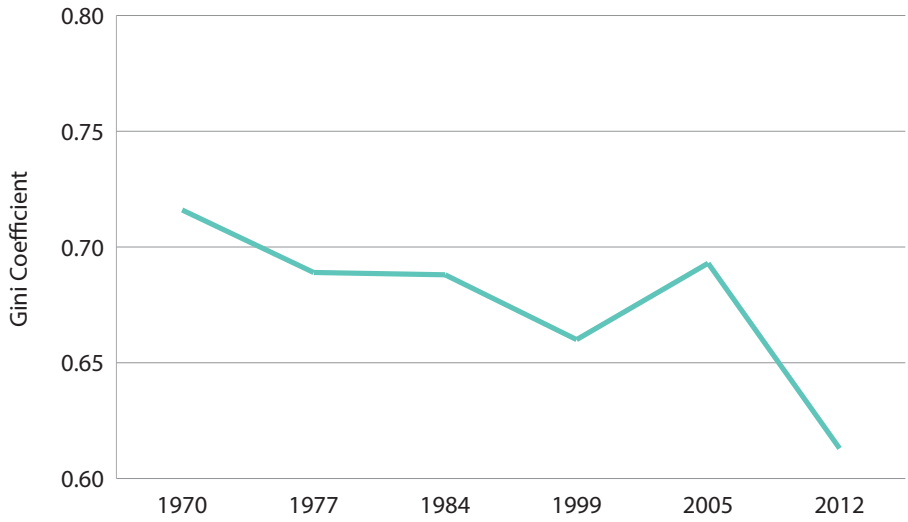
SFS public-use microdata files for 1984, 1999, 2005, and 2012 were used to determine the inequality of net worth among households. The author calculated quintile shares, decile shares, and Gini coefficients in each of those years. Prior to 1984, Statistics Canada determined wealth inequality for 1970 and 1977 for the same three indicators using some of their early surveys. They warn that there is an issue with data quality for those years due to the difficulty of collecting information on wealth and to the fact that certain components of wealth were excluded—principally equity in pension funds and insurance policies as well as some kinds of household durables (Oja, 1987: 5). The summary data they provide is included here with that proviso.

Figure 4 displays the trend of wealth inequality using the Gini Coefficient for Canada between 1970 and 2012. There is little ambiguity about the pattern. Wealth inequality has declined over the period and, by 2012, was about 17 percent below the level of four decades ago. Even if we take account of Oja's caveat about lower data quality during the 1970s and ignore the first two data points, inequality is still down 12 percent over the period from 1984 to 2012.

Figure 5 and **figure 6** show wealth inequality over the same period using top decile and top quintile shares. Specifically, figure 5 displays the share of total wealth flowing to the top 10 percent of households and figure 6, the top 20 percent of households in terms of wealth. In 1970, the top 10 percent of households owned about 53 percent of the total wealth. By 2012, the top decile's share had fallen to about 48 percent, a decline of about 12 percent. For quintiles, the decline over the period was about 5.2 percent.

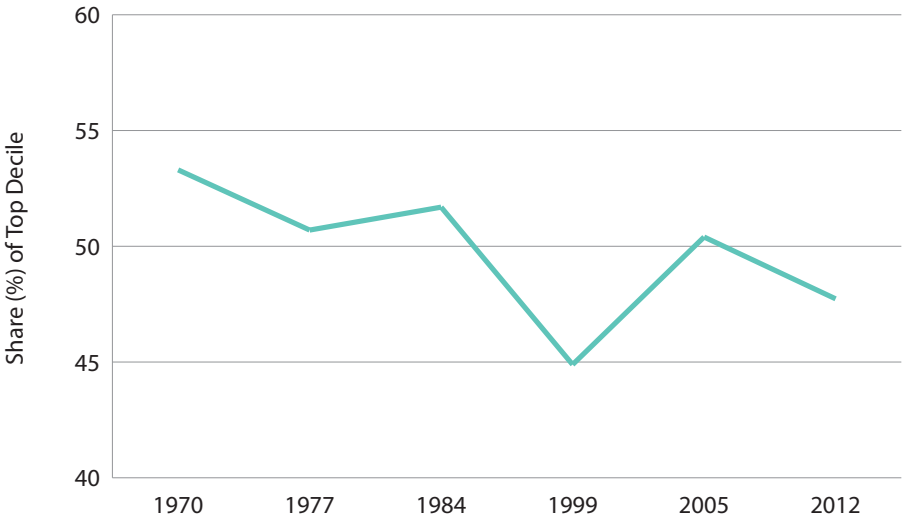
11. The 1999 public-use SFS file contains some records with missing data and, in those cases, Statistics Canada decided to place nine '9's in the relevant cell. Many software programs treat such numbers as actual values making those entire records unusable. So, for 1999, those records with nonsense values (505 records representing close to 167,000 households) were dropped. This left 15,428 records (representing just over 12 million households) for the analysis. The impact of removing these records on the representativeness of the remaining file is unknown. Statistics Canada has obviously removed, imputed, or edited any missing data from the other three surveys and there were no similar data issues with those files. The 2005 public-use SFS file also has issues due to its much smaller sample size.

Figure 4: Wealth Inequality Trend, 1970–2012—Gini Coefficient



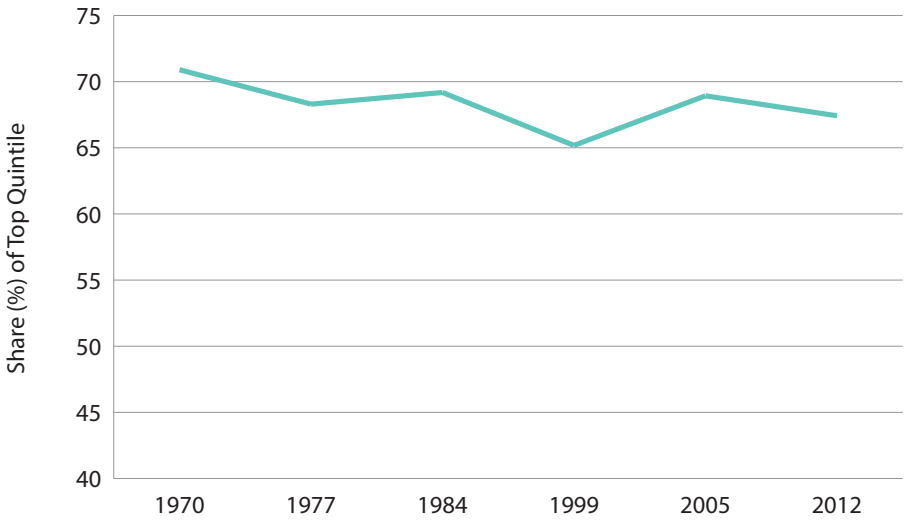
Sources: Oja, 1987; Statistics Canada, Survey of Financial Security, various years; calculations by author.

Figure 5: Wealth Inequality Trend, 1970–2012—Share of Top Decile



Sources: Oja, 1987; Statistics Canada, Survey of Financial Security, various years; calculations by author.

Figure 6: Wealth Inequality Trend, 1970–2012—Share of Top Quintile



Sources: Oja, 1987; Statistics Canada, Survey of Financial Security, various years; calculations by author.

The differences between the top shares trend and the Gini trend are small. Clearly, the Gini takes into account the entire distribution whereas the top shares just look at one (high end) component of it. So, we would not expect them to be identical. They do show, however, the same basic trend. Wealth inequality declined until about 1999, increased somewhat to 2005 and then declined again to 2012.[12] Overall, each of the trends shows a long term decline in wealth inequality.

In recent years, Statistics Canada has presented wealth inequality slightly differently. In their news release of June, 2015, highlighting the changes in wealth distribution between 1999 and 2012, they show a single graph with the shares of wealth flowing to *each income quintile* (Uppal and Larochelle-Côté, 2015b). In that graph, wealth inequality by income quintile is shown to have increased over that 13-year period. Share of wealth of the top income quintile has increased from 44.5 percent to 46.0 percent and that of the bottom income quintile has declined from 5 percent to 4 percent. However, the change in the distribution of wealth itself is not included.[13] The changes in wealth distribution by income quintile is shown below in **table 4**.

Using this measure (wealth shares by income grouping), wealth inequality has been increasing for a long time. This result stands in contrast to the pattern of wealth inequality shown in figures 4, 5, and 6. Part of the explanation for this is found in social and demographic changes. The lower share of wealth among the households in the bottom quintile is due, to some extent, to the fact that

12. The results for 2005 are not as reliable due to the small sample size in that year.
13. In Oja, 1987, the agency included both ways of displaying wealth inequality.

Table 4: Wealth Shares by Total Income Quintile Shares

Income Quintile	1970	1977	1984	1999	2012
Top 20%	10.4	9.0	6.1	5.0	4.0
Second	13.8	12.8	12.4	10.6	9.6
Third	14.0	15.0	16.4	16.6	16.5
Fourth	19.0	19.0	20.3	23.4	23.8
Bottom 20%	42.8	44.3	44.8	44.5	46.0

Note: Income is defined as before-tax income.

Sources: Oja, 1987; Statistics Canada, Survey of Financial Security, various years; calculations by author.

we now have a much higher proportion of young people (aged 18–24) still in school and therefore likely to be positioned in bottom quintile of both the income and wealth distribution. Forty years ago, many more young people were employed and beginning to acquire assets by their early twenties. As well, today, we have proportionately more households permanently dependent on government programs and trapped in a low-income, low-wealth predicament. The current labour market is clearly more challenging than it was decades ago and that makes it more difficult for people, especially poorly educated and unskilled people, to work their way out of relative poverty.

The pattern of wealth inequality by *after-tax income quintile* changes this picture slightly. Data is only available since 1984. **Table 5** shows the distribution of wealth by after-tax income quintile drawn from the four public-use microdata files that have been provided by Statistics Canada.[14]

Table 5: Wealth Shares by After-Tax Quintile

After-Tax Income Quintile	1984	1999	2005	2012
Top 20%	5.81	5.56	5.44	4.14
Second	11.83	11.96	9.29	9.53
Third	16.03	17.91	18.28	16.37
Fourth	20.55	23.18	22.63	24.11
Bottom 20%	45.82	41.60	44.71	45.99

Note: Income is defined as after-tax income.

Sources: Oja, 1987; Statistics Canada, Survey of Financial Security, various years; calculations by author.

14. Statistics Canada does not determine wealth shares by after-tax quintile and does not have microdata files involving wealth prior to 1984.

Over the period 1984 to 2012, wealth inequality by after-tax income shares has increased somewhat but by less than with pre-tax income shares. While the bottom quintile owns slightly less, the middle class (quintiles 2, 3, and 4 as a group) owns slightly more with the top quintile owning about the same over the 28-year time span. The Gini Coefficient is not available for after-tax shares; however, based on the comparison in table 5, it would be hard to make much of a case for a growing wealth gap. It is important to stress that the difference between the two tables is small. It might be expected that since the distribution of after-tax income is more compressed than that for pre-tax income, wealth distribution by those shares might also be somewhat more compressed.

Life-Cycle Patterns

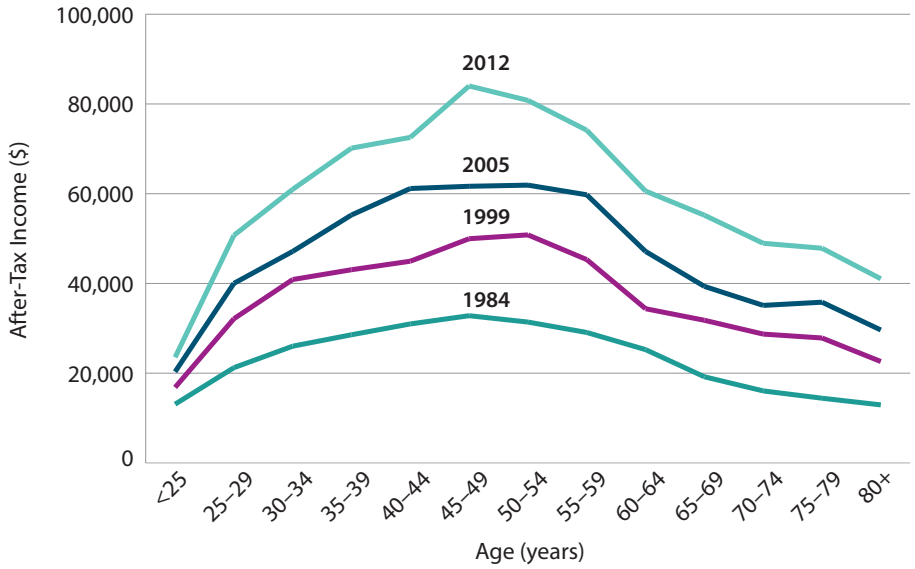
To what extent do we observe a life-cycle effect in the data over this period?

Let's start with after-tax income. More than any other definition of "income", disposable income represents a household's potential living standard. It is the base for consumption, saving, and wealth accumulation. And, according to the Life-Cycle Hypothesis, it should have a clear, identifiable hill-shaped pattern. **Figure 7** shows the path of after-tax income by age grouping for each of the years under consideration, 1984, 1999, 2005, and 2012. The graph shows a definite hill-shaped pattern of nominal after-tax income for each of the four years. The peak income years appear to be in the 45 to 55 range, consistent most empirical evidence on income and age. It is certainly not surprising that income starts out low for young people, then grows as workers acquire greater experience and skill and take on more responsibility, and then fall off after retirement. This is exactly what the Life-Cycle Hypothesis predicts and that is what we observe in each of the years.

Does wealth follow a similar, expected hill-shaped pattern?

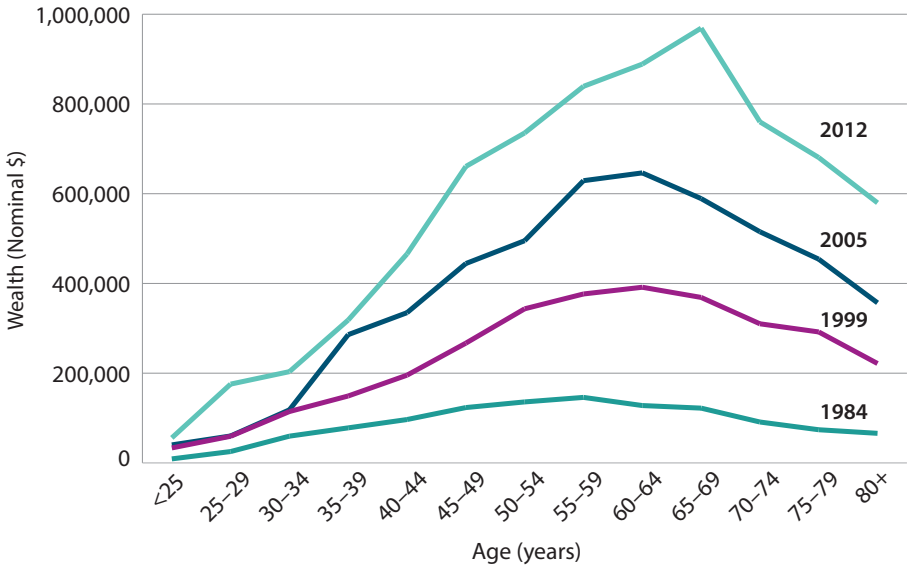
Figure 8 shows the age-path of wealth for the four years. The age-pattern of wealth appears to follow a predictable hill shape consistent with the Life-Cycle Hypothesis. Putting each of the years on the same graph has softened the visual impact of the earlier years but a look at the summary levels in each year (Appendix C, p. 40) indicates that the pattern is just as striking in the earlier periods. What is interesting is that the age of peak wealth has increased over time. In 1984, the highest level of wealth occurred in the 55–59 age grouping. In 2012, the age of peak wealth had increased by a full decade. Older people appear to be retaining more of their wealth. One explanation of this is that people are living longer and need to hang on to more of their wealth later in life. Perhaps, more importantly, the baby-boom cohort is accentuating the age-wealth pattern because they are the richest cohort ever and there are more of them.

Figure 7: Age Pattern of After-Tax Income, 1984–2012



Sources: Statistics Canada, Survey of Financial Security, various years; calculations by author.

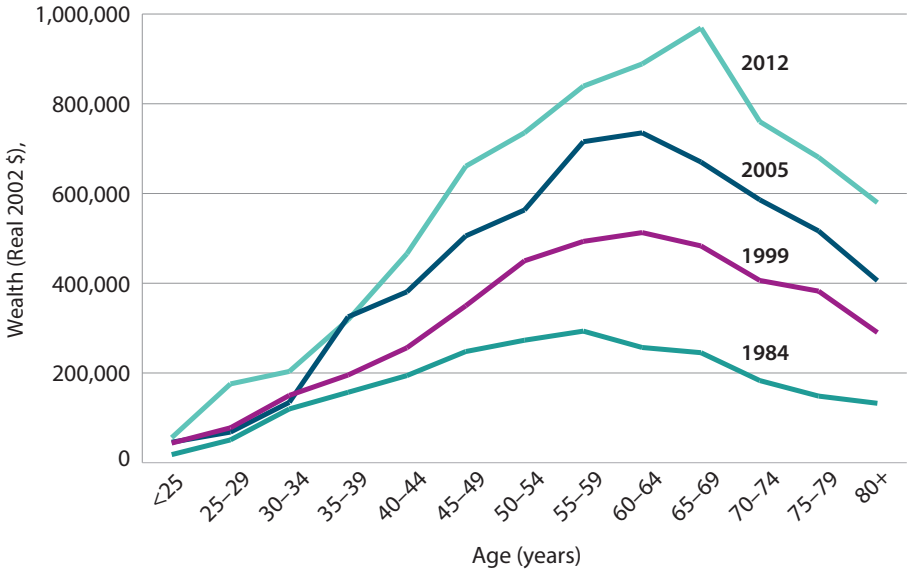
Figure 8: Age-Wealth Pattern, Nominal Dollars, 1984–2012



Sources: Statistics Canada, Survey of Financial Security, various years; calculations by author.

If we look at the same age-wealth pattern only in real 2012 dollars (**figure 9**), we notice that there have been significant real improvements in wealth levels for virtually all age cohorts but especially for those over 60. In each of the years surveyed, the households with a head between 55 and 75 seemed to have the biggest gains in percentage terms. **Table 6** summarizes the real gains by age cohort over the entire period shown in figure 9. This is an important result. It shows that, over the period, real wealth has increased overall and that each age group has shared in that increase (with no exception). This data highlights the overall improvement in the financial situation of seniors in real terms.

Figure 9: Age-Wealth Pattern, Real 2012 Dollars, 1984–2012



Sources: Statistics Canada, Survey of Financial Security, various years; calculations by author.

Table 6: Real Gains (%) in Wealth by Age Cohort, 1984–2012

Age Group	Real Gains by Age Group	Age Group	Real Gains by Age Group
under 25	309.25	55–59	286.17
25–29	345.10	60–64	346.07
30–34	169.73	65–69	395.11
35–39	202.94	70–74	415.19
40–44	239.83	75–79	458.31
45–49	266.69	80 and over	437.60
50–54	269.34		

Sources: Statistics Canada, Survey of Financial Security, various years; calculations by author.

Low net worth by age group, 2012

The influence of age on wealth holding is also seen if we examine the proportions with either zero wealth or insignificant wealth levels by age. **Table 7** displays these proportions and, predictably, the pattern is what we would expect if the Life-Cycle Hypothesis is an important determinant of saving and wealth. Here, having a net worth of less than $5,000 is considered insignificant because, in most cases, the assets are merely personal effects (like electronic devices including computers and televisions, clothing and some furnishings).

Table 7: Low Net Worth by Age Group, 2012

Age Group	Percentage With Zero Net Worth	Percentage With Net Worth <$5,000
under 25	21.52	48.46
25–29	16.96	27.84
30–34	10.34	21.76
35–39	9.43	17.54
40–44	5.56	10.40
45–49	3.30	10.90
50–54	5.22	10.03
55–59	4.41	12.31
60–64	2.97	10.40
65–69	2.25	8.50
70–74	1.16	8.59
75–79	1.84	4.87
80 and over	.73	5.72

Sources: Statistics Canada, Survey of Financial Security; calculations by author.

The gains by the under-30 age group are notable but perhaps anomalous. Given the substantial increase in participation in post-secondary education, increase in student debt load, and the dramatic changes in the labour market (towards low-paying service jobs for the poorly educated), we might have expected that group to struggle to acquire positive net worth before 30 rather than experience a more than 300 percent gain in real wealth levels over the full period.

Data anomalies

A close examination of the 2012 *Survey of Financial Security* (SFS) microdata file reveals a disturbing "choppiness" in the reported data on net worth. While a random sample of the population is never going to be a perfect representation of that population, there appear to be a significant number of sudden and large changes between years for which there is no obvious explanation.[15]

15. The information about the net worth of those aged 17 to 22 will not be as reliable as the other data points because of low sample counts.

The fact that the survey shows that average net worth of 17- and 18-year-olds in Canada in 2012 was over $45,000 is problematic. It is important to note that the vast majority of people that age are still in high school and are living with their parents. The only people of that age who would be surveyed would be those living on their own or as a head of a larger household. Our expectation would be that people in that circumstance would, *on average*, have almost no positive net worth.

If we dismiss the records of 17 and 18 year olds because of small sample size, what should we make of the wealth data of those 19 and 20? The average wealth of a 19-year-old in 2012 was $15,355 and that of a 20 year old was $81,186, a more than five-fold jump. Again, to be included in the survey, you must be living independently of your parents. In that case, these young people were either in a post-secondary institution or in the very early stages of their work life. While any positive net worth at that age is suspect, the sudden quintupling of wealth defies explanation. There is no obvious *en masse* threshold effect that would help explain such an increase.

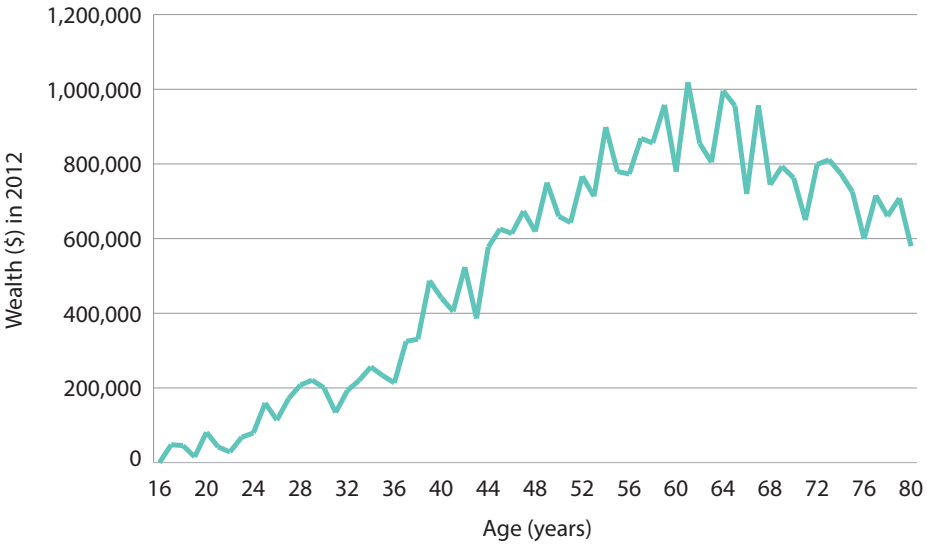
The rest of the data on average wealth by age continues to have these unexplainable "lurches" year to year. How do we account for a 50 percent increase in wealth between ages 26 and 27 and between ages 38 and 39? How do we explain a pattern that has average wealth holding go from $405,000 to $524,000 and then to $386,000 and then back to $578,000 between the ages of 41 and 44? In the real world, the averages should iron out all the different individual data points to produce a fairly even pattern. The cohort graphs (figures 7, 8, and 9) are much smoother because of the five year groupings that mask these year-to-year anomalies. The concern, of course, is that despite their best efforts, Statistics Canada's data on wealth may not be entirely reliable.

Figure 10 displays the full 2012 age-wealth profile without the grouping. This profile, drawn from the survey sample, is far more choppy and contains many more unexplainable anomalies than if the full population data were available. Despite the anomalies, the broad life-cycle pattern is clear. We have very low levels of wealth in the younger years; wealth levels rising rapidly in middle age and peaking around the "normal" retirement age; then falling off somewhat during retirement.

Does the Life-Cycle Hypothesis explain the differences in wealth?

To what extent does age (the life-cycle effect) explain the wealth inequality that we observe? This is not a new question. Economists have struggled with this issue since, at least, the 1970s. Superficially, we observe a pretty close fit between the actual age-wealth profile (once we iron out the year-to-year choppiness) in figures 6 and 7 and the hypothetical "pure" life-cycle pattern in figure 2. However, the visual similarity does not constitute empirical evidence of the strength of the relationship between age and wealth.

Figure 10: Age-Wealth Pattern, 2012



Sources: Statistics Canada, Survey of Financial Security; calculations by author.

A number of researchers have attempted to quantitatively investigate the nature and magnitude of this connection. In a review of the empirical literature up to that point, Davies and Shorrocks make the point: "All versions of the life-cycle saving model predict that wealth will vary with age. If these age-related differences are quantitatively important, then a substantial portion of observed wealth inequality may be due to the fact that people are sampled at different points of their lifetime" (1999: 648). They continue: "To determine whether this is a plausible approximation to the real world, a number of authors have examined the distributions that would be observed in simple egalitarian societies where all wealth differences are due to age" (1999: 648). Davies and Shorrocks reviewed the work of several researchers who used this approach including Atkinson (1971), Davies and Shorrocks (1978), Michael Wolfson (1977), and Davies (1982). Atkinson (1971) found that "within age group" wealth inequality was similar to wealth inequality for the whole population and concluded: "Life cycle differences are not an important factor in explaining the observed [wealth] inequality" (1971: 24).

Davies and Shorrocks (D&S, 1999) examined several authors who used a pure (egalitarian) life-cycle society as their starting point and then modelled in different earnings, different rates of return, variations in time preferences, and even introduced inheritances into the mix—all to see if, and to what extent, there were departures from the basic life-cycle results. They report that each of these studies suggest that life-cycle effects are quite important in explaining wealth inequality. Davies and Shorrocks (1978), for example, found that life-cycle factors accounted for between 60 percent and 82 percent of actual wealth inequality using the Gini coefficient (D&S, 1999: 649). And "Wolfson's work attributes considerable wealth inequality to life-cycle factors, but also

leaves substantial room for the role of inheritance" (D&S, 1999: 650). Davies ran a simulation model to capture the life-cycle effect and then re-ran the model to include inheritances. He found that "in the absence of inheritances, a simulated Gini coefficient of .66 is obtained, compared to the estimated actual value of .75" (D&S, 1999: 650). And, he also reports that "allowing a small variation across families in the rates of time preference had a strong impact on the degree of simulated wealth inequality" (D&S, 1999: 650).

Davies and Shorrocks argue that, even if a model of a pure egalitarian society is capable of exactly replicating the actual wealth distribution of a nation, so could a model of an inegalitarian society—with wealth determined entirely by inheritance (1999: 651). While the obvious point (that any "model" can be constructed to fit the data observed in the real world) is taken, surely there is no theoretical case to be made that inheritances determine the distribution of wealth. The economic theory behind the Life-Cycle Hypothesis is based on a foundation of repeated observation in different societies and in different time periods. It has been rigorously tested and supported. It has won its originators a Nobel Prize in economics. There is no theory that claims that inheritances explain actual wealth holdings, and the empirical evidence, as was revealed earlier in this study, shows that inheritances play a very small role in explaining wealth.

Davies and Shorrocks favour models that include both life-cycle effects and inheritances. Other researchers take a different approach. Paglin (1975) compares a life-cycle-driven pattern of wealth against the actual wealth holdings to determine the role that the life-cycle effect plays. His work suggests that using his "Paglin-Gini" explains about 50 percent of observed wealth inequality in the United States in the early 1960s. The other 50 percent would potentially be explainable by other factors, including inheritances. Almas and Mogstad (2012) argue that the Paglin Gini adjusts not only for the life-cycle effect but also for any other factor that is related to age (such as education). They employ a variation of the Paglin adjustment attempting to correct for this omission and find that life-cycle effects are, in fact quite small.

Modigliani, of course, believed that empirical research supported his view that age was a very important determinant of wealth. In a review of the relative importance of inheritances and the life-cycle effect, Menchik and Jiankoplos (1998) point out that a study by Ando and Kennickell supported the view that the life-cycle effect accounted for about 80 percent of wealth. Other researchers, they point out, have found that life cycle accounts for a much smaller percentage.

Attempts to reconcile these opposing views and to marshal additional evidence to support, or to contradict, each view are an ongoing part of current economic research. Blinder (1988) made a very thoughtful attempt to adjudicate this dispute. In the end, he concludes that using direct methods to measure the amount of inherited wealth supports the view that only 20 percent to 30 percent of wealth is inherited. On the other hand, he concludes that the best estimates

of life-cycle wealth place it in the 30-percent-to-50 percent range. Consequently, at least 20 percent of total wealth cannot be explained as the result of either inheritances or life-cycle savings (Menchik and Jiankoplos, 1998: 51–52).

Results for the United States do not exactly mirror what is happening in Canada. The United States does have somewhat more measured inequality of wealth and somewhat less economic mobility between groups; and inheritance is somewhat more important due to the greater amount of wealth at the top end. It would not be surprising, therefore, to find more of a life-cycle effect in Canada.

The important lesson to be drawn from a review of the various attempts to explain wealth variations in the United States is that, while the life cycle may be an obvious place to start and may be expected to play a prominent role, there are many other factors (besides inheritances) that can help explain wealth inequality. Skill differentials (and all of the considerations that play a role in these differences); preferences and choices; barriers and institutional (including state-produced) constraints; and luck are all likely to help determine differences in wealth not accounted for by life-cycle effects and inheritances.

The Paglin Method

This study will employ a variant of the method used by Paglin (1975) to estimate the proportion of wealth inequality that we can attribute to age. Any remaining inequality will, obviously, be the result of these other (non-life-cycle) factors. The estimation is applied only to the 2012 (the most recent) wealth database for Canada. Paglin argued that the "average age-wealth profile" is a good proxy for the life-cycle effect in the sense that, if everyone was at the average age, everyone's lifetime income would be the same. This assumption "would produce equality of wealth for families in the same age bracket, but would allow differences in wealth based on age" (Paglin, 1975: 608). Employing this approach, his "Paglin-Gini" coefficient for the United States in 1962 was .50. This compared to a value of .76 for the "Lorenz-Gini". This means that the traditional (Lorenz-Gini) measure of wealth inequality overstated the degree of inequality by about 52 percent (Paglin, 1975: 608).

While the use of an intra-age average in this context will certainly equalize lifetime wealth for every unit, the averages may well capture more than the pure age effect. Embedded in the averages could be other factors unrelated to age such as educational and choice differences that may be correlated with age.[16] For this reason, Almas and Mogstad (2012) construct a model that equalizes lifetime incomes based solely on age and leaves out any other considerations that might be correlated with age.

Since the simple simulation model summarized in table 3 (and figure 2) earlier in this publication was designed to model the pure life-cycle effect

16. Inherited wealth may also have somewhat of an age effect to the extent that older people tend to inherit more than the young.

leaving out all other factors unrelated to age, it can be similarly used as a benchmark for comparison. That simple (egalitarian) case produces a Gini Coefficient of .535. The actual Gini for 2012 is .613. This suggests that age is capable of explaining about 87 percent of the wealth inequality—at least using this particular version of the life-cycle model of an egalitarian society.

How robust is this result? Does it stand up to variations in the basic assumptions of the model? To test this, five additional versions of the comparison simulation model were employed and the corresponding Gini Coefficients determined. The results of this test are displayed in **table 8**.

Table 8: Testing Age as a Factor in Wealth Inequality, 2012

Case	Income growth rate	Saving rate	Rate of return wealth/ annuities	Start saving at age	Stop saving at age	GINI coefficient
Base	2.25%	10.0%	5%	28	65	.535
01	2.00%	10.0%	5%	28	65	.533
02	2.00%	7.5%	5%	28	65	.533
03	2.00%	7.5%	4%	28	65	.523
04	2.00%	7.5%	4%	25	65	.502
05	2.00%	7.5%	4%	25	68	.503
06	2.00%	7.5%	4%	25	68	.516

Small changes in the basic assumptions of the model appear to result in only a marginal difference in measured inequality of wealth. To the extent that a pure life-cycle effect can be captured by a static egalitarian model (where everyone has the same lifetime wealth) with characteristics similar to those in table 8, then we can say that most of the observed inequality in Canada in 2012 (about 80 percent to 87 percent) is explained by the life-cycle effect. This result is not entirely surprising. It is consistent with some of the higher-end results from studies examining US wealth inequality and the United States does appear to show a greater inheritance effect on wealth than Canada.

Undoubtedly, there are other egalitarian models with different assumptions that could generate less wealth inequality. However, this particular model was constructed to mimic the Life-Cycle Hypothesis—a theory that is well tested and is the dominant model that we have to explain exactly these interage differences in income, consumption, savings, and wealth. As well, the basic assumptions used here are broadly similar to those found in modern societies today.[17]

17. While saving rates in Canada are relatively low, if we include forced saving via the tax system and employer pension plans, the 10 percent assumption seems to be reasonable. Long-term rates of return on wealth invested in a balanced portfolio of stocks (or exchange traded funds) is approximately 4 percent to 6 percent (Credit Suisse, 2016).

Commentary

The evidence presented here suggests that the distribution of wealth in Canada is not more unequal than was the case about 28 years ago. The Gini Coefficient for net worth in Canada declined by about 12 percent from 1984 to 2012. The top 10 percent held about 52 percent of the wealth in 1984; by 2012 that share was down to 48 percent.

What are we to make of studies that track the distribution of wealth by income groupings? Statistics Canada, for example, points to the fact that, between 1999 and 2012, an increased share of wealth went to the top income quintile and a decreased share to the bottom income quintile as evidence of a growing wealth gap. First, why measure wealth inequality by looking at it through the filter of income? In what way does it improve our understanding of wealth differences? We certainly don't measure income inequality that way. Second, the use of total, pre-tax income as a representation of "income" is questionable. Over the years, total income has become less and less valid as a proxy for a household's standard of living as taxes and other deductions have increased. Most studies examining income inequality use after-tax income and when that indicator is employed here, the changes in wealth inequality by income quintile are found to be very small (with no change in the share going to the top quintile).

These results will be surprising to many students of the Canadian economy. Over the past three decades, there have been significant changes in society that we expect would have increased wealth inequality.

1 The aging of Canadian society

There is now a much higher proportion of people over 65 than in the past (Statistics Canada, 2015). It is this age cohort that has seen the largest increases (by far) in wealth, as the information in table 7 shows.

2 Increased participation in post-secondary education

There has been increased participation by young people in post-secondary education, especially in the 1980s and 1990s (Berger, 2009). This means that we have more young people delaying wealth acquisition until their late twenties, pushing more of them into the very bottom of the wealth distribution.

3 Increased female participation in the labour force

In 1981, about 61 percent of females between 25 and 54 were in the labour force. By 2012, that number was about 82 percent (Statistics Canada, 2016). This increase means that there were many more two-income families and, for those households, wealth acquisition would, on average, accelerate. That, in

combination with assortative mating,[18] would tend to stretch out the distribution of wealth, making it more unequal.

4 Increase in dependency

Since the 1980s, there has been an increase in the number and proportion of the population who are reliant on welfare over the long term (Caledon Institute of Social Policy, 2015). This kind of permanent dependency keeps people trapped at a very low, near-poverty, state of existence that makes it almost impossible to acquire assets of any significance. Perhaps more importantly, there are built-in disincentives in these programs, making it very difficult for people to become independent and improve their living standard.

5 Increase in "superstar" incomes

While the data here is sketchy, there appears to be a disproportionate increase in the salaries/incomes of our sports, entertainment and executive stars. For example, there are several thousand players in the NHL, most of them from Canada. The average salary of NHL players in real dollar terms has almost tripled from 1993 to 2012 (Yam, 2005; Burke, 2012). In a study of top 100 Canadian executive salaries, the CCPA found that the average for that group in 2014 (almost $8 million per year) was up about 22 percent from six years earlier (Mackenzie, 2016). According to tax-filer data for Canada, the after-tax incomes of the top 1 percent increased (in real dollar terms) by about 75 percent between 1982 and 2010 (and for the top 0.1 percent, after-tax incomes have fully doubled in real terms). Over the same period, there has been almost no apparent increase in the real incomes of the bottom 99 percent (Citizens for Public Justice, 2013). All of this suggests that the much higher incomes at the top end not only stretch of the distribution of income but also will likely increase wealth inequality because of the enhanced capacity of high-income households to accumulate net worth.

The fact that wealth inequality has not increased (and, according to the main indicator, has actually declined) implies that there were other factors working to reduce wealth inequality. The share of wealth owned by the middle 60 percent (and especially the top end of that middle) has increased over time. Perhaps the increases in human capital and skill development over the period has worked to bolster the middle and thereby reduce inequality. The disproportionate rise in home prices combined with lower borrowing costs may also have helped to strengthen the balance sheets of the middle class. The increase in the underground economy and in underreported incomes may have contributed, indirectly, to some degree of wealth equalization (Dunbar and Fu, 2015).

18. That is, the tendency of similar people, and similarly successful and able people, to marry each other. See Greenwood, Guner, Kocharkov, and Santos, 2014.

Finally, the concerns about data quality outlined earlier in this publication suggest that our information on net worth may not be reliable.

The evidence presented in this paper also supports the view that inheritances are not significant in Canada. The study by Morissette and Zhang (2006) concluded that less than 5 percent of the wealth gap in Canada is explained by inheritances. Evidence from the United States also points to the view that inheritances do not play a dominant role in wealth holding. Indeed, a recent study by Edward Wolff of New York University (Wolff and Gittleman, 2011) concludes that inheritances actually have an equalizing impact on the distribution of wealth in the United States.

What is it about wealth inequality that bothers social justice advocates, including many academics and people with a voice in the media? Is it merely a matter of envy, that is, people wishing they had the wealth and life styles of rich people but dressing that up to make it look like a moral objection? Let's set envy aside and examine some of the stated arguments against inequality of wealth.

1 The rich don't need all of the wealth they have

The rich have wealth in excess of what they need to live comfortably and so it is only "fair" that they be compelled to share some (or all) of that excess with others who have less. The ability to importantly improve the lives of poor people at a modest cost to the rich is a sufficient justification for wealth redistribution. This is a utilitarian argument that rests on the premise that people either have no real "rights" to property or, even if they do, the state can override those rights if it is for the common good.

2 Great wealth inevitably means great power over others

Harvard philosopher T.M. Scanlon asks if the concern about differences between what people have is not mere envy? He outlines several reasons why we might object to wealth inequality that go beyond envy. His principle argument is that inequality can give wealthier people an "unacceptable degree of control over the lives of others" (Scanlon, 2014: 2). The rich have more power to direct resources (including labour and capital) towards ends of their choosing. They exercise that power not only by their purchases by also by their ability to control the businesses they own and the people they employ. Scanlon uses the example of a wealthy person owning a media outlet which, he argues, "can give control over how others in society view themselves and their lives, and how they understand their society" (Scanlon, 2014: 2).

3 The rich have the power and the incentive to influence political decision-making in ways that favour their interests

Scanlon also makes the point that economic inequality can undermine the fairness of political institutions because people who hold elected offices must depend on campaign contributions and will be more responsive to the interests and demands of wealthy contributors (Scanlon, 2014: 2). The recent US election has highlighted concerns about the cronyism and the rich getting unfair advantages on taxes, regulations, government contracts, and so on.

4 Economic inequality (of both income and wealth) adversely affects opportunity

Economists have typically argued that, in fact, economic inequality has a strong incentive effect encouraging people to work harder and smarter to improve their living standard. In a sense, successful people (especially those who have emerged from modest backgrounds) are role models and their stories provide inspiration for those less well off. However, weighing against the incentive effect is a concern that inequality itself may hamper opportunity. The mechanism through which that might work can be articulated as follows:

> [I]nequality directly undermines equality of opportunity, likely through a variety of mechanisms. As the gap between the rich and poor widens, lower-income families have less ability relative to their rich counterparts to invest in enrichment goods for their children. Children from families with less income have relatively less extensive and privileged social networks and, compared to their rich peers, are more likely to experience the type of "toxic" stress that can hamper brain development and long term academic, health, and economic outcomes. (Bernstein and Spielberg, 2015)

While this argument is framed in terms of income inequality, it appears to fit as well with wealth differences. The idea that economic inequality can actually, by itself, hamper opportunity has been expressed recently by former President Obama. In his October, 2016 guest article in the *Economist* magazine, he stated: "That's the problem with increased inequality—it diminishes upward mobility. It makes the top and bottom rungs of the ladder "stickier"—harder to move up and harder to lose your place at the top" (Obama, 2016).

5 Opposition to wealth inequality is driven primarily by ideology

A core principle of socialism is equality of outcome. Adherents believe that the only good, fair, and successful society is one that is equal. Socialists may employ other arguments to achieve this goal but it is the goal of equality that is important. Thus, it is reasonable to use whatever works to convince voters and politicians that economic inequality is bad and that government intervention and redistribution are appropriate ways to remedy inequality.

What are we to make of these arguments against wealth inequality? Setting aside points 3 and 5 for the moment, it is easy for skeptics to find these arguments less than compelling. Utilitarianism is a serious problem for anyone who values liberty and who believes that every one of us has fundamental rights that no one (or no group) can violate. Unless you have acquired wealth by theft, coercion or other immoral means, the wider society has no right to forcibly take some or all of your wealth no matter what benefits it might bring to others.[19]

The argument that economic inequality hampers opportunity and upward mobility is simply not convincing. Poverty, as opposed to inequality, may be a barrier to opportunity. If people are too poor to acquire basic skills to get a foothold in the labour market or too poor to afford land in an agricultural society, that may well prevent them from moving forward to improved living standards. However, the link between inequality itself and opportunity is simply not there. Imagine a society where we have high levels of inequality (both wealth and income) but where the lowest incomes are over $100,000. No one lacks the means to acquire the things they or their children need for upward mobility. If a few more billionaires enter that society, what impact does that have on opportunity? It is not inequality, *per se*, that represents the barrier.

Bill Gates, Mark Zuckerberg, Jeff Bezos, Sergei Brin, and Warren Buffett: these are a few of the world's wealthiest people, multi-billionaires all. What power do they have over us? In what ways do they limit our autonomy and or ability to make choices to improve our own lives? An argument can be made that each of these people (and the companies they created) actually expand our choices and reduce the power of earlier entrenched interests and the inefficient use of capital. For sure, they control and direct resources within their own companies but any other CEO (including a bureaucrat appointed by the state) would have a similar power. And any wealthy person who owns a media outlet certainly has a voice but that voice is in a highly competitive market of information and entertainment. And again, if a non-wealthy person (or committee) was in control of a media enterprise, they would have that same power and voice. Is it possible that the real objection is having someone who has been financially successful and who might have capitalist sentiments in charge rather than someone with a different perspective?

The argument (#3) that the wealthy, as benefactors, can (and do) buy favours from their political friends has some merit. But the problem here surely lies with the political system and not with wealth itself. A truly accountable government needs to have mechanisms in place to prevent any kind of corruption or cronyism.

19. This, of course, raises broader questions about the appropriate role of the state and when it is justified to interfere with the freely made decisions of individuals and the consensual arrangements and transactions between citizens. These questions clearly go beyond the scope of this paper.

Conclusion

This paper has attempted to address two questions: "Is wealth inequality in Canada increasing?" and "What is driving the wealth inequality that we observe?" The empirical evidence presented here strongly suggests that, at least in recent decades, wealth inequality in Canada has not increased. As well, the evidence here appears to support the view that the life-cycle effect, which tells us that, for most people, wealth accumulation is a steady, lifelong process, is the dominant explanation for observed differences in wealth.

Specifically, we note that there has been a 17 percent decline in the Gini Coefficient (the most popular indicator of inequality) on Canadian net worth between 1970 and 2012. As well, both top decile share and top quintile share have declined over the same period, although by a smaller percentage. Even if we look at wealth inequality by income quintile (a dubious measure of wealth inequality to be sure) and use after-tax income as our definition of income, wealth inequality, at least since 1984, has not changed in any significant way. The fact that wealth inequality has not increased has led many in the social justice community to focus attention, rather, on the degree of wealth inequality. The fact that the top 20 percent of Canadians own about 67 percent of the wealth and the bottom 20 percent own none has been the subject of much attention and outrage.

Students of economics have long appreciated that, for most people, wealth has a predictable age pattern. The Life-Cycle Hypothesis developed in the 1950s by Modigliani and Brumberg shows that income, consumption, saving, and wealth accumulation change with age because of the natural rhythms of education, work, marriage and family formation, pension saving, and retirement. This means that, even if everyone were identical, there would be substantial wealth inequality because, at any point in time, we have people at different points in their life cycles. Of course, everyone is not identical and there are differences in wealth that are not due to age. The critical point here is that life-cycle effects, alone, are capable of explaining most of the observed wealth inequality in Canada.

Reasons for differences in wealth that are not related to the life-cycle effect would include skill differentials (and all of the personal characteristics that lie behind those differences); preferences and choices; luck (which would include inheritances); and institutional and policy considerations. The latter point refers to any institution, regulation, or policy that constrains (in an important way) the ability or incentive for upward mobility.

It is an empirical question as to how much of wealth inequality is explained by the life-cycle effect and how much by the other factors. Evidence from US studies about the relative importance of the life-cycle effect vary considerably—from the 30-percent-to-50-percent range to the 80 percent range. This paper uses a variant of the Paglin's (1975) approach and shows that the life-cycle

effect in Canada likely accounts for between 80 percent and 87 percent of wealth inequality in 2012. This is a tentative result both because there are concerns about the reliability of the raw data (drawn from a Statistics Canada survey) and the fact that Paglin's methodology is not the only approach to the problem. Nevertheless, the results do appear to be consistent with many of the US studies.

There is much heat and fury about wealth inequality. This paper addresses the popular perception and finds that much of the concern is misplaced. The fact that the bottom 20 percent have no wealth is not surprising and is unworthy of the passion devoted to it. Many of those in the bottom wealth quintile are young and have not yet had an opportunity to accumulate any wealth. Many people with no wealth in their twenties will be in the top wealth quintile (or even top decile) by the time they retire. The paper suggests that attention could be appropriately diverted towards the issues of poverty (real deprivation) and barriers (including governmental) to upward mobility.

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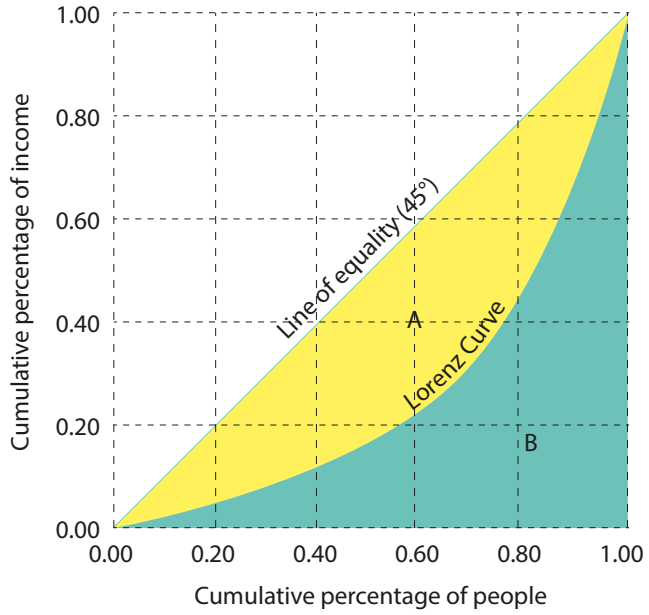
Appendix A: Lorenz Curve and Gini Coefficient

The *Gini Coefficient* is an index of income equality that has been used for many years and in many countries. Its nature can best be understood by considering the *Lorenz Curve* (**figure A1**), which measures along the horizontal axis the cumulative percentage of people with income from the lowest to the highest level and along the vertical axis the cumulative share of income earned by them. The 45° line represents a situation in which income is distributed equally. The two axes represent total inequality as one person earns all income in the country. The curved line shows a realistic degree of equality similar in nature to that found for Canada and most countries in the world.

Figure A1: The Lorenz Curve



The calculation of the Gini Coefficient basically involves dividing the area labeled A by the areas labelled A plus B in figure A1. In other words, the Gini Coefficient (G) is G = A ÷ (A + B). If the Lorenz Curve coincides with the 45° line, the denominator of the equation is zero so that G is also zero and income is perfectly equal. If the Lorenz Curve coincides with the two axes, B is zero and the ratio G is equal to one, reflecting perfect inequality. The arithmetic formula involved in the calculation of the areas A and B using the basic data on family incomes is complex and need not be discussed here.

* Adapted from Appendix 1.B: Properties of Gini Coefficient Used as a Measure of Income Equality, in *Income Mobility: The Rich and Poor in Canada* (Grubel, 2016: 16–17).

The Gini Coefficient has some undesirable statistical properties that require that it be used with caution. Table A1 illustrates one problem. The total incomes in the two countries A and B are the same at $200,000. However, in country A, the income of the lowest quintile group is $20,000 while that in B is only $9,000. Yet, the calculated Gini Coefficient is the same for both countries, 0.2. The explanation is that incomes of the second and third quintiles in A are below those in B. For the top two quintiles, the relationship is reversed with incomes in A exceeding those in B. Analysts focusing on the incomes of the bottom quintile would declare the distribution in B to be less fair than that in A but the Gini Coefficient contradicts this conclusion.

Table A1: Different Income Distributions With the Same Gini Index

Household Group	Annual Income ($)	
	Country A	*Country B*
1	20,000	9,000
2	30,000	40,000
3	40,000	48,000
4	50,000	48,000
5	60,000	55,000
Total	*200,000*	*200,000*
Gini	0.2	0.2

Source: Bellù and Liberati, 2006.

There are other problems with the Gini Coefficient as a reliable guide to changes in income equality through time. Thus, the coefficient changes when the aggregation of the basic data goes from deciles to quintiles and when previously single income earners form families.

Appendix B: Simulation Exercise—Egalitarian Society, Part 01

Lifetime Earnings and Wealth Simulation Model

Number	Age (years)	Income ($)	Saving ($)	Wealth ($)
[Basic assumptions of simulation ➔		1.02	10.000%	1.05]
1	16	0.00	0.00	0.00
2	17	0.00	0.00	0.00
3	18	0.00	0.00	0.00
4	19	5,000.00	0.00	0.00
5	20	6,000.00	0.00	0.00
6	21	30,000.00	0.00	0.00
7	22	30,600.00	0.00	0.00
8	23	31,212.00	0.00	0.00
9	24	31,836.24	0.00	0.00
10	25	32,472.96	0.00	0.00
11	26	33,122.42	0.00	0.00
12	27	33,784.87	0.00	0.00
13	28	34,460.57	3,446.06	3,446.06
14	29	35,149.78	3,514.98	7,133.34
15	30	35,852.78	3,585.28	11,075.28
16	31	36,569.83	3,656.98	15,286.03
17	32	37,301.23	3,730.12	19,780.45
18	33	38,047.25	3,804.73	24,574.20
19	34	38,808.20	3,880.82	29,683.73
20	35	39,584.36	3,958.44	35,126.36
21	36	40,376.05	4,037.61	40,920.28
22	37	41,183.57	4,118.36	47,084.65
23	38	42,007.24	4,200.72	53,639.61
24	39	42,847.39	4,284.74	60,606.33
25	40	43,704.34	4,370.43	68,007.07
26	41	44,578.42	4,457.84	75,865.27
27	42	45,469.99	4,547.00	84,205.53
28	43	46,379.39	4,637.94	93,053.75
29	44	47,306.98	4,730.70	102.437.13
30	45	48,253.12	4,825.31	112.384.30
31	46	49,218.18	4,921.82	122.925.34
32	47	50,202.54	5,020.25	134.091.86
33	48	51,206.59	5,120.66	145.917.11
34	49	52,230.73	5,223.07	158.436.04
35	50	53,275.34	5,327.53	171.685.37

Number	Age (years)	Income ($)	Saving ($)	Wealth ($)
36	51	54,340.85	5,434.08	185.703.73
37	52	55,427.66	5,542.77	200.531.68
38	53	56,536.22	5,653.62	216.211.89
39	54	57,666.94	5,766.69	232.789.17
40	55	58,820.28	5,882.03	250.310.66
41	56	59,996.69	5,999.67	268.825.86
42	57	61,196.62	6,119.66	288.386.82
43	58	62,420.55	6,242.06	309.048.21
44	59	63,668.96	6,366.90	330.867.52
45	60	64,942.34	6,494.23	353.905.13
46	61	66,241.19	6,624.12	378.224.51
47	62	67,566.01	6,756.60	403.892.33
48	63	68,917.33	6,891.73	430.978.68
49	64	70,295.68	7,029.57	459.557.19
50	65	71,701.59	7,170.16	489.705.20
51	66	46,470.69		467.719.77
52	67	46,470.69		444.635.07
53	68	46,470.69		420.396.13
54	69	46,470.69		394.945.25
55	70	46,470.69		368.221.82
56	71	46,470.69		340.162.22
57	72	46,470.69		310.699.64
58	73	46,470.69		279.763.94
59	74	46,470.69		247.281.44
60	75	46,470.69		213.174.82
61	76	46,470.69		177.362.87
62	77	46,470.69		139.760.33
63	78	46,470.69		100.277.65
64	79	46,470.69		58,820.85
65	80	46,470.69		15,291.20

Income		Wealth		
829,970	28.97	5,283,211	50.83	Principal: 489705.20
647,345	22.60	3,180,091	30.59	Interest: 0.05
603,027	21.05	1,509,047	14.52	Term: 180
516,010	18.01	419,022	4.03	PMT: 3872.557542
268,489	9.37	3,446	0.03	
2,864,842	100.00	10,394,817	100.00	

Appendix C: Summary Values for the Age-Wealth Pattern, 1984–2012

Age Distribution of Household Average After-Tax Income and Net Worth

1984

Age grouping	After-tax income	Net worth
under 25	13,091.51	8,986.95
25–29	21,227.23	25,344.81
30–34	26,019.53	59,675.50
35–39	28,561.75	78,154.88
40–44	30,976.58	96,707.40
45–49	32,810.55	123,373.72
50–54	31,391.99	135,957.00
55–59	29,071.42	146,037.35
60–64	25,249.97	127,882.85
65–69	19,197.82	122,110.22
70–74	16,050.51	91,167.86
75–79	14,420.47	73,944.85
80 and over	12,932.52	65,955.06

1999

Age grouping	After-tax income	Net worth
under 25	16,835.99	33,418.49
25–29	32,131.44	59,409.34
30–34	40,871.94	114,528.87
35–39	43,058.13	149,220.72
40–44	44,953.46	195,570.92
45–49	49,970.64	266,945.66
50–54	50,821.96	343,494.68
55–59	45,315.92	376,539.04
60–64	34,367.72	391,511.81
65–69	31,791.98	368,850.17
70–74	28,711.60	310,075.50
75–79	27,844.04	291,910.27
80 and over	22,601.72	221,525.14

2005

Age grouping	After-tax income	Net worth
under 25	20,320.45	40,178.96
25–29	40,022.66	60,072.72
30–34	47,144.39	118,302.79
35–39	55,262.41	285,895.13
40–44	61,158.61	334,856.69
45–49	61,653.81	444,381.57
50–54	61,906.86	495,268.31
55–59	59,758.13	629,013.69
60–64	47,132.80	646,388.75
65–69	39,344.80	589,168.31
70–74	35,109.74	515,188.48
75–79	35,819.50	454,092.56
80 and over	29,627.95	356,760.32

2012

Age grouping	After-tax income	Net worth
under 25	23,538.64	55,814.45
25–29	50,720.59	175,653.16
30–34	60,977.49	203,415.76
35–39	70,160.16	318,530.57
40–44	72,554.65	465,773.09
45–49	84,007.25	660,759.07
50–54	80,797.97	735,399.97
55–59	74,148.03	839,266.38
60–64	60,578.77	888,778.23
65–69	55,210.98	968,914.10
70–74	48,948.26	760,155.89
75–79	47,844.37	680,586.93
80 and over	41,040.15	579,615.86

Appendix D: A Critical Look at the 2012 Viral Video, *Wealth Inequality In America*

A viral video about wealth inequality in America now has 20 million views (Politizane, 2012). It captures pretty well the level and depth of understanding of wealth by most in the social-justice community. The six minute video involves a comparison between three things: (1) what people (who were apparently surveyed but with methods, questions, and technical details unknown) believe is the distribution of wealth; (2) what people believe is the ideal distribution of wealth; and (3) the actual distribution of wealth. Because the majority of those "surveyed" thought that an ideal distribution was more equal than (1) or (3), this, for the narrator of the video, constitutes proof that people know that the US system "is skewed unfairly".

The video is superficial and somewhat dishonest. In several parts of the video there is confusion between wealth and income[20] As well, in the article that the video is based on, the authors did not actually ask respondents to state their ideal wealth distribution but rather gave them a choice between the current wealth distribution in the United States and the current (more equal) income distribution in Sweden. Respondents were asked which society they would rather join (in a Rawlsian veil of ignorance) and most stated that they preferred the more equal distribution. The fact that Sweden actually has almost the same level of *wealth* inequality as the United States (Brandmeir, Grimm, and Holzhausen, 2015: 52) did not stop the authors from concluding that "most Americans prefer Sweden". An argument can be made that the survey results simply tell us that Americans, like most people, are risk averse and does not reveal any kind of preference relating to kind of society they regard as "ideal".[21] Finally, the video contained not a whisper about the life-cycle effect. Were respondents made aware that even in a highly egalitarian society (where everyone has exactly the same lifetime wealth), there will be large differences in wealth at any point in time?

The social justice community in Canada were sufficiently impressed by this video that they made a similar one for Canada, produced by the Broadbent Institute and narrated by Ed Broadbent (Broadbent Institute, 2014). Many of the criticisms made of the US wealth inequality video hold for this production as well. We have the same facile treatment of differences in wealth and the same expressions of shock and outrage at the fact that the bottom 20% hold virtually no wealth. The pejorative language (a more unequal wealth distribution is

20 For example, there is a poverty line (which is income based) right in the middle of a wealth chart.
21 Respondents were asked to pick between two outcomes and not two "processes". A more equal wealth distribution might find more favour among respondents if it occurred naturally because everyone was equally able and made similar choices than if it occurred through aggressive redistribution and by prohibiting bequests and *inter vivos* transfers. And respondents' answers might have changed if the more equal society had living standards and average wealth at the level of a third-world nation, like Cuba.

"worse" than a more equal one) and the call for action to change the distribution through political means implies, again, that unequal wealth is an obvious "bad" that requires no justification.

5. Measuring Income Mobility in Canada

Charles Lammam, Niels Veldhuis, Milagros Palacios, and Hugh MacIntyre

In recent years, the issue of income inequality and its implications for public policy have received renewed attention in Canada and internationally. Unfortunately, too many observers and participants in the debate have relied on piecemeal facts and faulty assumptions to support their positions. Doing so has led to a misunderstanding of a very complex issue.[1]

One assumption frequently underlying the debate about income inequality is that people's economic positions are fixed. That is, it is assumed that Canadians who have low incomes today will have low incomes tomorrow. (Similar assumptions are made about Canadians with higher incomes). Nothing could be further from the truth. In reality, Canadians with low or high incomes in one year are often not in that same income group in subsequent years. Thus, those who are experiencing low income today are not necessarily those who will experience it tomorrow.

This report tells a powerful story.[2] Contrary to the perception proclaimed by a number of prominent voices in the income-inequality debate, Canadians are not permanently stuck in the same income groups year after year. We are fortunate to live in a dynamic society where the majority of us experience significant upward—and downward—income mobility over the course of our lives.

The evidence in this report comes from a special data request made to Statistics Canada. This evidence should help everyone gain a better and more accurate understanding of income mobility in Canada. Importantly, the report is only a starting point in the research on income mobility, in that it helps to ensure Canadians are aware of the existence and extent of income mobility.

1. See Clemens (2012) for an excellent discussion of the many complex issues related to income inequality.
2. This report is an update to Lammam, Karabegović, and Veldhuis , 2012.

Future research may focus on what propels some Canadians to be more mobile than others, though uncovering these drivers is beyond the scope of this report.

Organization of the Study

This report consists of four sections and three appendices. The first section defines income mobility and explains why mobility is important to any debate about income inequality. The second section reviews the existing literature that has empirically examined income mobility in Canada. The third section presents new evidence on relative income mobility in Canada over three periods: 1993–1998 (five years), 1993–2003 (10 years), and 1993–2012 (19 years). The fourth section presents evidence on absolute income mobility for the 19-year period. There are three appendices with additional details about the data used in this report.

What Is Income Mobility and Why Is It Important?

Defining Income Mobility

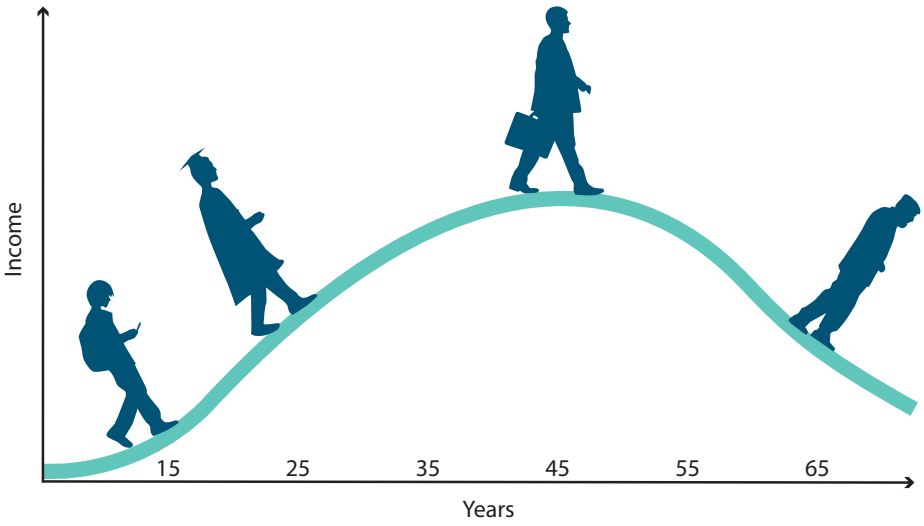
The concept behind income mobility is that people's incomes change over the course of their lives.[3] The typical life cycle of income is such that most individuals start with a relatively low income early in life because they are young, new to the workforce, and lack work and life experience (**figure 1**). Once they have acquired education, job-related skills, and experience, their income typically increases until it peaks in middle age (the prime earning years), and then drops again after they retire (income may fall, perhaps temporarily, if someone exits the workforce or changes jobs).

The life cycle of income is a reflection of human capital theory, which says human capital is the stock of competencies and knowledge embodied in one's labour-producing capability.[4] Investment in formal education and skills training as well as on-the-job experience typically increase one's human capital, leading to greater working efficiency and productivity. Ultimately, a more productive worker is able to command a higher wage, meaning a connection exists between one's development of human capital and the capacity to earn income.

An insight from human capital theory is that people make most of their investments in education and skills training during their younger years, which explains why earnings often rise quickly early on in life.[5] However, as people

3. A related concept is the "permanent income hypothesis" proposed by the eminent economist Milton Friedman (Friedman, 1957). The fundamental insight is people change their consumption patterns in response to permanent changes in income, not temporary changes, where their permanent income is based on what they expect to earn over their lifecycle. An important implication is people will generally smooth their consumption patterns despite fluctuations in income over the life cycle. They may save during unusual periods of high income and draw upon savings or borrow during unusual periods of low income.
4. See Mincer, 1958; Becker, 1964; and Ben-Porath, 1967 for seminal research on human capital.
5. See Polachek, 2007, for an overview of the insights from human capital theory.

Figure 1: Typical Life Cycle of Income



age, their human capital investments decline and, as a result, their earnings continue to rise but at a decreasing rate until they eventually fall. The theory suggests, therefore, that upward income mobility is generally greater for younger individuals than those who are at or near their peak earning years.

Measuring Income Mobility

Income mobility is measured using statistical databases that regularly follow and record income data for a group of individuals over some period of time. These data allow us to analyze how the incomes of these individuals change over time. In other words, the data enable us to measure the extent to which individuals move up and down the income ladder.

Here's how a typical database is assembled: a statistical authority such as Statistics Canada first identifies a group of individuals. In addition to income, the authority records an assortment of statistics for all individuals in the group at various points in time.[6] For example, the statistical authority identifies the group based on particular characteristics in some year, say 1993, and at regular intervals (perhaps every year or every couple of years) checks in with members of the group to assess changes in income and other relevant statistics. The income data can be collected either through surveys or from the income tax returns of the group's members.

6. Statistics Canada has two databases that can be used to measure income mobility: the Survey of Labour and Income Dynamics (SLID) and the Longitudinal Administrative Databank (LAD). LAD, which is based on data from income-tax returns, has the advantage of a larger sample size (20% of T1 tax returns) and the ability to follow individuals over a longer period. SLID is based on survey data rather than administrative tax data and can only track income mobility over a five-year period. However, SLID was terminated as of 2013.

Income mobility can be measured both in absolute and relative terms. Absolute income mobility simply measures the actual change in an individual's income after accounting for inflation, regardless of their relative standing within a broader group. Relative income mobility measures income changes compared with other members in a group. It is measured by dividing the broader group into smaller groups according to their initial income and examining the extent to which individuals move up, down, or stay within these groups over a specific time. Someone who starts in the lowest income group in one period but moves to a higher group over time has experienced greater relative income mobility.[7]

Why Income Mobility is Important

There can be no meaningful discussion about income inequality in Canada without considering income mobility. Unfortunately, many researchers often neglect income mobility and consequently their analysis of income inequality is incomplete and misleading. When they examine income inequality, researchers may calculate the share of national income earned by the "richest 20 percent" and the "poorest 20 percent" of Canadians, and observe how the share for each group changes over time.[8] However, these year-to-year comparisons compare snapshots of the income distribution at specific points in time and, as a result, do not account for the fact that the "rich" and "poor" may not be the same people in the different years of comparison.[9]

Of course, significant and growing income inequality would be a concern if we lived in a society where the rich and the poor were the same group of people year after year. A society that lacks income mobility over long periods is undesirable for many reasons—primarily because it suggests that luck and historical circumstances, not hard work or individual effort, largely determines

7. There are drawbacks when measuring relative income mobility. Individuals may experience no relative income mobility even though they have increased their absolute income mobility. For instance, if someone moved from the bottom to the top of a given income group, they would have experienced upward absolute mobility but not relative mobility. Alternatively, if someone merely crossed one dollar over their income group threshold, they would be counted as moving up, even if by a very small amount. In addition, the extent of relative mobility can be influenced by how the income thresholds are determined—and specifically whether the groupings are quintiles, deciles, or some other categorization. Finally, if income mobility is measured at two points in time with several years in between, the terminal year may not reflect what happened between the points when income mobility is measured. For instance, someone could have moved to a higher income group and then fallen to a lower income group but the analysis would not capture the individual's complete mobility.

8. See Conference Board of Canada, 2011 for an example of this type of research methodology. Other research methodologies for examining income inequality also fail to account for income mobility. One is a simple comparison of "Gini coefficients" for a country at two different points in time. A Gini coefficient can range from zero (a state of perfect equality where everybody in the country has the same level of income) to one (a state of perfect inequality where all the income is held by one person). See OECD, 2008, and Keeley, 2015 for examples of the Gini coefficient methodology.

9. In addition, such comparisons do not account for age differences in the population. Since income tends to rise as people gain education and experience, inequality at any given age should be lower than inequality within the broader population. A more informative measure of static income inequality would calculate changes in inequality for cross-sections of the population by age.

one's economic fortunes. Some level of income inequality is tolerable as long as people in that society are sufficiently mobile. If they are moving up and down to higher and lower income groups over the course of time, the people in the top 20% and bottom 20% are constantly changing.

As this report will show, Canada is not a caste society where the rich and poor are permanently stuck in their respective income groups. Rather, our country is a dynamic one where individuals are economically mobile. This stands in stark contrast to some developing countries, such as Brazil and Peru, where not only is there large income disparities but also little economic mobility (Corak, 2012). In those societies, income inequalities may translate into a permanent divide between low-income individuals and the well off.[10]

Defining "Income"

It is important to understand the various definitions of income because different measures of income can be used to measure income mobility. **Figure 2** shows the various components of total income as defined by Statistics Canada. Broadly speaking, according to Statistics Canada, total income consists of market income and income from government transfers. The two main components of market income are earnings and other market income. Earnings are the sum of wages and salaries and self-employment income. Other market income may include investment and retirement income. Finally, income from government transfers includes income from various benefit programs such as the Canada Pension Plan (CPP), Old Age Security (OAS), the Guaranteed Income Supplement (GIS), social assistance, and Employment Insurance (EI). **Table 1** displays the average composition of total income[11] for Canadian families (including single individuals)[12] in 2013. Market income and, specifically, earnings are by far the largest source of total income at approximately 73%. Wages and salaries, the main component of earnings, is the single largest source of income for Canadian families, making up approximately 68% of the total.[13] Other market income and income from government transfers represent much smaller proportions of total income, 15% and 12%, respectively (see table 1).

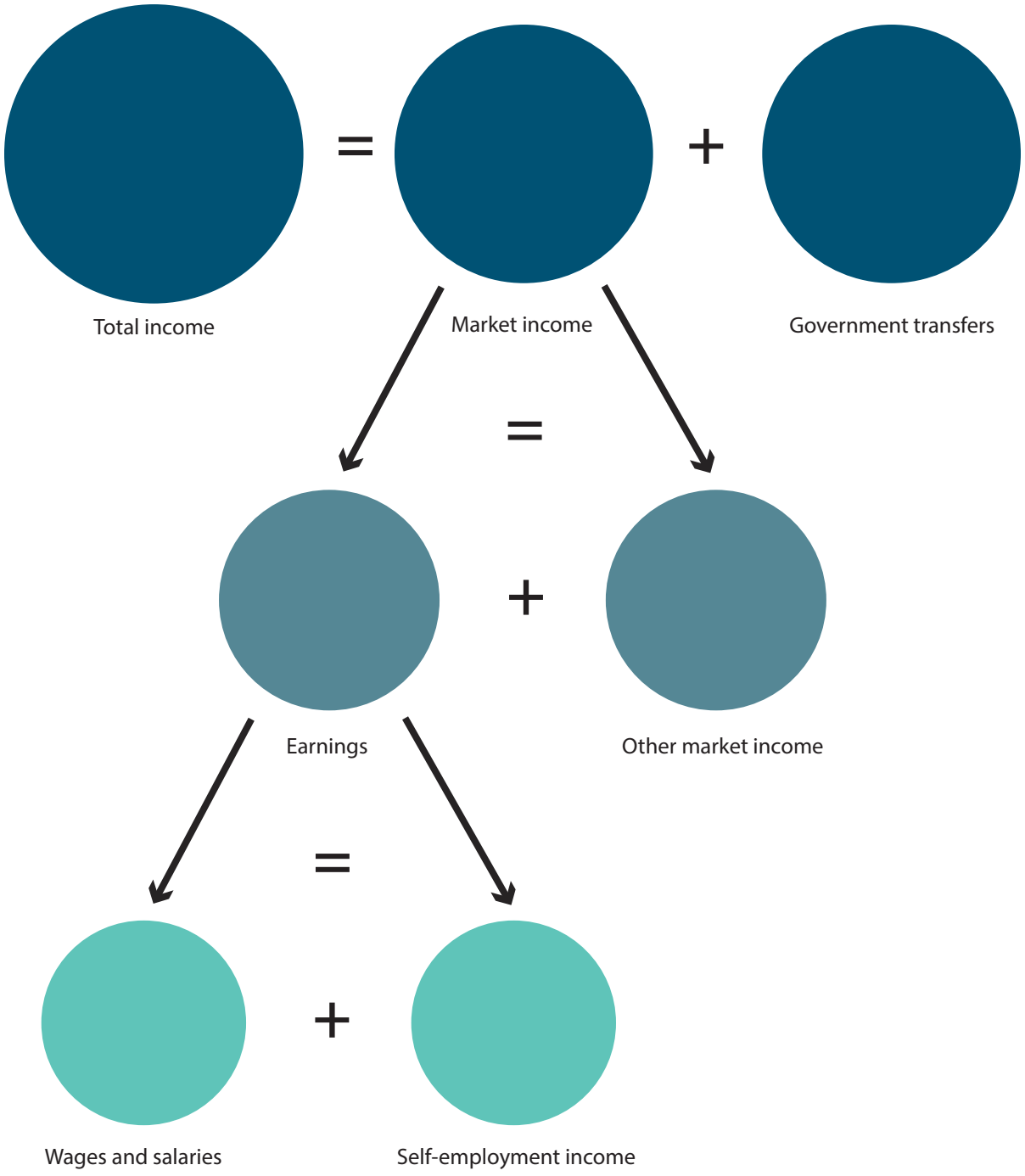
10. For an excellent discussion on the importance of income mobility and the interplay between it and income inequality, see Friedman, 1962, chapter 10. See also Cox and Alm, 1999 for a discussion about why income mobility is important in the United States. Finally, see Murray, 1994, for a discussion about alternative measures of well-being and success.

11. Other sources of income not displayed in Table 1 also contribute to the total income available for many Canadians. For instance, Canadians may earn unreported income, draw down their savings when the additional income is needed, obtain in-kind (non-monetary) transfers through various government programs, or receive inter-family transfers and transfers through religious or charitable organizations.

12. In this context, a family refers to a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law, adoption, or a foster relationship. A single individual is a person living either alone or with others to whom he is not related.

13. As a percentage of market income, however, wages and salaries make up an even larger proportion (78%) (Statistics Canada, 2015a).

Figure 2: Components of Total Income



Notes: Income from government transfers includes Canada Pension Plan (CPP), Old Age Security (OAS), Guaranteed Income Supplement (GIS), Social Assistance, Employment Insurance (EI), child benefits and othere transfers. Other market income includes investment income, retirement income, and other income.

Sources: Statistics Canada, 2015a; calculations by the authors.

Table 1: Average Composition of Total Income for Canadian Families, 2013

Component of Total Income	Percentage of Total Income
Market income	87.7
Earnings	73.1
Wages and salaries	68.4
Net income from self-employment	4.7
Other market income	14.6
Income from government transfers	12.3
Total	*100*

Notes: "Other market income" includes investment income, retirement income, and other income. "Income from government transfers" includes Canada Pension Plan (CPP), Old Age Security (OAS), the Guaranteed Income Supplement (GIS), social assistance, Employment Insurance (EI), child benefits, and other transfers.

Source: Statistics Canada, 2015a.

Some researchers examine income mobility using the measure of total income after taxes. This income measure is calculated by simply deducting income taxes from total income. The result is after-tax income. Ultimately, when measuring income mobility, the selected definition of income should be based on the researcher's measurement objectives.

Review of Research on Income Mobility in Canada

This section briefly summarizes the existing research on income mobility in Canada; it also includes one study on income mobility for a group of developed nations including Canada.[14] Research into income mobility requires income data on the same group of Canadians over a specified time period. Since access to such data is not readily available and often expensive, the body of research in this area is sparse and consists of only a handful of studies.

14. This section reviews the literature that has examined income mobility in Canada across various income groups (high and low income) but there is a separate strand that focuses only on the mobility of low-income Canadians. For studies in this strand, see Morissette and Berube, 1996; Finnie, 1997, 2000; Drolet and Morissette, 1998; Morissette and Drolet, 2000; Morissette and Zhang, 2001; Finnie and Sweetman, 2003; Janz, 2004; Morissette and Zhang, 2005; Ren and Hu, 2011; Murphy, Zhang, Dionne, 2012; and Statistics Canada, 2013. In addition, our literature review covers only Canadian research on "intragenerational mobility", which is the extent to which individuals' income changes over their lifetimes. This is distinct from "intergenerational mobility", which is the extent to which individuals' incomes are connected to that of their parents. That being said, research shows Canada has one of the highest levels of intergenerational mobility in the developed world (Grawe, 2004; Blanden, 2005; Corak, 2006). A recent study estimated that, in Canada, a son whose father was in the bottom quintile of the distribution of lifetime earnings would have a 69% chance of being in a higher lifetime earnings quintile than his father, representing strong upward intergenerational relative income mobility (Corak, Lindquist, and Mazumder, 2014).In Canada, there is a relatively weak relationship between parents' economic standing and that of their child.

One of the earliest studies in Canada was written by economists Charles Beach and Ross Finnie (Beach and Finnie, 1998). The authors examined how the income of a sample of Canadian men and women changed over one year (1993–1994), six years (1982–1988 and 1988–1994), and 12 years (1982–1994). They measured income as earnings (wages and salaries plus self-employment income). The authors divided their sample of Canadians into six income groups, from lowest to highest.[15] Overall, they found a "considerable amount" (Beach and Finnie, 1998: 9) of income mobility and that income mobility generally increased over longer time periods, as more and more people moved upwards from one income group to another. For instance, 59% of men and 45% of women in the lowest income group moved to a higher income group after just one year (1993–1994). However, after 12 years (1982–1994), 86% of men and 80% of women in the lowest income group had moved to a higher income group.[16] The authors also found that income mobility wasn't all upwards. In the highest income group, for instance, 12% of men and 17% of women moved to a lower income group after one year; after 12 years, 31% of men and 34% of women had dropped to a lower income group.

Another study by Finnie (1999) examined income mobility for a group of Canadians between 1982 and 1992 over periods ranging from one to 10 years. In this study, Finnie measured income more narrowly to include only wages and salaries. He divided the sample of Canadians into quintiles—five groups from lowest to highest income with each group containing 20% of the total. After tracking the change in people's income, Finnie found considerable upward income mobility.[17] Specifically, he found that on average, 36% of Canadians in the lowest quintile had moved to a higher income group after one year, 45% had moved up after two years, 61% had moved up after five years, and 72% had moved up after 10 years. At the same time, he found that on average 14% of Canadians in the top quintile had moved to a lower income group after one year, 17% had moved down after two years, 22%had moved down after five years, and 27% had moved down after 10 years (Finnie, 1999).[18]

In later work, Beach and Finnie (2004) again collaborated to examine income mobility in Canada. This time they examined income mobility for several one-year periods between 1982 and 1999. As they had in Beach and Finnie, 1998, they divided their sample into six income groups from lowest

15. The six income groups were: very low (25% or lower than the median income), low (25%–50% of the median), low middle (50%–100% of the median), high middle (100%–150% of the median), high (150%–200% of the median), and very high (200% or higher than the median).
16. A notable finding in Beach and Finnie (1998) is that upward earnings mobility is higher for men than women. In addition, they observe that men's income mobility has declined over time while women's mobility has increased. Their observation is based on the results from two periods: 1982–1988 and 1988–1994. They observed a similar trend in their later work (Beach and Finnie, 2004).
17. Finnie (1999) also found that income mobility was greater for those who started in lower income groups, for younger workers, and for men.
18. These averages were calculated by the authors using Finnie's (1999) results.

to highest. Their measure of income was earnings (wages and salaries plus self-employment income). Beach and Finnie found that Canadians are quite mobile, even over the very short time period of just one year.[19] For instance, they found that in 1998, 51% of Canadians in the lowest income group had moved up at least one income group by 1999. During the same period, 14% of Canadians from the highest income group had moved to a lower income group.[20]

In the previous edition of this report, Lammam, Karabegović, and Veldhuis (2012) provide further evidence of income mobility in Canada. Income was defined in terms of individual wages and salaries and the sample was divided into income quintiles based on the overall population. The report's primary results focused on the relative income mobility of a sample of approximately one million Canadians starting in 1990 after 10 years (1990–2000) and 19 years (1990–2009). It found that 83% of those initially in the lowest quintile in 1990 had moved to a higher income group by 2000. By 2009, 87% had moved up with over 40% reaching the top two quintiles. The report also found considerable downward mobility, with 21% of those initially in the highest quintile in 1990 moving to a lower income group by 2000 and 36% moving down by 2009.

In contrast to the research summarized thus far, Statistics Canada produced an annual publication (terminated as of 2013) that measured income mobility but using a different data source, different income definition, and a different unit of analysis. Statistics Canada uses survey-based data, not data derived from Canadian income-tax returns. Instead of measuring income by earnings or wages and salaries, Statistics Canada uses total, after-tax income (total income from all sources including government transfers, investment income, and pension income minus income taxes paid). Finally, Statistics Canada uses a measure of income that adjusts for family size rather than solely using an individual's income.

In the most recent and final edition of this publication, Statistics Canada (2013) examined income mobility in Canada over four one-year periods (2003–2004, 2006–2007, 2008–2009, and 2009–2010) and two five-year periods (1999–2004 and 2005–2010). The group of Canadians analyzed were divided into quintiles. As in previous studies, Statistics Canada found a greater degree of income mobility, the longer the time period. On average, 24% of Canadians in the lowest quintile had moved up at least one quintile after one

19. Beach and Finnie (2004) may be measuring income volatility, not income mobility, since large changes cannot easily be explained by the accumulation of human capital over very short time periods like one year.

20. Interestingly, Beach and Finnie (2004) found that economic conditions may affect income mobility. In comparing income mobility over two one-year periods (1991–1992 and 1998–1999), they found less upward and more downward mobility in Canada's recessionary 1991–1992 period. Finnie (1999) also found that upward mobility decreased during economic downturns.

year. But after five years, 43% of individuals in the lowest income group had moved up. Conversely, Statistics Canada found that, on average, 21% of those in the top quintile had moved to a lower quintile after one year, and 43% had moved down after five.

A study by Chen (2009) also includes income mobility results for Canada over several periods in the 1990s and 2000s.[21] Chen's definition of income is the same as that of Statistics Canada (2013): total income including government transfers minus income taxes. Chen's analysis divided the Canadian samples into deciles—10 groups from lowest to highest income with each group containing 10% of the total. The findings on relative income mobility for Canada were as follows: on average, 50% to 55% of Canadians were not in the same decile after one year; approximately 70% were not in the same decile after four years; and around 35% had moved up at least one decile after four years. [22]

While the specific data source, definition of income, and methodology may differ in the studies summarized above, the consistent finding is that Canadians are mobile. That is, existing research shows Canada is a dynamic society where many of us move up and down the income ladder over time—often in very short order.

Relative Income Mobility in Canada over 5-, 10-, and 19-Year Periods

This section presents the results from our special data request to Statistics Canada. The results for income mobility are based on the experience of nearly one million Canadians whom we follow starting in 1993 over three time periods: five years (1993–1998), 10 years (1993–2003), and 19 years (1993–2012). The various periods allow us to measure income mobility over short and longer periods. The section starts by describing the data and then explains the measure of income used in the analysis. A discussion of the results follows.

21. While Chen (2009) includes income mobility results for Canada, the goal of the study was to compare income mobility in four countries and to uncover the underlying reasons for the differences. The four countries were Canada, the United States, Great Britain, and Germany. After examining an assortment of income-mobility measures, Chen's international comparison revealed that Canada generally has less income mobility than do the other countries. He found that a key reason for lower mobility rates in Canada is the stabilizing effect of government transfers. Given this finding, it would be interesting to replicate Chen's international comparison using a different definition of income (say, wages and salaries), to avoid the distortionary impact of a country's system of taxes and transfers.

22. In addition to relative mobility, Chen also examined other measures of income mobility, including a measure of absolute income mobility and the relationship between income mobility and income inequality.

Data Source and Description

The data for the analysis in this section are from Statistics Canada's Longitudinal Administrative Databank (LAD), which is constructed from the income-tax returns of a group of Canadians from 1982 to 2012. By linking tax-filing information to an individual's Social Insurance Number, Statistics Canada is able to track and record annual changes in income for the same group of individuals. Our data request covers one group of nearly a million Canadians over three time periods: 1993–1998, 1993–2003 and 1993–2012. That is, we measure income mobility for a group of Canadians in 1993 after five years, after 10 years, and again after 19 years. The age range for those in our sample in 1993 is 20 to 45 (inclusive). This means the maximum age for people in the sample at the end of each period is: age 50 for the 5-year period, age 55 for the 10-year period, and age 64 for the 19-year period.[23] Appendix A has additional details on the data used for the income mobility analysis.

Definition of Income

As section 1 explained, there are several ways to define income when measuring income mobility. The definition used here is wages and salaries. We have chosen that definition for many reasons. First, wages and salaries is by far the single largest component of total income (see table 1). Second, our objective is to measure income mobility with a definition of income that relies solely on one's labour-market efforts. That is, our objective is to measure the extent to which Canadians are able to improve themselves by their own effort and diligence. As a result, our income definition excluded non-labour market income such as government transfers, investment income, and retirement income. We also excluded income from self-employment, which is a form of labour-market income, because there is considerable annual fluctuation in this income source over time and its volatility obscures any clear indication of mobility.

The "wages and salaries" definition is before taxes to minimize the impact of the tax system on income mobility. Finally, we are analyzing individuals, not the family. Changes in family size and structure often alter family income, and by extension, the income mobility of the family unit. This means that changes in a family's income mobility can occur without any changes in the income of individual earners in that family. Our analysis of income mobility focuses on individuals to avoid the direct influence of changes in family size and structure.

23. It would be interesting to conduct a sensitivity analysis by varying the age range of individuals contained in the sample. One way to conduct the sensitivity analysis would be to examine the impact on relative income mobility by limiting the sample to individuals with ages at which most people are increasing their labour market income. This could be achieved by constraining the maximum age for people in the sample to 45 at the end of the 10-year period and 55 at the end of the 19-year period. However, we do not have direct access to the mobility data to perform such an analysis. All tabulations are performed by Statistics Canada and additional data requests are costly.

Results

Income mobility over five years (1993–1998)

Table 2 summarizes the results for income mobility over the five-year period from 1993 to 1998. The table divides the sample of individuals into five groups based on their income in 1993. The groups range from lowest to highest income with each group containing 20% of the total LAD population (such groupings are called quintiles).[24] We refer to the income groups as: the bottom 20% (the lowest income group), second, third, fourth, and the top 20% (the highest income group).

Table 2: Summary of Five-Year Income Mobility from 1993 to 1998

Income group in 1993	Income group five years later: Percentage that moved into a higher income group	Income group five years later: Percentage that moved into a lower income group	Total mobility (%)
Bottom 20%	78.6	0.0	78.6
Second	58.5	10.4	68.9
Third	40.7	16.1	56.8
Fourth	27.9	17.7	45.6
Top 20%	0.0	15.6	15.6

Notes: Income is measured by wages and salaries. Zero percent for the bottom 20% since it is the lowest income group and individuals cannot move down any further. Zero percent for the top 20% since it is the highest income group and individuals cannot move up any further.

Source: Statistics Canada, 2015b.

The income thresholds for the quintiles were determined by the income of all individuals in the broader LAD group, not the income of just the individuals in our sample. To be part of the overall LAD group in these calculations, individuals had to report at least $1,000 of income from wages and salaries (in 2012 dollars). This methodology is in line with previous research on income mobility using earnings or wages and salaries as a definition of income.[25]

24. A previous edition of this study measured five-year income mobility with data from the Survey of Labour and Income Dynamics (SLID), which is now terminated (Lammam, Karabegović, and Veldhuis, 2012). For the purpose of measuring income mobility, LAD has several advantages over SLID. The sample from LAD is larger than the sample from SLID. Also, panel data from SLID follows individuals for a limited number of relatively short (six-year) periods. Because LAD collects data from income-tax returns rather than a survey, it can track individuals over a longer period.

25. Finnie (1999: 10) measured income mobility for individuals in his sample relative to the income of individuals in the broader panel group, not relative to those in his sample. It appears that Beach and Finnie (1998: 5) and Beach and Finnie (2004: 222) did the same, although they do not explicitly state so. We also consulted a senior official at Statistics Canada who is a leading expert on income mobility data regarding the methodology we used to measure relative income mobility.

We measured income mobility relative to the broader LAD group because it is a better reflection of the income distribution of the entire Canadian population. Our decision to compare changes in income for the working-age population relative to the overall population is appropriate since that is the society that everyone lives in—young or old. Ultimately, we are interested in knowing into which income groups individuals in our sample fall relative to the overall Canadian population.

The first column in table 2 displays the proportion of individuals that had moved from their initial income group in 1993 to a higher income group by 1998. The second column displays the proportion of individuals that had moved to a lower income group by 1998. The third column displays total mobility, the sum of the first and second columns.

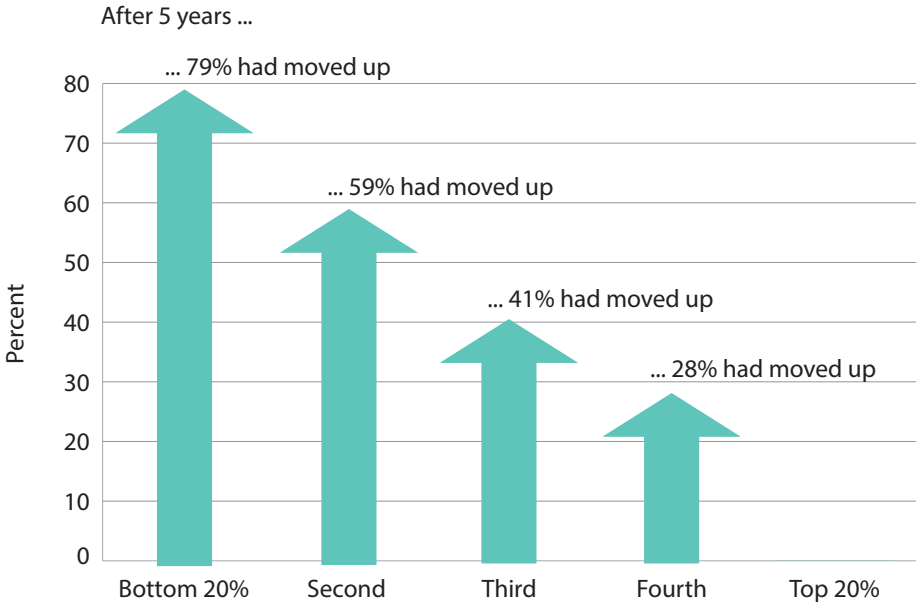
The results in table 2 point to considerable mobility across all income groups. By a wide margin, the lowest income group experienced the highest level of upward mobility: 79% of individuals in the bottom 20% in 1993 had moved to a higher income group by 1998 (**figure 3**). Put differently, in only five years, nearly eight out of ten individuals in the lowest income group moved into a higher income group.[26] Indeed, most Canadians who start in the bottom 20% do not remain there for long and move up quickly.

The other income groups also experienced upward income mobility from 1993 to 1998: 59% of the second income group, 41% of the third income group, and 28% of the fourth income group moved to higher income groups in that time. For those in the highest income group (the top 20%), the rise in income mobility was zero because relative to others, individuals in that group cannot move up any further.

Table 2 shows that, while some individuals moved up the income ladder over the five-year period, others moved down the ladder between 1993 and 1998 (**figure 4**). Sixteen percent of the top income group, 18% of the fourth income group, 16% of the third income group, and 10% of the second income group moved to a lower income group during the five-year period. Individuals in the lowest income group (bottom 20%) did not drop further because they are already in the lowest income group. Interestingly, despite the relatively short time period of just five years, some Canadians did move down the income ladder, demonstrating notable mobility among the top income group.

26. A robustness check was conducted by Statistics Canada using LAD data for various five-year periods and the conclusion was that the upward income mobility results for the bottom 20% presented here are consistent across the various time periods.

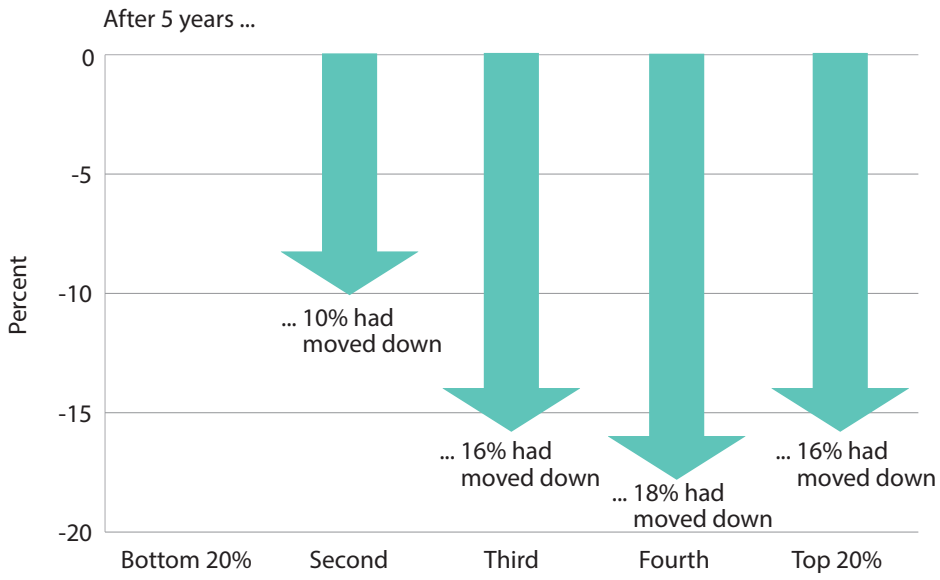
Figure 3: Proportion of Each Income Group in 1993 That Had Moved to a Higher Group by 1998



Notes: Income is measured by wages and salaries. None from the top 20% had moved up since this is the highest income group and individuals cannot move up any further.

Source: Statistics Canada, 2015b.

Figure 4: Proportion of Each Income Group in 1993 That Had Moved to a Lower Group by 1998



Notes: Income is measured by wages and salaries. None from the bottom 20% had moved down since this is the lowest income group and individuals cannot move down any further. Downward income mobility for the top 20% is likely understated because the maximum age of the sample is 50, and so this downward mobility does not capture the effect of income falling as individuals approach retirement.

Source: Statistics Canada, 2015b.

Overall, a considerable degree of total mobility is evident. When we sum up the proportion of individuals in each income group in 1993 that moved up and down the income ladder over the five-year period, total mobility for the second, third, and fourth income groups was 57% on average. This means, on average, almost three of every five individuals in these income groups were not in their initial income group five years later—some moved up while others moved down. Table 2 understates the true level of total mobility for the bottom 20% and top 20% since individuals in these income groups can only move either up or down the income ladder, not in both directions.[27] Nonetheless, total mobility after five years was approximately 79% for the bottom 20% and 16% for the top 20%.

While the overall results show the proportion of individuals that moved up and down from each income group in 1993, it is informative to examine which income group these individuals ended up in 1998. **Table 3** shows where individuals from the various income groups in 1993 finished up five years later. Consider the results for the bottom 20% (first row) in 1993, which are displayed graphically in **figure 5**. The largest proportion of the bottom 20% in 1993 (31%) moved up to the second income group in 1998. However, nearly half of the individuals who were in the bottom 20% in 1993 moved up to the third income group or higher, and more than 20% moved to the two highest income groups. In the relatively short span of just five years, many Canadians initially in the lowest income group moved to the top rungs of the income ladder.

Table 3: Where Individuals From Income Groups in 1993 Ended up Five Years Later in 1998

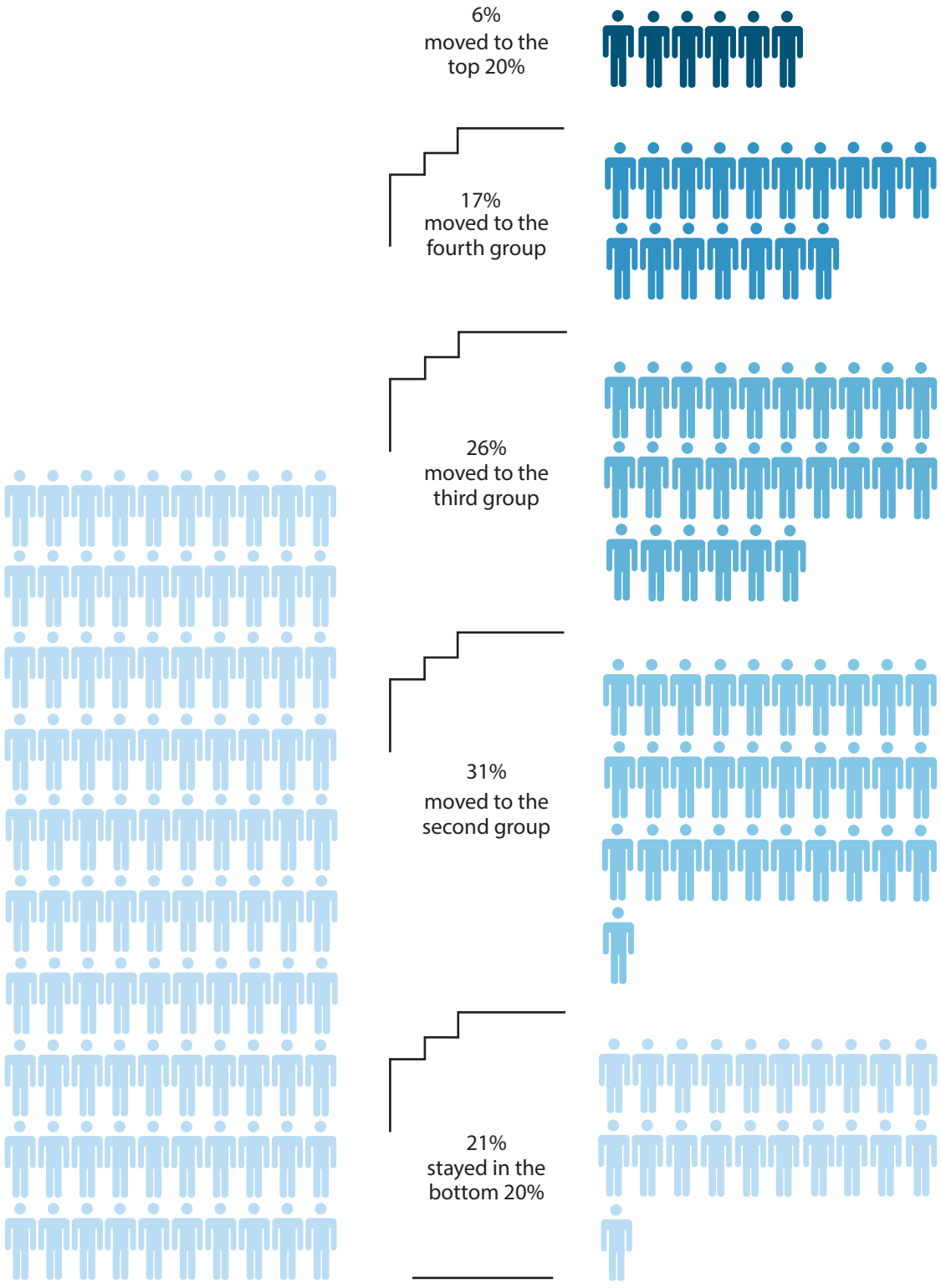
		Where they ended up (percentage in income group in 1998)				
		Bottom 20%	Second	Third	Fourth	Top 20%
Income group in 1993	Bottom 20%	21.4	30.7	25.8	16.5	5.6
	Second	10.4	31.1	32.9	19.0	6.6
	Third	4.3	11.8	43.3	31.6	9.1
	Fourth	1.9	4.0	11.8	54.5	27.9
	Top 20%	0.8	1.3	2.7	10.8	84.4

Note: Income is measured by wages and salaries.

Source: Statistics Canada, 2015b.

27. Total mobility is understated because we are comparing income mobility at two points in time without accounting for what happened in the years in between. Individuals in the bottom 20% may after one year move to higher income group (say, the second) and then fall back into the bottom 20% by the fifth year. In our analysis, we do not account for the income mobility that may have occurred between the first and last year of the period.

Figure 5: Where the Bottom 20% in 1993 Were Five Years Later in 1998



Notes: Income is measured by wages and salaries. Numbers in this graph may not add to 100 due to rounding.

Source: Statistics Canada, 2015b.

Income mobility over ten years (1993–2003)

Table 4 summarizes the results for income mobility over the 10-year period from 1993 to 2003. As with the five-year period, the table divides the sample of individuals into five groups based on their income in 1993. The results are for the same group of individuals from the five-year analysis except that we now examine how their incomes have changed after 10 years. The first column in table 4 displays the proportion of individuals that moved from their initial income group in 1993 to a higher income group by 2003. The second column displays the proportion of individuals that moved to a lower income group by 2003. The third column displays total mobility (the sum of the first and second columns).

Table 4: Summary of Ten-Year Income Mobility from 1993 to 1998

		Income group ten years later		
Income group in 1993		Percentage that moved into a higher income group	Percentage that moved into a lower income group	Total mobility (%)
	Bottom 20%	87.5	0.0	87.5
	Second	69.6	7.6	77.2
	Third	50.7	14.6	65.3
	Fourth	36.4	18.2	54.6
	Top 20%	0.0	18.5	18.5

Notes: Income is measured by wages and salaries. Zero percent for the bottom 20% since it is the lowest income group and individuals cannot move down any further. Zero percent for the top 20% since it is the highest income group and individuals cannot move up any further.

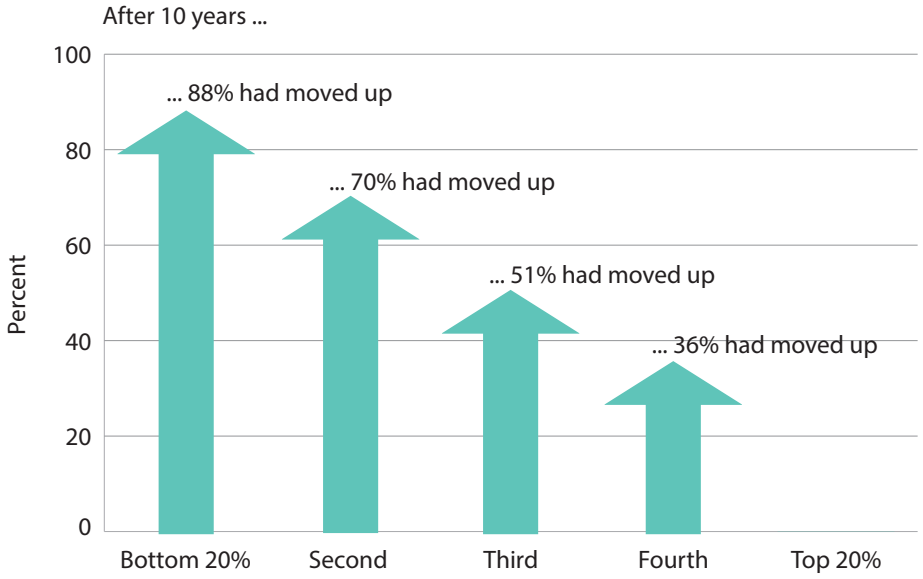
Source: Statistics Canada, 2015b.

The results of the 10-year analysis reveal income mobility was greater in this time period than in the five-year period. Individuals in the lowest income group again had the greatest upward mobility: 88% of those in the bottom 20% in 1993 had moved to a higher income group 10 years later. Put differently, over a decade, nearly nine of every 10 individuals in the bottom 20% moved up the income ladder. This compares to the upward mobility in the five-year period of roughly eight of every 10 individuals in the bottom 20%. Indeed, most of the upward mobility out of the bottom 20% group took place in the first five years but many continued to move into higher income groups over time as they developed and amassed their human capital.

Figure 6 shows the proportion of individuals in the various income groups in 1993 that had moved to a higher income group by 2003. There was clearly upward mobility across all income groups.[28]

28. The only exception was individuals in the top 20%; they cannot move into a higher income group because they are already in the highest possible group.

Figure 6: Proportion of Each Income Group in 1993 that had Moved to a Higher Group by 2003



Notes: Income is measured by wages and salaries. None from the top 20% had moved up since this is the highest income group and individuals cannot move up any further.

Source: Statistics Canada, 2015b.

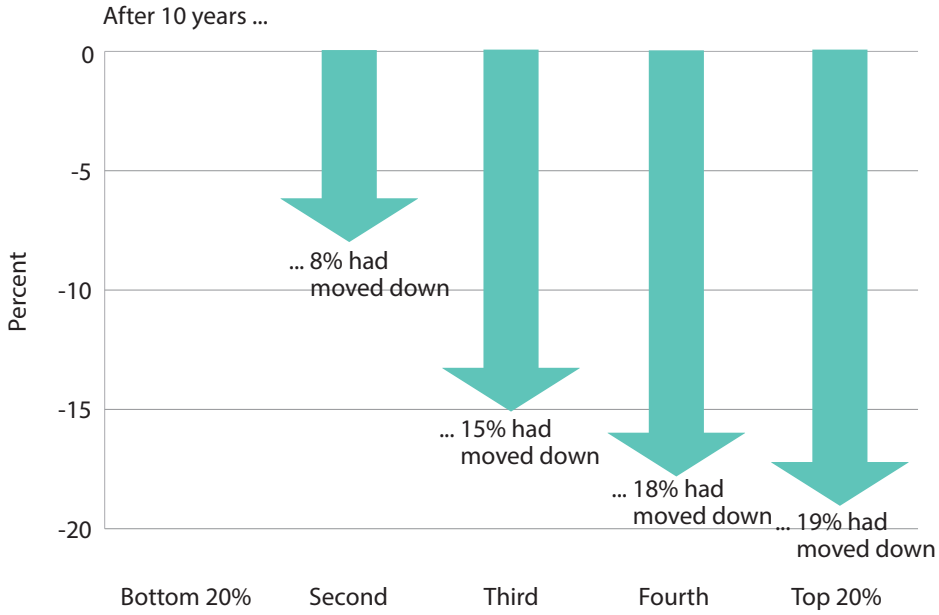
Specifically, 70% of individuals in the second income group in 1993 had moved to a higher group by 2003, while 51% in the third income group had moved up, and 36% in the fourth income group had done so. Taken together, the results indicate that a large number of individuals in our sample from 1993 experienced substantial relative income mobility over the decade.

Yet, table 4 also shows that individuals in our sample moved down the income ladder. Those in the top 20% in 1993 experienced the greatest downward mobility after 10 years. Specifically, 19% of individuals in that group in 1993 had moved to a lower income group by 2003. Eighteen percent from the fourth income group had moved down, as did 15% from the third income group, and 8% from the second income group (**figure 7**).

Total mobility over the 10-year period is sizeable. On average, 66% of individuals in the second, third, and fourth income groups in 1993 had moved to a higher or lower income group by 2003. So, within the span of a decade, most Canadians did not stay in their initial income group, reinforcing the notion that Canadians are not economically stationary and highlighting the presence of considerable income mobility—in both directions.

Let us now look at where the individuals from the various income groups in 1993 ended up 10 years later. These data are displayed in **table 5**; the results for the bottom 20% is shown graphically in **figure 8**.

Figure 7: Proportion of Each Income Group in 1993 that had Moved to a Lower Group by 2003



Notes: Income is measured by wages and salaries. None from the bottom 20% had moved down since this is the lowest income group and individuals cannot move down any further. Downward income mobility for the top 20% is likely understated because the maximum age of the sample is 55, and so this downward mobility does not capture the effect of income falling as individuals approach retirement.

Source: Statistics Canada, 2015b.

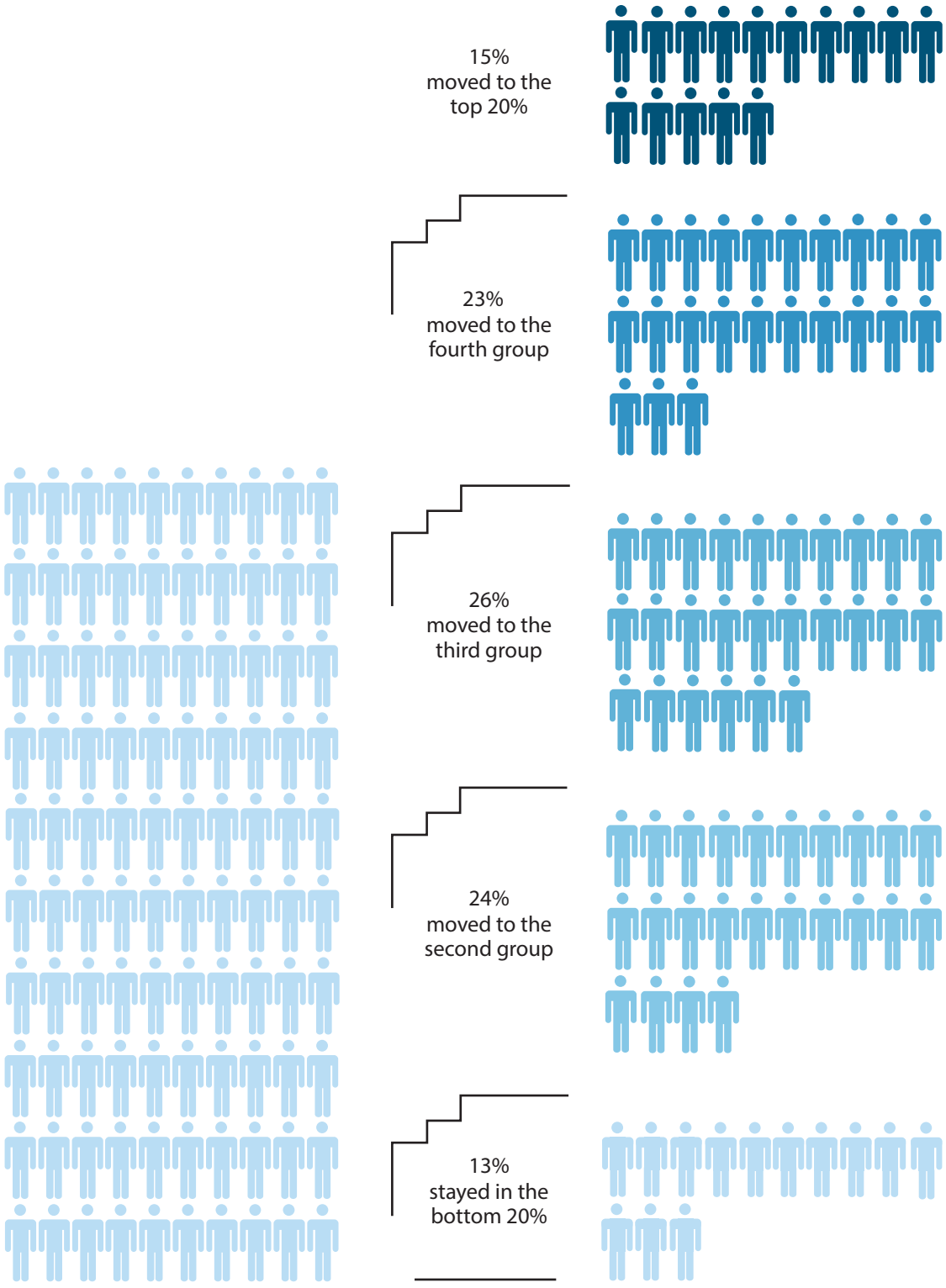
Table 5: Where Individuals From Income Groups in 1993 Ended up Ten Years Later in 2003

	Where they ended up (percentage in income group in 2003)				
Income group in 1993	Bottom 20%	Second	Third	Fourth	Top 20%
Bottom 20%	12.5	23.6	26.3	22.5	15.1
Second	7.6	22.9	30.8	24.1	14.7
Third	4.0	10.6	34.7	34.4	16.3
Fourth	2.1	4.2	11.9	45.3	36.4
Top 20%	1.2	1.9	3.4	12.0	81.5

Note: Income is measured by wages and salaries.

Source: Statistics Canada, 2015b.

Figure 8: Where the Bottom 20% in 1993 Were Ten Years Later in 2003



Notes: Income is measured by wages and salaries. Numbers in this graph may not add to 100 due to rounding.

Source: Statistics Canada, 2015b.

Figure 8 shows that approximately 13% of the individuals that started in the bottom 20% in 1993 were in that income group in 2003. However, of the 88% that moved up, 24% ended up in the second income group, 26% ended up in the third income group, 23% ended up in the fourth income group, and 15% were in the top 20% after only 10 years. The results are impressive: nearly two thirds of the people in the bottom 20% in 1993 ended up in one of the top three income groups by 2003; nearly two fifths ended up in the top two; and well over a tenth found their way from the bottom to the very top income group.

Table 5 also shows that many individuals from the second, third, and fourth income groups in 1993 managed to reach the top 20% group by 2003. Specifically, of those in the second income group, 15% reached the top 20% group after 10 years. Of those in the third income group, 16% reached the top 20% group, and of those in the fourth income group, 36% reached the top 20% group. This means that the make-up of the top 20% changed a lot after 10 years as many new people entered this group who were not there in 1993.

In sum, the 10-year mobility analysis not only shows that many low- and middle-income Canadians moved up the income ladder but that many who started in lower income groups in 1993 were able to reach the higher income groups within a decade.

Income mobility over 19 years (1993–2012)

Table 6 summarizes the results for income mobility over the 19-year period from 1993 to 2012. These results are for the same group of individuals from the previous analyses except that now we examine their income mobility after 19 years. The table divides the sample into the same five groups (quintiles) based on their 1993 income. The first column displays the proportion of people that had moved from their initial income group in 1993 to a higher income group by 2012. The second displays the proportion that had moved to a lower income group. The third column displays total mobility.

Table 6: Summary of 19-Year Income Mobility from 1993 to 2012

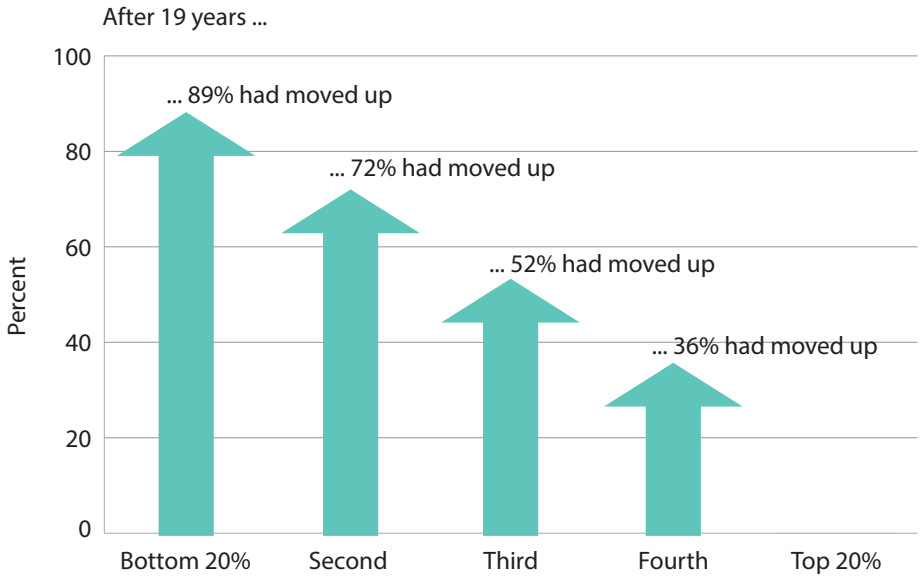
Income group in 1993	Income group 19 years later: Percentage that moved into a higher income group	Income group 19 years later: Percentage that moved into a lower income group	Total mobility (%)
Bottom 20%	89.0	0.0	89.0
Second	72.1	8.3	80.4
Third	51.8	18.7	70.5
Fourth	35.5	28.0	63.5
Top 20%	0.0	34.6	34.6

Notes: Income is measured by wages and salaries. Zero percent for the bottom 20% since it is the lowest income group and individuals cannot move down any further. Zero percent for the top 20% since it is the highest income group and individuals cannot move up any further.

Source: Statistics Canada, 2015b.

As expected, individuals who were in lower income groups in 1993 saw the greatest degree of upward mobility (**figure 9**). Of those from the bottom 20% in 1993, 89% moved into a higher income group by 2012. Put differently, nearly nine of every 10 Canadians in the lowest income group moved up the income ladder within the span of two decades. About 72% of those from the second income group moved up, as did 52% and 36% of individuals in the third and fourth income groups, respectively.

Figure 9: Proportion of Each Income Group in 1993 that had Moved to a Higher Group by 2012



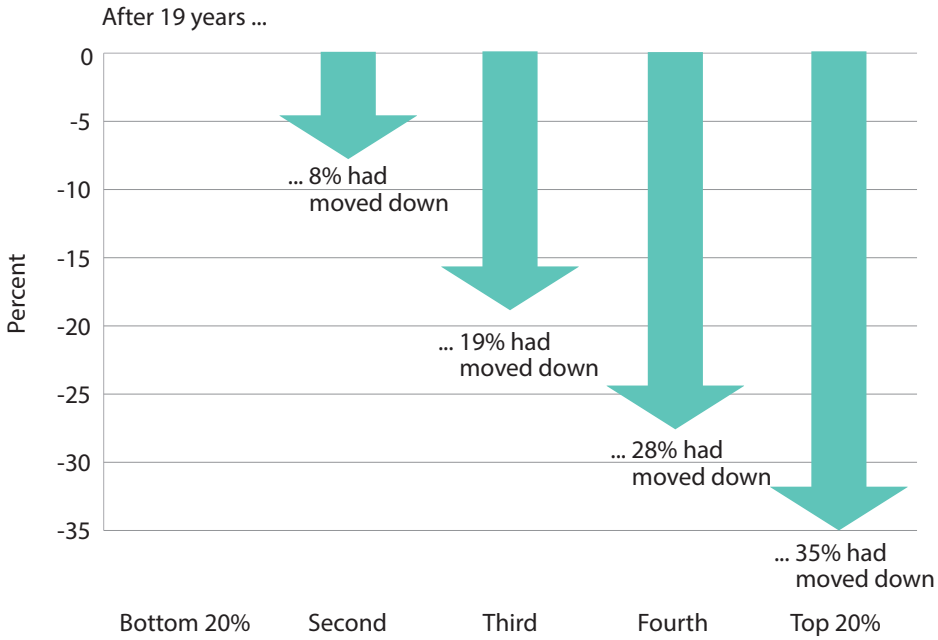
Notes: Income is measured by wages and salaries. None from the top 20% had moved up since this is the highest income group and individuals cannot move up any further.

Source: Statistics Canada, 2015b.

Table 6 also shows the proportion of individuals in 1993 that moved to a lower income group after 19 years (**figure 10**). Downward mobility is proportionately higher for individuals who started the period in higher income groups and is largest for those in the top 20%. Specifically, over a third (35%) of individuals from the top 20% in 1993 had moved to a lower income group by 2012. Among those in the fourth income group, 28% had moved down, as had 19% in the third group, and 8% in the second.

Total mobility over the 19-year period is higher than in all other periods examined. For individuals in the second, third, and fourth income groups, total mobility over the period was 71%, on average. Except for those in the top 20%, total mobility was approximately two thirds (64%) or higher, which means the vast majority of Canadians were not economically stationary. As explained earlier, the true amount of total mobility for the top 20% (and bottom 20%) is somewhat understated because individuals that start in these income groups can move in only one direction, given the methodology used.

Figure 10: Proportion of Each Income Group in 1993 that had Moved to a Lower Group by 2012



Notes: Income is measured by wages and salaries. None from the bottom 20% had moved down since this is the lowest income group and individuals cannot move down any further.

Source: Statistics Canada, 2015b.

Table 7 provides more detailed information on where individuals from the various income groups in 1993 ended up after 19 years. The results for the bottom 20% are displayed graphically in **figure 11**. Of those in the bottom 20% in 1993, 19% ended in the second income group by 2012, 24% in the third income group, 23% in the fourth income group, and 24% in the highest income group. Remarkably, almost one of every four people in the bottom 20% in 1993 eventually made it to the highest income group after 19 years. Nearly half (46%) ended up in the top two income groups after 19 years, while more than two of every three (70%) ended up in the top three income groups.

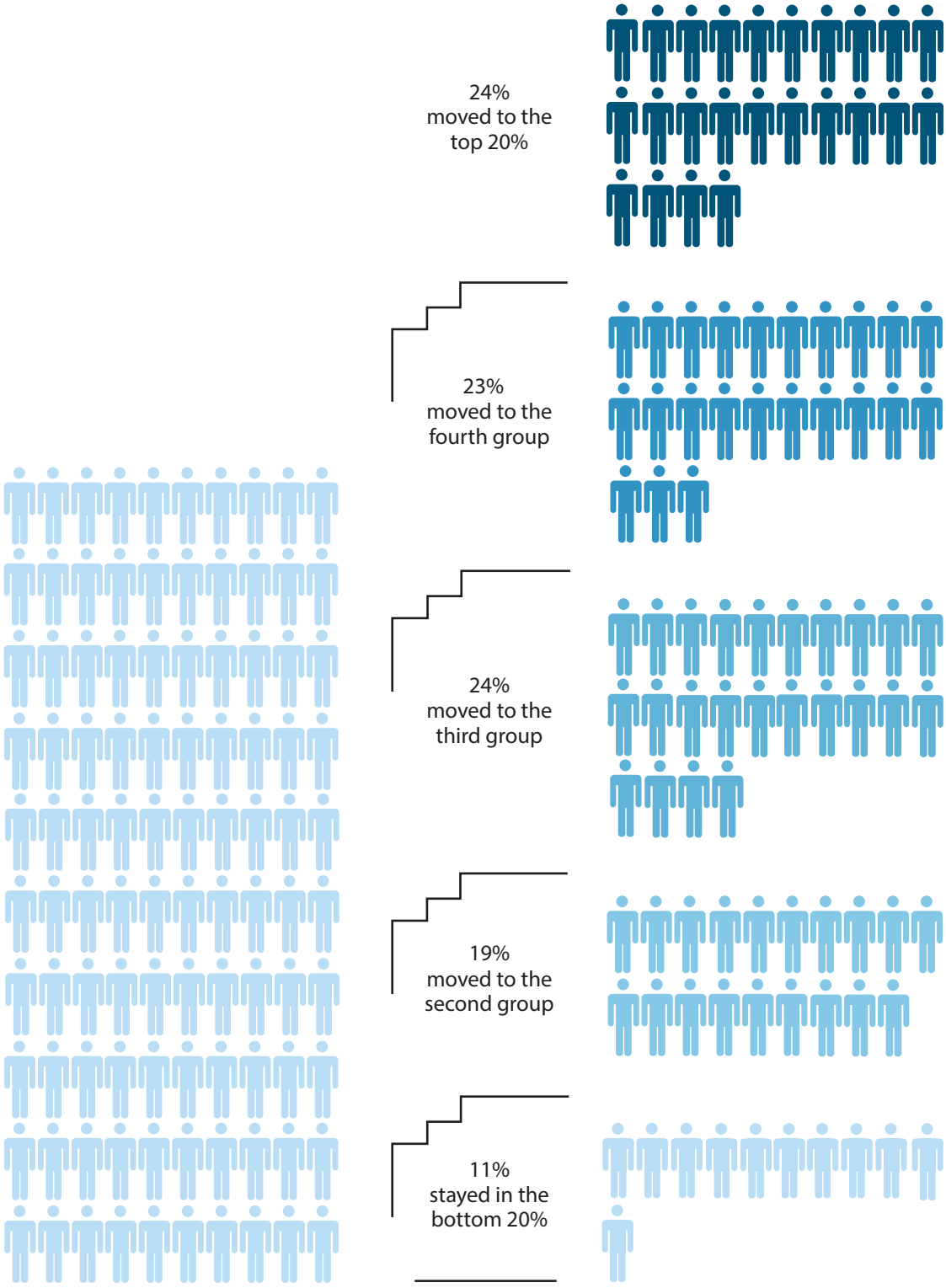
Table 7: Where Individuals From Income Groups in 1993 Ended up 19 Years Later in 2013

	Where they ended up (percentage in income group in 2012)				
Income group in 1993	Bottom 20%	Second	Third	Fourth	Top 20%
Bottom 20%	11.0	19.2	23.6	22.6	23.6
Second	8.3	19.5	26.9	24.1	21.1
Third	6.2	12.5	29.5	30.9	20.9
Fourth	5.5	7.4	15.1	36.5	35.5
Top 20%	6.9	5.4	6.3	16.0	65.4

Note: Income is measured by wages and salaries.

Source: Statistics Canada, 2015b.

Figure 11: Where the Bottom 20% in 1993 Were 19 Years Later in 2012



Notes: Income is measured by wages and salaries. Numbers in this graph may not add to 100 due to rounding.

Source: Statistics Canada, 2015b.

A meaningful proportion of Canadians initially in the second, third, and fourth income groups also managed to reach the top 20% by 2012 (see table 7). Specifically, 21% from the second income group in 1993 were in the top 20% after 19 years, while 21% from the third, and 36% from the fourth reached the highest income group. Table 7 demonstrates yet again that Canada is an economically mobile society where in time many income earners—including the lowest—climb the income ladder.[29]

Comparing Results From the Three Time Periods

In comparing the results from the five-, 10-, and 19-year periods, a key finding is that most of the upward mobility out of the bottom 20% takes place in very quickly. In just five years, 79% of Canadians in the bottom 20% in 1993 had moved to a higher income group. After 10 years, 88% of the same group of individuals had moved up. And after 19 years, 89% had moved out of the bottom 20%. Clearly, the lion's share of mobility out of the lowest income group occurred after five years.

However, the differences in upward relative mobility between the various periods are more pronounced when we consider which income groups the bottom 20% ended up in. For instance, after five years, 6% of those initially in the bottom 20% in 1993 had moved to the highest income group. After 10 years, this percentage increases to 15%. After 19 years, 24% of those initially in the bottom 20% had moved into the top 20%. As time passed, the vast majority of those initially in the bottom 20% were not only able to move out of this group, but many reached the very highest group.

The results show that downward mobility among the top two income groups is similar for the five- and 10-year periods. Specifically, 16% of the top 20% had moved to a lower income group after five years and 19% had moved to a lower income group after 10 years. For the second highest income group, 18% had moved to a lower income group over both the five- and 10-year periods. However, downward mobility was considerably higher for the two top income groups in the 19-year period. By 2012, 35% of the top 20% in 1993 had moved to a lower income group. That is 16 percentage points higher than the figure for the 10-year period. Similarly, after 19 years, 28% of the second highest income group had moved to a lower income group (a difference of 10 percentage points from the 10-year period). Thus, the proportion of individuals

29. To check the robustness of the results, we measured income mobility using two alternative methods. The first method defined income as earnings (wages and salaries plus net self-employed income) instead of wages and salaries. There were only small differences in the results. For example, if income is defined as earnings, 88% of the bottom 20% moved to a higher income group from 1993 to 2012, while the figure when income is defined as wages and salaries is 89%. The second alternative method determines quintile thresholds by the income of the cohort sample rather than by the income of the broader LAD group. The results yielded by this method support the conclusion that Canada is an economically mobile country. Relative to the sample group, the upward mobility of the bottom 20% from 1993 to 2012 was 70%. See Appendix C for more detailed results using this alternative method.

in the top two income groups that moved down is noticeably higher after 19 years than after 10 years.

These results are consistent with the life cycle of income. Typically, a young person's income increases until it peaks during the prime earning years (around age 55) and then drops near and after retirement. The individuals in our mobility sample are between the ages of 20 and 45 (inclusive) in 1993. By 1998 and 2003, the oldest person in our sample is 50 and 55, respectively, still within their prime earning years. However, by 2012 some of the people in our sample reach age 64 and are near retirement. From age 55 to 64, many people experience downward income mobility because they have passed their prime earning years and are beginning to pare back their working hours in preparation for retirement. Some may even be partially or fully retired. The life cycle of income, coupled with our sample's demographics, suggests that we should expect upward income mobility to slow, and downward income mobility to accelerate, in the 19-year period compared to the five- and 10-year periods.

Summary of the Relative Income Mobility Results

The results from the relative income mobility analysis for the three time periods tell a powerful story. Over time, the vast majority of individuals from the lowest income group moved to a higher income group—and often in very short order. Being in the lowest income group is generally a temporary experience. Not only did many from the bottom 20% end up in higher income groups, but a meaningful proportion of them ended up in the top 20%. While many individuals from the lower income groups moved up the income ladder, some from the higher income groups moved down. Total mobility was considerable over five-, 10-, and 19-year periods. Critically, the Canadians in our sample generally did not stay in their initial income group.

Absolute Income Mobility in Canada over the 19-Year Period

The analysis thus far has focused on relative income mobility. However, it is instructive to examine absolute income mobility, which is how people's income changes over time (after accounting for inflation), regardless of their relative standing within a broader group. **Table 8** shows the average income of individuals in the five income groups in 1993 (in 2012 dollars). It also displays the average income of the same individuals 19 years later in 2012, regardless of which income group they ended up in (also in 2012 dollars). The table gives the dollar and percentage increase in average income for individuals in each initial income group.

The first row in table 8 contains individuals that began the 19-year period in the bottom 20%. Their average income earned through wages and salaries in 1993 was $5,800 but increased dramatically to $51,100 by 2012 (all income in 2012 dollars). The $45,300 rise represents an impressive 781% gain in average income.

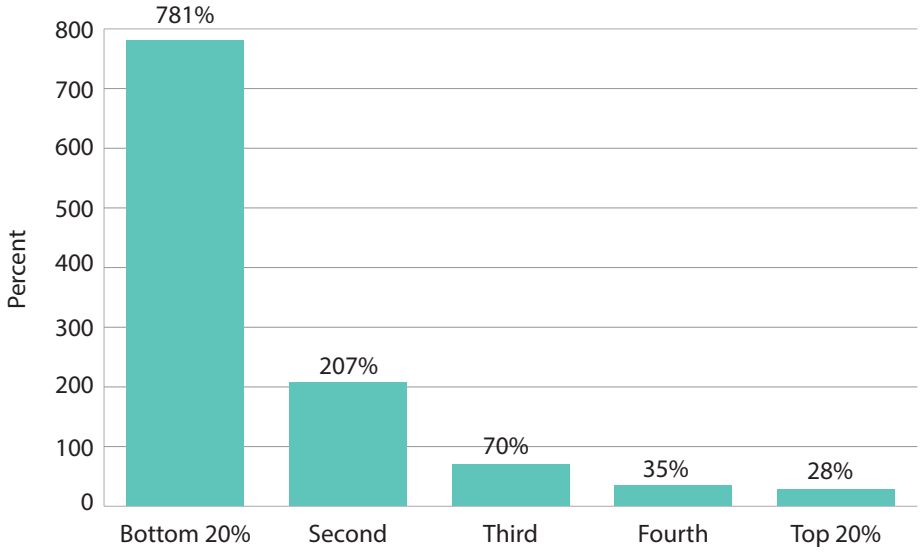
Table 8: Average Income of the Same Group of People in 1993 and 2012 and the Increase in Dollars and Percentage

Income group in 1993	Average income in 1993 ($ 2012)	Average income in 2012 ($ 2012)	Dollar increase, 1993–2012	Percentage increase, 1993–2012
Bottom 20%	5,800	51,100	45,300	781%
Second	16,500	50,700	34,200	207%
Third	31,200	53,100	21,900	70%
Fourth	48,400	65,500	17,100	35%
Top 20%	82,600	106,100	23,500	28%

Note: Income is measured by wages and salaries.
Source: Statistics Canada, 2015b.

Now consider the increase in absolute mobility for those in the top 20% (last row of table 8). Individuals that began the 19-year period in the top 20% had an average income of $82,600 in 1993, which increased by $23,500 to $106,100 by 2012. This growth represents a percentage increase of just 28% (**figure 12**). Interestingly, among individuals in the five initial income groups, the percentage increase in absolute mobility is greatest for those in the bottom 20% (781%). While the growth in average income is also large for those initially in the second income group (207%), it is considerably smaller for those in the other income groups: 70% growth for those in the third income group, 35% growth for those in the fourth, and just 28% growth for those in the top 20%. In absolute terms, individuals in the bottom 20% in 1993 had by far the largest gains in absolute income mobility. In other words, the income of the poor increased at a faster rate than the income of the rich.

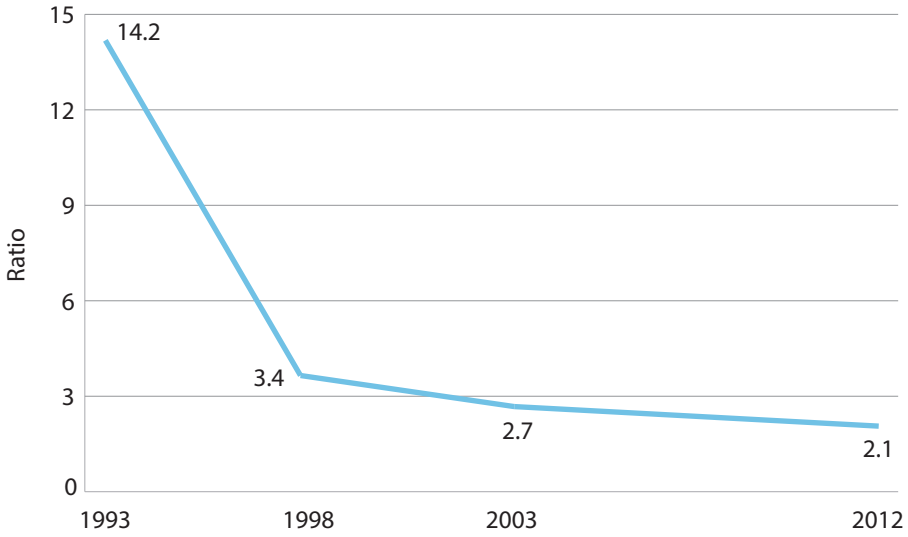
Figure 12: Percentage Growth in Average Income of the Same Group of People, 1993–2012



Note: Income is measured by wages and salaries and adjusted for inflation.
Source: Statistics Canada, 2015b.

Another telling figure emerges from the data: the ratio of average income for those initially in the top 20% in 1993 to those initially in the bottom 20% in 1993 compared to this ratio for the same group of people 19 years later. In 1993, the average income of individuals in the top 20% was 14 times greater than those in the bottom 20%. By 2012, those who were in the top 20% in 1993 now had an average income that was only twice as high as those who were initially in the bottom 20% in 1993. In other words, in a comparison of income of the same group of people over time, dynamic income inequality declined significantly (**figure 13**). The reason for the decline is that people's incomes were mobile—some moved up while others moved down. Unfortunately, this critical fact is never reported in debates about income inequality.

Figure 13: Ratio of Average Income of Those Who Were in the Top and Bottom 20% in 1993 from 1993 to 2012



Note: Income is measured by wages and salaries and adjusted for inflation.

Source: Statistics Canada, 2015b.

Conclusion

This study measured income mobility in Canada. The data are based on the experience of nearly one million Canadians whom we follow starting in 1993 over three time periods: five years (1993–1998), 10 years (1993–2003), and 19 years (1993–2012). The study found considerable upward relative mobility in all time periods, with individuals initially in the lowest income group (the bottom 20%) experiencing the most upward relative mobility. For instance, in just five years (1993–1998), 79% of Canadians who started in the bottom 20% had moved to a higher income group and 88% had moved up after 10 years (1993–2003).

The 19-year period (1993–2012) is the longest covered in the study and best captures income changes over the life cycle. Here, 89% of those in the bottom 20% in 1993 moved up at least one income group by 2012. That is, within two decades, nearly nine of every 10 individuals in the lowest income group had moved up the income ladder. And, those in the lowest income group were not alone in their mobility. About 72% of people from the second income group moved up at least one income group, while 52% of Canadians from the third, and 36% from the fourth, income groups also did so.

Being in the lowest income group was generally a temporary experience, as the vast majority of people covered in the study moved to a higher income group over time. But, in which income groups did the bottom 20% end up after the 19-year period? By 2012, 19% ended in the second income group, 24% in the third income group, 23% in the fourth income group, and 24% in the highest income group. Remarkably, nearly one of every four Canadians in the bottom 20% in 1993 eventually made it to the highest income group 19 years later.

The study also found that some Canadians move down the income ladder over time, including those initially in the top 20%. Over the 19-year period, 35% of individuals in the top 20% in 1993 moved down at least one income group by 2012, as did 28% from the fourth income group, 19% from the third, and 8% from the second. Downward mobility was generally greater for individuals who started the 19-year period in higher income groups and greatest for those who started in the top 20%.

Taken together, the results of our analysis of relative income mobility showed that many Canadians initially in the bottom 20% moved to higher income groups over time while some Canadians initially in the top 20% moved to lower income groups.

The study also examined absolute mobility, which is the change in average income of the same group of people over time after accounting for inflation. In absolute terms, individuals initially in the bottom 20% in 1993 experienced by far the largest income gains (in both in dollars and percentages).

This study provides compelling evidence that low- and high-income Canadians do not remain stuck in their respective income groups year after year. This evidence is critical to enable a better understanding of the debate about income inequality. In any measure of income inequality, it is very misleading to rely solely on comparisons of "snapshots" of the income distribution at any two points in time because doing so does not capture the fact that Canadians are mobile. By not accounting for income mobility, one paints an incomplete picture of the well-being of Canadians. Ultimately, such an analysis could lead to misguided policies and a reduction in Canada's prosperity.

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Appendix A: Data Description

The income mobility data for this report relies on data from Statistics Canada's Longitudinal Administrative Databank, which were obtained through a special request made to Statistics Canada. At the time of writing, the databank provided income data on a group of Canadians from 1982 to 2012. The income data is derived from income-tax returns collected by the Canada Revenue Agency (CRA). The databank includes a sample of 20% of all tax-filers in a given year. By linking tax-filing information using an individual's Social Insurance Number, Statistics Canada is able to track and record the income of the same individuals year after year.

We examined income mobility for a group of nearly one million Canadians starting in 1993 over the course of five years (1993–1998), 10 years (1993–2003), and 19 years (1993–2012). The sample consists of 995,556 individuals, which corresponds to 23.9% of the overall group available through the Longitudinal Administrative Databank (4,167,335 individuals in total).

Our sample consists of individuals between the ages of 20 and 45 (inclusive) in the first year of the period (1993). Thus, the sample consists of individuals between the ages of 39 and 64 (inclusive) in the final year of the 19-year mobility period (2012). Individuals under the age of 20 in the initial year are excluded because they are typically students and not expected to experience significant income mobility while enrolled in post-secondary schooling or training. Unfortunately, the Longitudinal Administrative Databank does not allow us to directly identify tax-filers who are post-secondary students.[30] Individuals who are 65 and older also were excluded since they are typically retired, are unlikely to have significant income from wages and salaries, and are therefore unlikely to experience material income mobility.

In addition, our sample includes only individuals who reported at least $1,000 of income from wages and salaries (in 2012 dollars) in order to exclude individuals with only a marginal attachment to the labour force. And, finally, the sample used for analysis of income mobility from 1993 to 2012 includes only individuals who filed a tax return in four years: 1993, 1998, 2003, and 2012 (but not necessarily in any of the years in between).

Finally, the relative income mobility of individuals in our sample is evaluated relative to all individuals contained in the entire LAD group. That is, for each year that we analyzed income mobility, income thresholds for the quintiles were determined by the income of all individuals in the LAD group,

30. Indirectly, researchers can estimate whether a tax-filer is a post-secondary student through LAD according to whether or not they claimed tuition tax credits. This is an imperfect method, however, because we would be unable to discern whether they are full- or part-time students. In addition, parents or spouses may claim these credits if transferred by a student. Finally, students may not choose to claim their tuition tax credits in the year in which they are a student as they have the option to carry forward the amount eligible for the tax credit to years when they will be earning a higher income.

not just the income of individuals in our sample. To be part of the overall LAD group in these calculations, individuals had to report at least $1,000 of income from wages and salaries (in 2012 dollars).

The specifications for our data request on long-term mobility are generally in line with existing Canadian research that examines income mobility using earnings or wages and salaries as a definition of income (see Beach and Finnie, 1998, 2004; Finnie, 1999).

Appendix B: Income Range by Quintile Group and Year

	1993	1998	2003	2012
Bottom 20%	1,000–10,000	1,000–11,000	1,000–11,000	1,000–12,000
Second	10,000–23,000	11,000–24,000	11,000–25,000	12,000–28,000
Third	23,000–39,000	24,000–40,000	25,000–41,000	28,000–45,000
Fourth	39,000–59,000	40,000–61,000	41,000–63,000	45,000–70,000
Top 20%	59,000 and over	61,000 and over	63,000 and over	70,000 and over

Note: Income is measured by wages and salaries and adjusted for inflation.

Source: Statistics Canada, 2015b.

Appendix C: Mobility Results Based on Quintile Determination Relative to Sample

To arrive at the results in this report, the income thresholds for the quintiles were determined by the income of all individuals in the broader LAD group. To be part of the overall LAD group in these calculations, individuals had to report at least $1,000 of income from wages and salaries (in 2012 dollars). We measured income mobility relative to the broader LAD group because it is a better reflection of the income distribution of the entire Canadian population. Ultimately, we are interested in knowing into which income groups individuals in our sample fall relative to the overall Canadian population. However, an alternative way of determining income quintiles is to base it on the income distribution of just the sample group, which primarily consists of relatively younger working Canadians. Still, the data in **tables C1**, **C2**, and **C3** show that this method of measuring income mobility also points to significant mobility, and particularly to upward mobility for the bottom 20%.

Table C1: Summary of Five-Year Income Mobility from 1993 to 1998 (Income Groups Determined by the Sample)

Income group in 1993	Income group 5 years later: Percentage that moved into a higher income group	Income group 5 years later: Percentage that moved into a lower income group	Total mobility (%)
Bottom 20%	51.2	0.0	51.2
Second	32.6	32.1	64.7
Third	21.7	42.3	64.0
Fourth	15.8	39.8	55.6
Top 20%	0.0	29.1	29.1

Notes: Income is measured by wages and salaries. Zero percent for the bottom 20% since it is the lowest income group and individuals cannot move down any further. Zero percent for the top 20% since it is the highest income group and individuals cannot move up any further. Quintiles are based on the cohort (not the entire LAD population) with at least $1,000 (in 2012 dollars) in each period.

Source: Statistics Canada, 2015b.

Table C2: Summary of Ten-Year Income Mobility from 1993 to 1998 (Income Groups Determined by the Sample)

Income group in 1993	Income group 10 years later: Percentage that moved into a higher income group	Income group 10 years later: Percentage that moved into a lower income group	Total mobility (%)
Bottom 20%	59.0	0.0	59.0
Second	37.5	33.0	70.5
Third	24.2	47.9	72.1
Fourth	17.3	49.3	66.6
Top 20%	0.0	39.6	39.6

Notes: Income is measured by wages and salaries. Zero percent for the bottom 20% since it is the lowest income group and individuals cannot move down any further. Zero percent for the top 20% since it is the highest income group and individuals cannot move up any further. Quintiles are based on the cohort (not the entire LAD population) with at least $1,000 (in 2012 dollars) in each period.

Source: Statistics Canada, 2015b.

Table C3: Summary of 19-Year Income Mobility from 1993 to 1998 (Income Groups Determined by the Sample)

Income group in 1993	Income group 19 years later: Percentage that moved into a higher income group	Income group 19 years later: Percentage that moved into a lower income group	Total mobility (%)
Bottom 20%	69.5	0.0	69.5
Second	45.1	26.6	71.7
Third	28.5	45.5	74.0
Fourth	18.8	53.5	72.3
Top 20%	0.0	53.3	53.3

Notes: Income is measured by wages and salaries. Zero percent for the bottom 20% since it is the lowest income group and individuals cannot move down any further. Zero percent for the top 20% since it is the highest income group and individuals cannot move up any further. Quintiles are based on the cohort (not the entire LAD population) with at least $1,000 (in 2012 dollars) in each period.

Source: Statistics Canada, 2015b.

6. The Myth of Middle-Class Stagnation in Canada

Donald J. Boudreaux, with Joel Emes, Hugh MacIntyre, and Charles Lammam

> "Strictly speaking, statistics never lie, but the truths they tell are often misinterpreted. This is particularly the case with economic statistics."
>
> Steven E. Landsburg, *The Armchair Economist* (2012)

In a speech at the 2016 World Economic Forum Annual Meeting held in Davos, Switzerland, Prime Minister Justin Trudeau spoke of the need to ensure that economic growth benefits everyone (*Maclean's Magazine*, 2016), implying that this has not necessarily been the case. This is a theme that was made explicit in the 2016 federal budget:

> The net result is that even though there has been economic growth over the past three decades, it hasn't much benefited the middle class. Too often the benefits have been felt only by already wealthy Canadians, while the middle class and those working hard to join it have struggled to make ends meet. (Canada, Department of Finance, 2016: 14)

Prime Minister Trudeau and his government are not alone in expressing a concern that the middle class has not adequately enjoyed economic gains over the past few decades.[1] Indeed, the claim that the middle class has stagnated economically is a common meme in political debates across Western countries, including Canada and the United States. This meme spans the ideological spectrum and is often repeated as if its truth is settled beyond any question.

1. For example, University of British Columbia professor Kevin Milligan wrote a column in *Maclean's Magazine* arguing that stagnating middle-class incomes is a problem (Millgan, 2013).

But the truth of this meme is not at all settled. Indeed, the evidence against it is significant. No matter, the meme fuels itself: the more it is repeated, the greater seem to be its prospects of being further repeated. This phenomenon is dangerous, for if a public policy "cure" is fashioned in response to a mistaken belief about the economy, the policy will almost certainly be counterproductive. That policy will be a medicine prescribed for a non-existent illness. The patient is then likely to be inflicted with a genuine ailment rather than cured of its imaginary one. Indeed, government policies can create more problems even if they get the diagnosis right.

An accurate understanding of middle-class living standards is important if we are to avoid false diagnoses of economic ills and any resulting reckless treatments of those "ills." The following analysis, therefore, is meant to give a clear, fact-based account of the standard of living of ordinary Canadians over the past several decades. The hope is that this account will help to diminish the risk that false pessimism about the economy will prompt Canadian governments to adopt unwise economic policies.

Defining the Middle Class

When pundits and politicians refer to stagnation among the middle class, they often do not provide a precise definition of the term. There are in fact many issues involved with defining and measuring the middle class.[2] The middle class can be defined in terms of income, net wealth, occupational standing, or self-identification. It is also unclear how to delineate at what points in the distribution the middle class begins and ends. For instance, even if "middle class" is defined by some measure of income, it is not clear what income range qualifies someone as middle class. As a result, the middle class can be defined in multiple ways. Rather than providing its own definition, this study relies on the statistical definition that purportedly shows that middle-class incomes are stagnating. In this context, middle-class income usually refers to the median income, or the middle point in the income distribution.

Setting the Context: The Meme and Insights from America

The claim of middle-class stagnation is being increasingly challenged by researchers in the United States, and many of the arguments on both sides of the debate also apply to Canada. Also, it is likely that the debate in Canada has been influenced to at least some degree by rhetoric from the United States.[3] For these reasons, an overview of the evidence in the United States provides some

2. For a discussion on the issues related to defining and measuring the middle-class, see Cross and Sheikh (2015).

3. Commentaries and news articles on income stagnation in Canada often discuss the situation in the United States as well. For examples, see Walkom (2014) and Grant (2013).

important context. Two pieces of data are to blame for fueling this myth that since the mid-1970s only very rich Americans have enjoyed improvements in their living standards. The first is the average real hourly wage rate of production and non-supervisory workers: In 2016 US dollars, that wage in 1975 was $20.94; today (April 2016) that wage is $21.45—a mere 2.4 percent higher than it was four decades earlier (Federal Reserve Bank of St. Louis, 2016; calculations by authors).[4]

The second piece of data is median household income. The median-annual-income household in the US in 1975 earned $11,800. Converted, using the CPI, into 2014 dollars, that was a median annual income of $51,924. Today (2014) it is $53,657—only 3.3 percent greater than it was during Gerald Ford's first full year in the White House.[5]

Despite first appearances, these data are not unassailable evidence of middle-class stagnation. They are fraught with problems, most notably:

1. The dollar values are adjusted for inflation using the Consumer Price Index, which almost certainly overestimates inflation, not least because it inadequately accounts for improvements in product quality.

2. The data on wages exclude changes in the value of non-wage benefits (such as employer contributions to workers' pension savings)—benefits which have increased over the years as a share of total worker compensation.[6]

3. These data potentially create statistical illusions. For example, if the population of workers changes over time because of additions to this population of a disproportionately large number of workers who are paid below-average wages, the average wage will be pulled down even if the wages earned by each and every one of the workers in the population are rising significantly. Because of the continuing entry since the mid-1970s of married women and, especially, of immigrants into the US workforce—and because these new workers generally earn below-average hourly wages when they first enter the workforce—the average wage gives a falsely pessimistic impression of workers' fortunes over time.

4. The 1975 wage of $4.73 was converted into 2016 dollars by using the Consumer Price Index online calculator available from the US Bureau of Labor Statistics at <http://data.bls.gov/cgi-bin/cpicalc.pl>.
5. See US Census Bureau, Current Population Reports: Consumer Income, Series P-60, No. 104, March 1977, Table A: <https://www2.census.gov/prod2/popscan/p60-104.pdf> and US Census Bureau, Current Population Survey: Annual Social and Economic Supplement (2015), Table HINC-01: <http://www.census.gov/hhes/www/cpstables/032015/hhinc/hinc01_000.htm>. 2014 is the latest year for which we have data on median household income.
6. See Schwenk (2001) and the US Bureau of Labor Statistics at <http://data.bls.gov/cgi-bin/surveymost?cm>.

4. Data on household income should be—but too often are not—adjusted to reflect changes in the number of people who live in the average-size household. The number of people per household, on average, in the US in 1975 was 2.94. Today (2014) it is 2.54. That is, compared to 1975, 16 percent fewer people live today in the typical American household. Any given amount of household income, therefore, is spread less thinly across individuals today than it was in the past. While this 16 percent difference might seem small, it means that even if real median *household* income today is only 3.3 percent higher than it was in 1975, the real income share of each *person* in the typical American household today is 20 percent higher than it was in 1975.[7]

5. Data on wages and on household income are typically reported before taxes have been paid by—and before government transfers have been made to—workers and households.

Assembling, processing, and interpreting quantitative data can indeed be tricky. Fortunately, a number of scholars over the past several years have attempted to correct the resulting misimpressions. The present author has done much work on this topic, especially on his blog (<www.cafehayek.com>). So, too, has the economist Terry Fitzgerald in research sponsored by the Federal Reserve Bank of Minneapolis. The most important of these efforts, however, is the 1999 book by Michael Cox and Richard Alm, *Myths of Rich & Poor.*

Of particular note is Cox's and Alm's method for avoiding the myriad difficulties of adjusting for inflation. To get a good sense of changes over time in workers' real incomes, these authors divide the nominal hourly wage of an ordinary worker into the nominal price of each of a variety of goods and services available for sale. In this way, Cox and Alm discover the number of hours it took an ordinary worker in, say, 1975 and again in 1995 to earn enough income to buy, say, an automobile battery. If an ordinary worker had to work fewer hours in the more recent year to earn enough income to purchase this item, then in a concrete and economically meaningful sense the real price of this item (measured in work time) fell.

By performing this work-time calculation for several different items commonly purchased by ordinary Americans, Cox and Alm painted a compelling

7. This is a rough calculation for the impact of changes in household size. Dividing the inflation-adjusted 1975 median household income of $51,924 by 2.94—which is the number of people in the average-size 1975 household—yields a per-household-person annual income for 1975, in 2014 dollars, of $17,771. Performing the same calculation for the 2014 median household income and the number of people in the average-size 2014 household yields a per-household-person annual income for 2014 of $21,125. The 2014 income figure is 20 percent larger than the 1975 income figure. The adjustment for household size to the Canadian income data made in the next section follows a different methodology. Data on average number of persons per US household are from Statista.com, *Number of People Per Household in the United States*: <http://www.statista.com/statistics/183648/average-size-of-households-in-the-us/>

portrait of what actually happened over time to ordinary Americans' living standards. They found, in fact, that ordinary Americans' living standards did not stagnate at all from the mid-1970s through the mid-1990s. Quite the contrary. Those living standards improved greatly.

Follow-up work, including some by the present author, not only confirmed Cox's and Alm's findings but showed that the improvement in ordinary Americans' living standards continues. As summarized in 2013 by Manhattan Institute scholar Scott Winship, "[a]fter adjusting for household size … [median] post-tax income was 49 percent higher" for Americans in 2007 than it was in 1979 (Winship, 2001).

This American context provides important insights for the Canadian debate and for assessing whether ordinary Canadians have stagnated economically.

Have Ordinary Canadians Stagnated Economically Since the Mid-1970s?

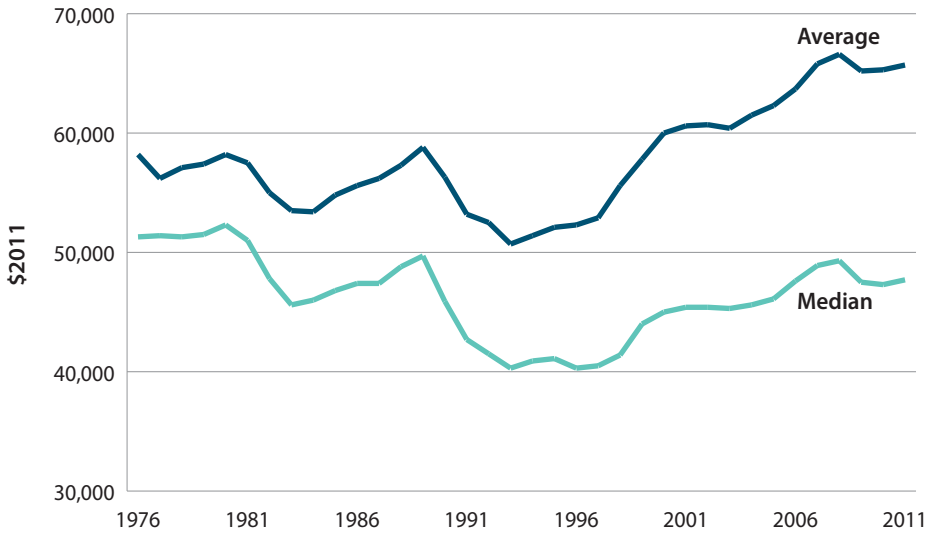
So what has been the economic fate of Canada's middle-class since the mid-1970s? As in the US, some data do indeed tell a tale of stagnation. The inflation-adjusted *median* income (before taxes and government transfers) of Canadian families was seven percent *lower* in 2011 than in 1976, while the inflation-adjusted *average* income (again, before taxes and government transfers) of Canadian families grew by only 12.9 percent over those same years (**figures 1**, **2**). For two reasons, these figures combine to suggest that ordinary Canadians have indeed stagnated economically since the mid-1970s.[8]

First and most obviously, a seven percent decline in real median family income seems clearly to be bad news for ordinary Canadians. It seems to indicate a fate *worse* than mere stagnation: economic decline. Second, the fact that real *average* family income rose while real median family income fell suggests that whatever economic growth *did* occur in Canada between 1976 and 2011 was captured exclusively by higher-income Canadians.

The stagnation story is reinforced by a glance at inflation-adjusted wage rates. The average real hourly wage of the average Canadian worker was only 13.8 percent higher in 2011 than in 1976 (**figure 3**).[9] That difference seems to imply real-wage-rate growth so paltry that, if this implication is correct, it is no abuse of language to describe Canadians' real wages since 1976 as having stagnated.

8. A similar analysis was used in the 2016 federal budget to argue that "the benefits of economic growth have been shared by fewer and fewer Canadians" (Canada, Department of Finance, 2016: 11).
9. Statistics for the average hourly wage are not readily available for years prior to 1997. The average hourly wage was calculated by dividing the average income earned (from employment and net self-employment) by the average weekly hours worked (Statistics Canada, 2013c, 2016d).

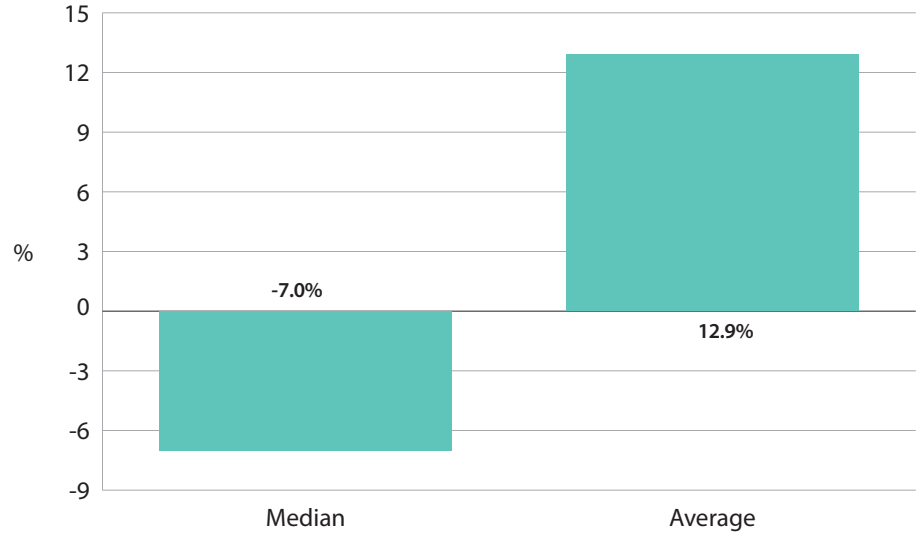
Figure 1: Median and Average Family Income Before Taxes and Government Transfers, 1976–2011



Note: Refers to all family units.

Sources: Statistics Canada, 2013a, 2013b.

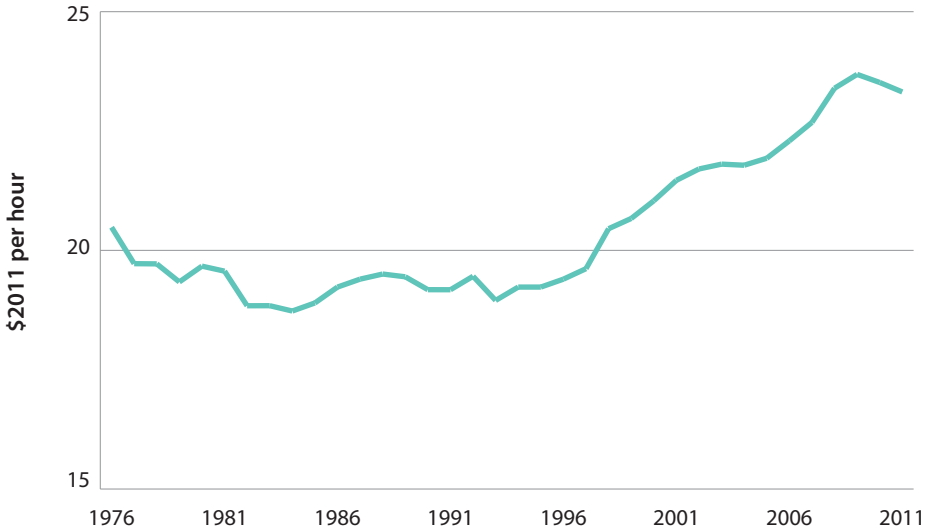
Figure 2: Growth in Median and Average Family Income Before Taxes and Government Transfers, 1976–2011



Notes: Refers to all family units. Based on 2011 dollars.

Sources: Statistics Canada, 2013a, 2013b.

Figure 3: Inflation-Adjusted Hourly Earnings, 1976–2011



Note: The average hourly wage was calculated by dividing the average income earned (from employment and net self-employment) by the average weekly hours worked.

Sources: Statistics Canada, 2013c, 2016a.

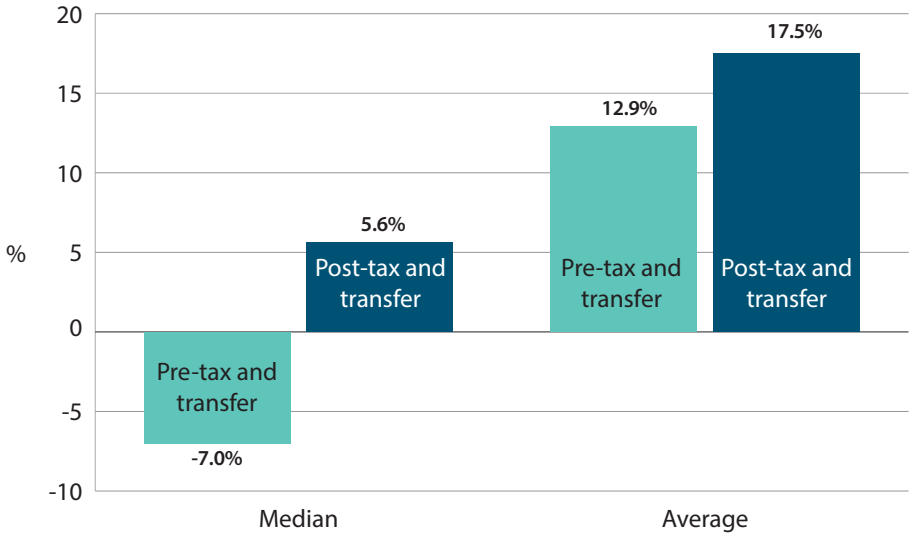
But as in the US, the simple story of stagnation told by these data is highly misleading. Consider annual family income. The figures before taxes and government transfers reported above are obviously less relevant for a family's economic well-being than are figures *after* taxes and government transfers.[10] What a family cares about in the end is how much it has available to spend (and to save) *after* it has paid all taxes and received all transfers.[11] So looking at the much more relevant post-tax and -transfer family-income figure reveals that, rather than falling by seven percent between 1976 and 2011, real median family income rose by 5.6 percent. And real *average* family post-tax and -transfer income rose, not by the 12.9 percent figure mentioned above, but by 17.5 percent (**figure 4**). Although such rises in income over a span of 35 years are small, the differences between these figures and the earlier-reported figures before taxes and government transfers reveal clearly the importance of knowing just what the analyst (or the pundit) means by "income." Is the "income" under discussion pre-tax and -transfer income, or post-tax and -transfer income—or yet some other definition of income? The differences between these alternative

10. In this context, taxes narrowly refer to income and payroll taxes, not all taxes including sales, property, profit, vehicle, and other taxes. Specifically, Statistics Canada (2009) defines income tax as "taxes on income, capital gains and RRSP withdrawals, after taking into account exemptions, deductions, non-refundable tax credits, and the refundable Quebec abatement."

11. This is not to say that income before taxes and government transfers is never relevant for economic analyses. For example, it can be useful for researchers interested specifically in an income measure that is more closely connected to the labour market.

conceptions of income—each one colloquially often called simply "income"—are significant, both numerically and for purposes of assessing the performance of the middle-class.[12] We present data for both median and average family income, but will focus our attention on median income as it is not affected by extreme values.

Figure 4: Growth in Median and Average Family Income Before Taxes and Government Transfers, 1976–2011



Notes: Refers to all family units. Based on 2011 dollars.

Sources: Statistics Canada, 2013a, 2013b.

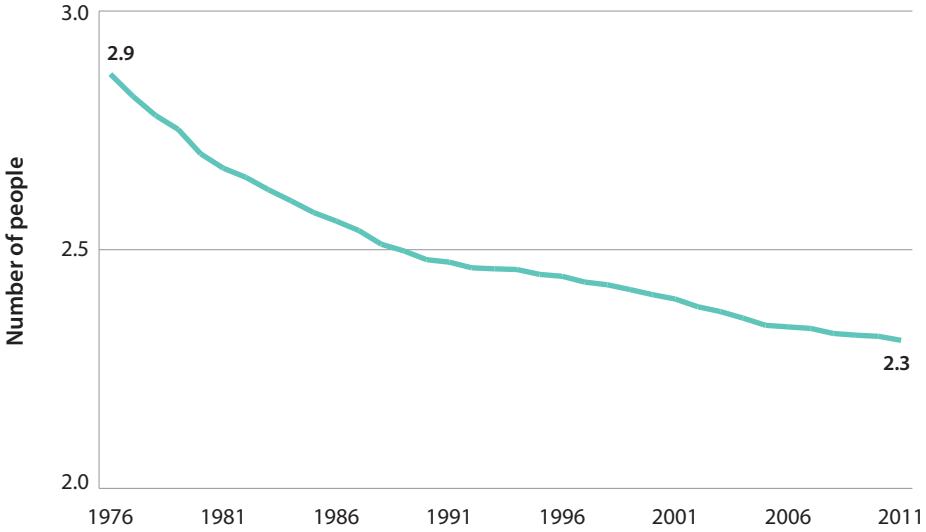
Adjusting for Family Size

Another adjustment that is necessary to secure a more accurate understanding of middle class performance over time is one that accounts for changes in the average number of people in a family. In 2011, the average number of people in a Canadian family is 2.3, which is 19 percent lower than the 1976 figure of 2.9 persons per family (**figure 5**). This difference is not small. It means that the seemingly meager 5.6 percent increase in real median post-tax and -transfer family income becomes a 30.7 percent increase—in per-family-*member* income once the data are adjusted for family size (**figure 6**).[13]

12. Compared to pre-tax and -transfer income figures, post-tax and -transfer figures offer a more accurate reflection of how well, over time, markets combined with government policies are working.

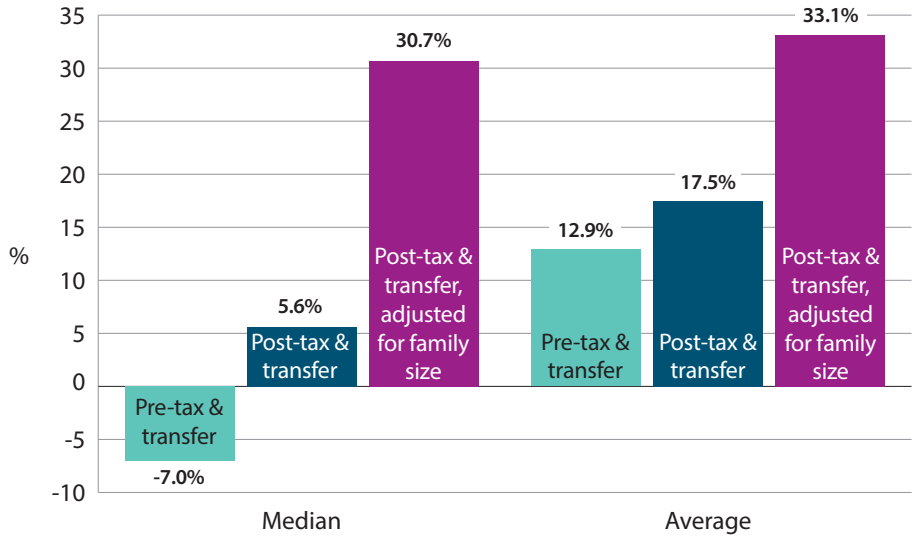
13. The average family size is presented here for informational purposes and does not directly enter into the adjustment that is made to the median income data to reflect changes in family size. The adjustment is made with a commonly used equivalence scale (dividing the unadjusted income by the square-root of the family size), which approximates the equivalent level of income needed by households of different sizes to achieve the same standard of living.

Figure 5: Average Family Size in Canada , 1976–2011



Source: Statistics Canada, 2013f, 2015.

Figure 6: Growth in Median and Average Family Income Before and After Taxes and Government Transfers, After Adjusting for Family Size, 1976–2011



Notes: Refers to all family units. Based on 2011 dollars.

Sources: Statistics Canada, 2013a, 2013b, 2013d, 2013e, 2013g, 2016b.

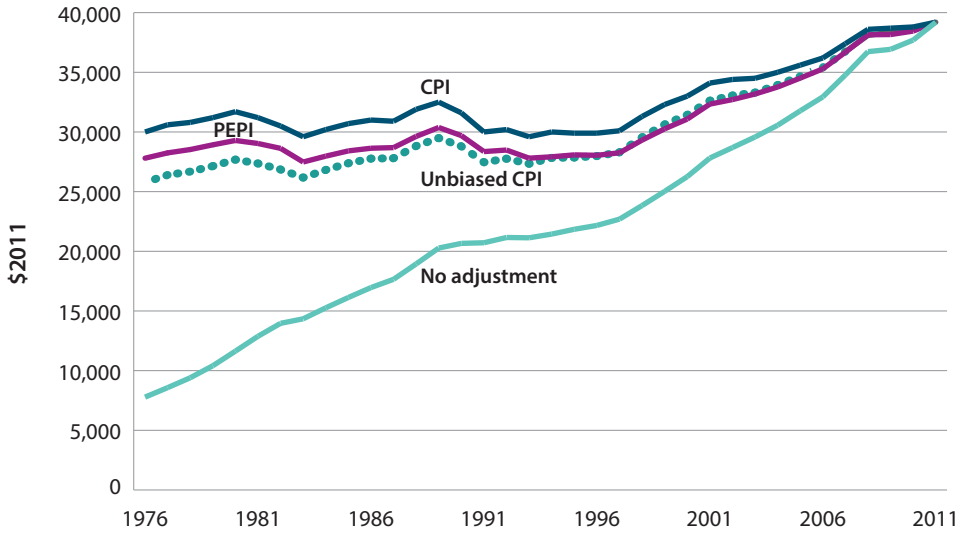
Inflation Adjusters

Yet another problem that calls for attention is the imperfection in inflation adjusters. The above figures are all adjusted for changes in the dollar's purchasing power by using the conventional consumer price index (CPI). Adjusting for purchasing-power changes—that is, for inflation when the dollar's purchasing power is falling over time—is necessary for obvious reasons. $100 of nominal income represents a great deal more real value if the price of a bundle of widely purchased goods and services is $50 than if the price of that same bundle is $500. So to the extent that we use monetary figures to get a reasonably objective sense of changes in real income over time, these figures must be comparable over time. Inflation adjusters, such as the CPI, are used to create such comparability.

But these adjusters are imperfect. Testifying to this imperfection is the fact that several different inflation adjusters are used, each of which adjusts for inflation differently from the others and, as a result, yields a different estimate of inflation than is yielded by the other adjusters.

Consider, for example, that in 1976 the adjusted median post-tax and -transfer income in Canada was, in 1976 dollars, $7,781 (see "no adjustment" line in **figure 7**). But to understand what that income was had Canadians in 1976 been paid in 2011 dollars—with a 2011 dollar, of course, possessing less purchasing power than did a 1976 dollar—those 1976 dollars must be "deflated" so that they have the same (lower) purchasing power as 2011 dollars. Using the conventional CPI to convert 1976 dollars into 2011 dollars yields an adjusted median post-tax and -transfer income in 1976 of $30,000 ("CPI" in figure 7). This conversion means that, according to the conventional CPI, each 1976 dollar was the equivalent of $3.86 in 2011.

Figure 7: Median Family Income Using Different Deflators, 1976–2011



Note: Median family income is post tax- and -transfer, adjusted for family size.

Sources: Statistics Canada, 2012, 2016b, 2016c.

But look at what happens when we adjust for inflation by using, not the conventional CPI, but the Personal Expenditure Price Index.[14] The $7,781 nominal adjusted median after-tax income in 1976 becomes $27,801 when reckoned in 2011 dollars. This inflation-adjusted figure for 1976 income is 7.3 percent lower than the inflation-adjusted figure derived by using the conventional CPI.

A third inflation-adjusted figure is available—namely, one that is arrived at by modifying the conventional CPI to eliminate its suspected upward bias. Call this adjuster the "unbiased CPI." In the mid-1990s, the Boskin Commission found that the US CPI overstates inflation by about 1.1 percentage points annually. The four principal reasons identified by the Commission for this bias can be summarized in two points. First, products whose prices have fallen (or that are totally new) are weighted too lightly in the bundle of goods the prices of which are used to calculate price-level changes over time; second, higher prices due to improvements in product quality are too often miscounted as being due to inflation.

Researchers found a similarly-caused upward bias in the Canadian CPI, although this bias isn't as great as in the US. Based on estimates for 2005 to 2011, the Canadian CPI overestimates inflation by about 0.45 percentage points annually.[15] So when 1976 Canadian dollars are adjusted to equivalence with 2011 dollars using the unbiased CPI, the adjusted per-family-member median after-tax income in Canada in 1976 was $25,771—a figure notably lower than the figure of $30,000 that is generated when using the conventional CPI.

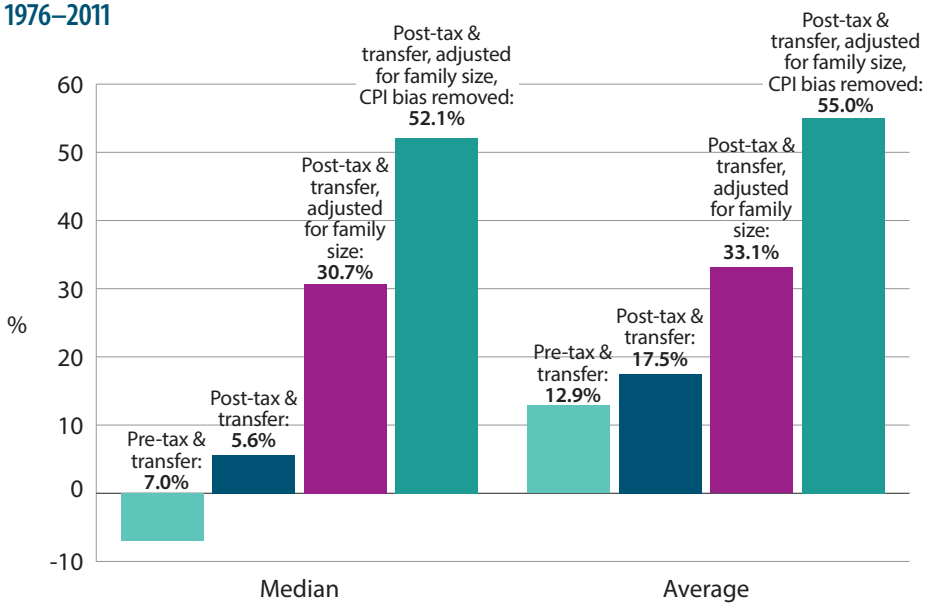
Therefore, if we treat $25,771 as the correct adjusted median post-tax and -transfer income figure for 1976 when reckoned in 2011 dollars, and use it as the base from which we calculate changes in income over the 35 years from 1976 through 2011, we find that adjusted post-tax and -transfer income rose by 52.1 percent to $39,200. (**figure 8**).

Such a rise is significantly larger than the reported 30.7 percent increase when adjusting for inflation using the conventional CPI. And this 52.1 percent rise is certainly enough of an increase in real monetary income to cast deep doubts on claims that the economic welfare of ordinary Canadians has stagnated since the mid-1970s.

14. The Personal Expenditure Price Index deflator is based on the implicit price index for personal expenditures on consumer goods and services as reported in Statistics Canada (2011) and updated with Statistics Canada (2012).

15. This is the mean estimate for 2005–2011 as reported by Sabourin (2012), who states that "empirical evidence suggests that the average size of the measurement bias in the Canadian CPI has been relatively constant over the past 15 years." Extending this estimate back further than 15 years is conservative as inflation was much higher over 1976–1996 (5.7 percent on average) than 1997–2011 (2.0 percent), and Fortin (1990) estimated the bias at between 0.5 and 1.0 percentage points.

Figure 8: Growth in Median and Average Family Income Before and After Taxes and Government Transfers, After Adjusting for Family Size and Correcting CPI Bias, 1976–2011



Notes: Refers to all family units. Based on 2011 dollars.

Removing the CPI bias changes the 7.0% decline seen in pre-tax and -transfer to 8.2% growth and the 5.6% growth in post-tax and transfer income increases to 23.0%.

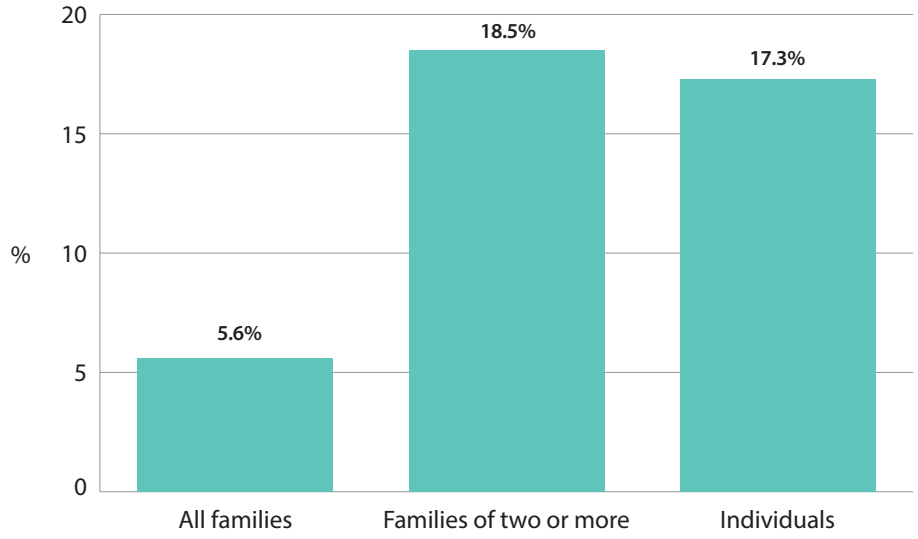
Sources: Statistics Canada, 2013a, 2013b, 2013d, 2013e, 2013g, 2016b.

Simpson's Paradox

Yet another reality to keep in mind is the ability of even the most accurate statistics to mislead. Of special relevance here is Simpson's Paradox. This paradox refers to the fact that when the mean or the median of a data set is taken at one level of aggregation, this mean or median can be surprisingly different from what might be inferred from the mean or median of each of the subsets of that data set.

An example is found in Canadian data on the change in real median, post-tax and -transfer income by family type, between 1976 and 2011. As mentioned above, for "All families," this income in 2011 was only 5.6 percent higher than it was in 1976 (when dollars are adjusted for inflation using the conventional CPI). This paltry figure suggests that the typical Canadian family over the course of those 35 years enjoyed an increase in real, post-tax and -transfer income that is barely perceptible. But if we disaggregate "All families" into its two constituent parts—"Economic families, two persons or more" and "Unattached individuals"—we find that the percentage increase in the real median, post-tax and -transfer income of each of these two groups was much higher than 5.6 percent. The real median, post-tax and -transfer income for "Economic families, two persons or more" grew over these 35 years by 18.5 percent, while that for "Unattached individuals" grew by 17.3 percent (**figure 9**).

Figure 9: Growth in Median Income After Taxes and Government Transfers, 1976–2011



Note: Based on 2011 dollars.

Sources: Statistics Canada, 2013e.

How can this be? The answer lies in the changing composition of the subgroups of family types. Here's an explanation offered by Terry Fitzgerald when he identified a similar occurrence in the data on US household incomes:

> As an extreme but illustrative example, consider what would happen if one-half of all married couples were to divorce next year. Median household income would plummet as each higher-income married-couple household is dissolved into two lower-income households—the same income is spread across more households. This would be true even if wages increased substantially for all workers, so that household types had large income gains. (Fitzgerald, 2008: 29, 51)

As in the US, in Canada economic families with two persons or more earn significantly higher annual incomes than do unattached individuals, largely because such families often have two or more income earners.[16] So if, over the years, some multi-person families divide into unattached-individual "family" units, this change in family composition puts downward pressure on overall median family income. The result might well be only a modest increase (or even a decrease!) in overall median family income although the median incomes of all subgroups of families increase substantially. And as it happens, between 1976 and 2011 the portion of economic families with two persons or

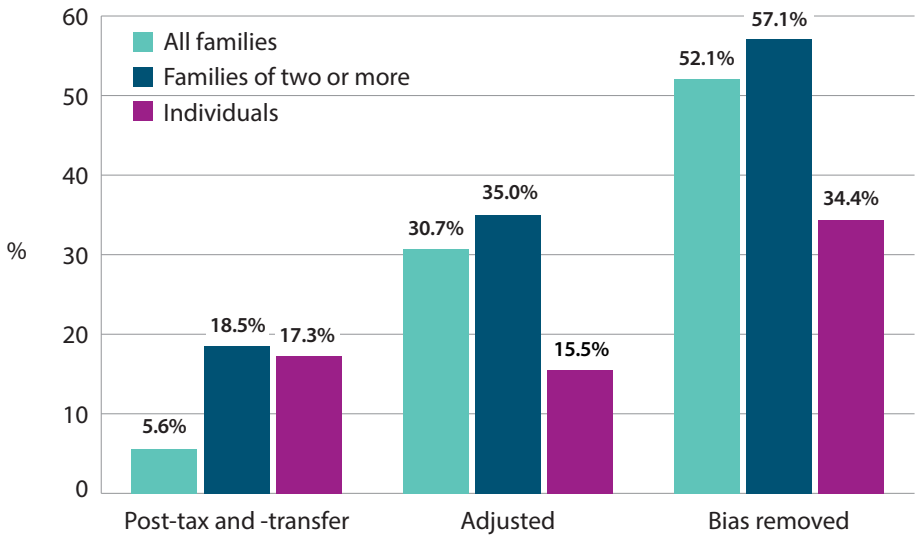
16. In 1976, the median annual after-tax income of economic families with two persons or more was 161 percent higher than the median after-tax income of unattached individuals. In 2011, this difference was 164 percent.

more fell, relative to all family units, from 91 percent to 85 percent (with, of course, the portion of unattached individuals rising)—a change that explains the apparently anomalous result of the median after-tax income of "All families" rising by a mere 5.6 percent while the median after-tax income of each of the two subgroups of "All families" rose by significantly more.

The astute reader will recognize that these higher growth figures for the subgroups still likely underestimate the improvement in ordinary Canadians' economic well-being from 1976 through 2011. The reasons are that these figures (1) do not account for the reduction in the average number of people in the typical Canadian family, and (2) are adjusted for inflation using the conventional CPI. So what happens when these adjustments are made?

In 1976 the average number of members of families with two or more persons was 3.5; by 2011 that figure had fallen by more than 14 percent to 3.0. The result is that, once we adjust for the change in family composition over these years, median post-tax and -transfer income *per person* rose by 35.0 percent rather than 18.5 percent (**figure 10**).[17] By no stretch of the imagination is such growth in family income stagnant.

Figure 10: Income Growth, 1976–2011



Notes: Based on 2011 dollars.

The growth of income for individuals defined as "post-tax and -transfer" and "adjusted" should be the same. The discrepancy is due to adjustments made to the data by Statistics Canada to produce the custom tabulation.

Sources: Statistics Canada, 2013a, 2013b, 2013d, 2013e, 2013g, 2016b.

17. No per-family-member income-share adjustment is necessary for unattached individuals because, by definition, each person counted as an unattached individual is one person.

When adjusted for inflation using the unbiased CPI, the growth, between 1976 and 2011, in real adjusted median post-tax and -transfer annual income *per person* in economic families with two or more persons rises to 57.1 percent from 35.0 percent, while the growth in this income for unattached individuals is 34.4 percent rather than 15.5 percent (figure 10). These growth rates are inconsistent with charges of middle-class economic stagnation.

Summary

Let's pause to recount how aggregate income figures (and the impressions they convey) change when adjusted to better reveal the underlying reality that we are ultimately concerned with—namely, the economic well-being of flesh-and-blood individual Canadians. From a reported seven percent *fall*, from 1976 through 2011, in real median all-family income (when reckoned before taxes and before transfers, without adjusting for changes in family size, and when adjusted for inflation using the conventional CPI) we arrive at a 52.1 percent *increase*, over these same years, in median income. These figures are emphatic evidence *against* claims that ordinary Canadians' material standards of living are today no higher, or only barely higher, than they were in 1976.

Yet we can look at even more data to sharpen our picture of the change in living standards.

Consumption, Not Income, is the End

Clearly, data on incomes—and, especially, on changes in real incomes over time—must be interpreted with caution because of how easily these data can convey wholly misleading impressions of economic reality. The need for such caution is only further raised by the fact that, ultimately, at stake in economic activities are only people's subjective utilities—individuals' personal experiences that are unobservable, unmeasurable, and knowable only to each individual. Ultimately what each person cares about, economically, is (1) the subjective utility she receives from the multitude of goods and services that she consumes, and (2) the subjective disutility she suffers as a result of acquiring the means to consume whatever goods and services she consumes. Objective, observable prices and incomes can at best give only a partial, flawed, and impressionistic picture of the ultimate performance of an economy in terms of its ability to meet the needs of people.

None of this is to say, however, that we shouldn't keep searching for ways to make our picture of the ultimate performance of an economy a bit fuller and more realistic, even if a complete and flawless hi-def "photograph" is forever

beyond our reach. One way to improve our picture is to use Michael Cox's and Richard Alm's device of calculating work-time costs for different goods.[18]

Working for pay is the chief means used by the overwhelming majority—and by nearly all of the middle-classes—in Canada and other market-oriented societies to acquire the incomes that they then spend on items for consumption.[19] We can infer from the fact that almost no one works for zero pay (as well as from our own introspection) that work is a source of "disutility." People work not because it gives them direct satisfaction but because it is the best means available for acquiring the incomes that are necessary to acquire those goods and services the consumption of which *does* yield satisfaction.

In short, the means is work and the end is consumption (rather than income). And because a person is made better off if the amount of means he must use to achieve a given end is reduced, reducing the amount of work necessary to acquire a given amount of consumption items represents an improvement in the economic well-being of workers. *This increase in well-being is real even if the amount of inflation-adjusted money income that that worker receives does not increase.*

A helpful, if imperfect, proxy for the amount of work a person does to achieve a given amount of consumption is the *time* that that person must work in order to earn the income necessary to purchase those consumption items—for example, the number of hours that that person must work to acquire enough income to purchase a pair of shoes.[20] If the work-time cost of a consumption good falls, it is fair to count this falling cost as a real benefit to workers and their families. The reason is obvious: if the amount of time a worker must work to purchase a pair of shoes falls, the amount of time the worker can devote to earning income to be used to purchase other goods and services (including leisure) rises. The size of the available bundle of consumption goods and services available to that worker is enlarged by the fall in the work-time cost of

18. The Cox-Alm method of dividing the nominal price of each of a large number of consumer goods by the mean or median nominal wage, and then comparing the resulting "work-time" calculations across time, has some limitations. First, posted and catalogue prices are sometimes higher than are the prices actually paid by consumers. Second, as done in this paper, this method uses only pre-tax and pre-transfer prices and wages. While using post-tax and post-transfer prices and wages would give a somewhat more accurately detailed measure of changes over time in the typical Canadian worker's work-time costs for various goods, the use of pre-tax and pre-transfer prices and wages gives a reliable big-picture account of the trend in ordinary Canadians' "work-time" costs of these goods. Third the analysis is limited to goods contained in the available catalogues and leaves out important goods and services such as housing and education.

19. See Chapter 3 for further discussion on the importance of examining consumption over income, particularly as it pertains to measurements of inequality.

20. The chief reason that time spent working is only an imperfect proxy for the amount of work that a person must perform to acquire sufficient income to purchase a given bundle of consumption goods is that not all jobs are equally agreeable. For example, the amount of work effort required of workers per hour is variable. If Smith works the same number of hours each week as does Jones, but expends twice the amount of effort each hour while on the job than does Jones, Smith works "more" each week than does Jones. Nevertheless, because for nearly all workers the dominant cost they incur to work is the sacrifice of their time to their employers, we can reasonably use time spent on the job as a good enough proxy for work effort.

a pair of shoes. The worker, in short, is made richer than otherwise in what matters most: ability to consume. Therefore, as Michael Cox and Richard Alm (1999) have shown, measuring changes in the work-time costs to an ordinary worker of various, commonly purchased consumer items is a useful way of improving our understanding of what has happened over time to ordinary people's material standard of living.

A particular benefit of looking at changes over the years in the work-time costs of a variety of commonly purchased consumer goods is that this investigation avoids the need to adjust for inflation. A worker in 1976 received his income in 1976 dollars and paid 1976 prices for his consumption items, while a worker today receives his income in today's dollars and pays today's prices for his consumption items. Therefore, by simply dividing the price of a consumption good in 1976 by the nominal average hourly wage in 1976, and then repeating the same process for a comparable good today, we can easily determine if the work-time cost of that good is higher, lower, or the same today as in 1976. To the extent that the work-time costs of various comparable consumer goods are lower today than in the past, ordinary Canadians are more prosperous than they were in the past, regardless of the trends of statistics on real wages or annual incomes.

The phrase "comparable consumer goods" should not be read to imply that the items in 2011 are identical, or necessarily even close, to those of 1976. In some cases—for example, jeans and sofas—the items are indeed close in both kind and quality.[21] But in many other cases—for example, televisions and video cameras—the quality of the 2011 items differs radically from that of their 1976 counterparts. Almost always, the quality of the 2011 item is higher than that of its counterpart of 35 years earlier.

We do not attempt in this paper to prove with any scientific rigor our contention that the quality of today's consumer products is generally higher than was the quality of such items in the past. Instead, we rely upon casual observations and comparisons that readers themselves can easily make by exploring catalogues from the past. Readers doubtful of our claim of improved product quality can compare product-offerings today to those of 1976 and then ask themselves, for each good, which of the two—today's version of that good or yesterday's version—they would prefer to have if each item cost the same as the other. We are confident that in most cases informed readers would choose today's product over its past version.

So what has been the trend of work-time costs from the mid-1970s until now (2011)? Let's take a look.

21. Nevertheless, the variety of these goods might differ across time. For example, while the quality of any given pair of jeans might be the same at a later time as it was at an earlier time, the number of readily available styles of jeans—boot-cut, straight-leg, relaxed fit, trim fit, stone-washed, button-fly, etc.—might change over time. If the variety of a good increases, that increase is itself an improvement in the quality of that good, although one that is manifest more in the selection available to consumers and less in any physical feature of one unit of that good today compared to a unit of that good from yesterday.

Work-Time Costs

In 1976, the average Canadian worker earned $5.30 per hour; the 2011 counterpart of that 1976 worker earned $23.30 per hour.

Table 1 shows, for each of a number of different familiar consumer goods available from Sears, the 1976 prices of these goods (in 1976 dollars) and the 2011 prices (in 2011 dollars). For each good, the 1976 price is then divided by the 1976 wage of $5.30 and the 2011 price is divided by the 2011 wage of $23.30. The results of each of these divisions is the number of hours the typical Canadian worker had to work, in each of the two years, to earn enough income to purchase the good in question. The last column shows the percentage change in work-time costs for each good.

The table, of course, has only a sample of the thousands of goods available, then and now, from Sears. Yet this sample is representative. And it shows that the work-time costs of the vast majority of consumer goods for middle-class consumers—from inexpensive clothing to expensive appliances—are today lower than they were in the 1970s. In many cases these costs today are *much* lower.

And, as noted above, *quality* differences are not adjusted for in this sample of goods. Adjusting for quality would produce an even more remarkable reduction in the work-time costs of acquiring these products—or, more precisely, in the work-time costs of acquiring the satisfaction, or utility, that consumers get from owning such products. It's very good that today the amount of work-time required to earn sufficient income to buy a television is 90 percent less than it was in 1976; it's even better when the higher quality—improved sound, far better picture, higher efficiency, and greater durability—of today's televisions is accounted for. Eighty-eight percent less work time than was required in 1976 buys today not only a television, but an incomparably improved television-viewing experience than was available back then.

For some products, quality over the years has not changed, or changed only a little. The quality of a quarter-carat diamond ring today is no higher (or lower) than it was in the mid-1970s, and the same is likely true for pairs of jeans (although the variety of cuts and colors of jeans has expanded). Hand-tool sets aren't *much* better today: a manual screwdriver today hardly differs from its counterpart of 40 years ago. But the number of different hand tools offered in the set sold today is slightly larger (75) than was the number (71) offered in a similar set sold in 1976. Likewise, women's gloves aren't that much better now than they were back then—but they do today come in a greater variety of colors. And the quality of today's weight-lifting bench isn't that much higher than that of such a bench four decades ago. When you buy a weight-lifting bench today, however, you also get a set of accompanying weights, while in 1976 you had to buy the weights separately.

Table 1: Work-Time Costs of Various Consumer Goods in 1976 and 2011

	1976		2011		
	Price ($)	Work-time cost (hours)	Price ($)	Work-time cost (hours)	Percent change in work-time cost (%)
Household appliances					
drip-coffee maker	49.98	9.4	69.99	3.0	-68
automatic dishwasher	489.98	92.2	399.97	17.5	-81
automatic clothes washer	459.98	86.6	469.70	20.6	-76
automatic clothes dryer	319.98	60.2	399.97	17.5	-71
refrigerator	729.98	137.4	499.97	21.9	-84
microwave oven	579.98	109.2	229.99	10.1	-91
conventional oven	279.98	52.7	399.99	17.5	-67
griddle	37.98	7.1	79.99	3.4	-52
portable room fan-heater	26.98	5.1	49.99	2.1	-58
toilet	44.98	8.5	139.99	6.1	-28
electric hair dryer	24.98	4.7	44.99	1.9	-59
Household furniture					
futon	134.98	25.4	299.99	12.9	-49
cushion chair	150.00	28.2	399.99	17.2	-39
sofa	269.98	50.8	849.99	36.5	-28
Household tools					
snow blower	368.00	69.3	399.99	17.2	-75
electric vacuum	69.88	13.2	89.99	3.9	-71
luggage with wheels	63.98	12.0	249.99	10.7	-11
hand-tool set	99.98	18.8	119.99	5.1	-73
electric 10" table saw	419.98	79.0	499.99	21.4	-73
Apparel					
women's jeans	17.00	3.2	39.99	1.7	-46
men's jeans	14.98	2.8	54.99	2.4	-16
long underwear	4.49	0.8	9.99	0.4	-49
woman's faux-fur coat	115.00	21.6	250.00	10.7	-50
man's leather coat	120.00	22.6	329.99	14.2	-37
women's leather gloves	15.00	2.8	49.99	2.1	-24
.25 carat diamond ring (14-carat gold)	266.60	50.2	999.9	42.9	-15
Sporting and entertainment goods					
boy's skates	18.98	3.6	39.99	1.7	-52
exercise bike	99.98	18.8	349.99	15.0	-20
billiards and table-tennis combo	299.98	56.5	599.99	25.7	-54
weight-lifting bench	89.98	16.9	299.99	12.9	-24
pocket camera	11.99	2.3	29.99	1.3	-43
high-quality camera with video recorder	309.94	58.3	199.99	8.6	-85
electric guitar	99.98	18.8	149.99	6.4	-66
clock radio	28.88	5.4	17.99	0.8	-86
stereo (with radio)	79.98	15.1	99.99	4.3	-72
television	599.98	112.9	269.88	11.6	-90

Notes: Work-time costs are calculated by dividing the price of the consumer good by the nominal average hourly wage in the respective year. The average nominal hourly wage was $5.30/hour in 1976 and $23.30/hour in 2011.

Some items were drawn from the 2010 Sears catalogue instead of the 2011 catalogue. Specifically, the following came from the 2010 catalogue: automatic dishwasher, automatic clothes washer, automatic clothes dryer, refigerator, conventional oven, and toilet.

Consumer goods on this list are selected on the basis of being common household goods that make for reasonable comparisons. Specifically, a comparison is made if goods have similar functions and, as much as possible, similar features in 1976 and 2011. For example, the price of a colour television from 1976 is compared to a colour television of approximately the same size from 2011. Where there are a number of options of similar comparable goods, the cheapest available item is selected for comparison. For example, the cheapest woman's jeans from 1976 are compared to the cheapest 2011 woman's jeans.

Sources: Sears Canada, 1976, 2010, 2011.

For some other products, though—such as the television mentioned above—the improvement in quality is extraordinary. Consider, for example, a home-music system. A typical 1976 system featured a stereophonic record player and AM-FM radio. Decent sound required large speakers. A home-music system today is incomparably different—and, for most consumers, incomparably better. Today's system has a compact-disc player (rather than a turntable) and a dock for an MP3 player, the speakers are smaller and produce better sound than those of 1976, and this system is digital. (While many high-end audiophiles insist that analog vinyl LPs are superior in quality to CDs and other digitized sources of recorded music, such superiority is far less likely for modestly priced systems of the sort that were, and are, available from Sears. For everyday music enjoyment, digitized systems—with their absence of the scratchy sounds of typical vinyl records, the availability of instant downloading of music, and other advantages—are for most middle-class consumers superior in quality to the analog systems that were dominant in the mid-1970s.)[22]

Perhaps even more dramatic than the improvement in sound systems is the improvement in photography. In 1976, all cameras available to middle-class consumers were film cameras. So the costs of photography included not only the price of the camera but also the price of each role of film and, in addition to that, the price of developing each role of film. Also, the quality of the overall "photographic experience" back then was much worse than is the quality of that experience today. A photo taken with a digital camera can be viewed immediately. If Aunt Yvonne's eyes were closed or little Billy suddenly stuck his tongue out mischievously, the photographer knows to tell his or her subjects to remain in place so that another photo can be taken. In addition, the number of photographs that can be taken with a digital camera is multiple times the number that can be taken with a film camera. And unlike photos taken with a film camera, photos taken with a digital camera can be easily cropped, color- and tint-adjusted, or otherwise "photoshopped" to turn them into something closer to the photographer's ideal. Finally, digital photos can be widely shared, in multiple forms, with people across the globe no less easily or quickly than with people across the room.

While theoretically—using hedonic pricing techniques[23]—quality changes can be factored into calculations of changes in the real prices of

22. The late economic historian Stanley Lebergott offered complementary evidence that supports, although it does not strictly prove, the contention that product quality (as judged by consumers spending their own money) is today higher than it was in the past: "But the array of available goods changes slowly. The high-button shoes of 1900 were still for sale in 1905. Vacuum tubes were stocked in the 1950s, even as transistorized appliances began to replace them. Twentieth-century consumers could therefore usually choose last year's budget items this year if they desired. Yet real consumer expenditure [in the US] rose in seventy of the eighty-four years between 1900 and 1984, as consumers continually switched to new goods. Such repetition reveals consumers behaving as if the newer goods did indeed yield more 'worthwhile experience.'" (Lebergott, 1993: 15)

23. See Maynes (1976).

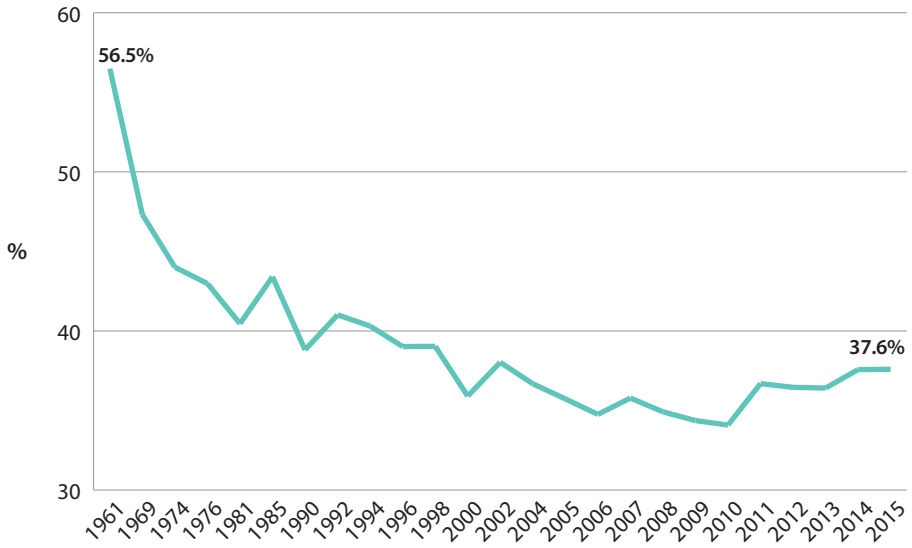
goods and services, in practice such a factoring in of quality changes can be at best imperfect. Most quality improvements are too small to be noticed and accounted for in official statistics. While, say, the addition of airbags to automobiles might be easily noticed, and while a more or less accurate "price" might be calculated for the value of this amenity, no such notice and price calculation occurs for the most common kinds of quality improvements—improvements such as slightly stronger plastic kitchen garbage bags, canned goods that can be opened with a pull-tab rather than with a can opener, and the more thorough washing of fresh vegetables available at supermarkets.

Most quality improvements that occur today in market economies are relatively small. Each is a tiny modification of an existing product (such as, to give another real-world example, the treatment of cotton swabs with an antimicrobial agent to make them even more sanitary than before). These modifications are each so small, and they occur with such regularity and in such large numbers, that statisticians cannot practically hope to document more than a fraction of them, much less to hedonically "price" each of these improvements. But this failure to capture in official statistics the value of these quality improvements does not render these improvements any less real or significant.

Detractors might object that goods, other than clothing, sold at Sears are of little significance compared to more essential goods, such as food and shelter. A starving family's well-being isn't meaningfully improved if economic growth enables them to acquire at lower costs only the likes of household appliances and sporting equipment. But in fact the percentage of income spent by the average Canadian family on basic necessities—food, clothing, and shelter—has fallen significantly over the past half-century. In 1976, the average Canadian family spent 43 percent of its income on these necessities; in 2011, it spent 36.7 percent, a decline of 6.3 percentage points (**figure 11**). This decline is powerful evidence that the cost to the average Canadian family of supplying itself with the basic necessities has indeed fallen.

And this decline in the cost of basic necessities is even more impressive in light of two additional facts. The first is that the quality and variety of these basic necessities has improved. The second is the steep decline, as documented above, in the costs of non-necessities such as cameras and televisions. Falling costs of non-necessities means that the percentage of the family budget that the average family today must spend to acquire the same quantity of non-necessities that it acquired in 1976 is lower. That the average family today in fact spends a higher percentage of its budget on non-necessities, even though the costs of non-necessities has fallen, underlines the great improvement in ordinary Canadians' material standard of living since the mid-1970s.

Figure 11: Expenditures on Basic Necessities (Shelter, Food, and Clothing) as a Percentage of Income for the Average Canadian Family, Select Years, 1961–2014



Source: Palacios et al., 2016.

Conclusion

Considered carefully, the empirical record reveals clearly that the living standards of ordinary Canadians have improved significantly since the mid-1970s. There has been no stagnation. Many of the data that are conventionally used to tell a story of stagnation are flawed. These data, in addition to being pre-tax and pre-transfer, are adjusted neither to account for changes in the average number of people living in Canadian households nor for quality improvements in the products available for sale to ordinary Canadians. Also, statistical illusions—most notably Simpson's Paradox—create an empirical mirage of stagnation.

When the data are rid of these flaws and interpreted appropriately, they show that the typical Canadian has a standard of living today that is approximately 50 percent higher than it was in the mid-1970s. That's a significant improvement in the material living standards of ordinary Canadians. Canada's middle class emphatically has not stagnated.

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7. Measuring the Distribution of Taxes in Canada: Do the Rich Pay Their "Fair Share"?

Charles Lammam, Hugh MacIntyre, and Milagros Palacios

Many people who are concerned about inequality often propose increasing taxes on upper earners. This is based, in part, on a mistaken impression that the country's top earners are getting away with paying relatively little tax. Governments, especially the current federal government, have fuelled this misperception, by invoking "tax fairness" to justify recent tax changes such as the creation of a new and higher top personal income tax rate of 33 percent—an increase from the previous top federal rate of 29 percent (Canada, 2017a). Indeed, tax fairness was a prominent theme in the 2017 federal budget, which even featured in the title of one of the chapters (Canada, 2017b). Most recently, the federal government used "tax fairness" to defend its proposed changes to how small businesses are taxed (Canada, 2017c). However, the reality of the distribution of taxes does not match the government's rhetoric. As this paper will show, top earners in Canada—collectively as a group—pay a disproportionate share of the country's taxes, particularly when compared to their share of total income earned.[1]

While proponents of raising taxes on top income earners almost never define what constitutes a "fair share" of the tax burden, this paper uses a definition of fairness based on the shares of taxes paid and income earned by various income groups. If the shares of taxes and income are equal, then this signals a fair distribution of taxes.

1. While there are some cases where top earners pay little (or no) tax, these cases are the exception rather than the rule. This paper looks at the entire group of top earners collectively (i.e. the top 20 or top 1 percent), and as a group top earners pay more tax than is proportionate to their income. For further discussion on the relatively few cases where top earners pay little tax, see <https://www.fraserinstitute.org/blogs/cbc-s-misleading-tax-analysis-a-disservice-to-canadians-and-the-inequality-debate>.

When examining all taxes from all levels of government in Canada, the paper finds that the top 20 percent of income-earning families is the only group that collectively pays a greater share of total taxes than their share of total income earned. Specifically, the top 20 percent earns 49.1 percent of the nation's income but pays 55.9 percent of total taxes—a difference of 13.9 percent. By contrast, families in the bottom 20 percent earn 4.1 percent of the nation's income while collectively paying just 1.8 percent of all taxes.

The top 1 percent of income earners is often targeted as the group that should pay higher taxes, so this group warrants special focus. However, the top 1 percent's collective share of total taxes paid (14.7 percent) is greater than its share of total income earned (10.7 percent). This amounts to a gap of 36.9 percent between the share of taxes paid and the income earned by the top 1 percent. Notably, over time, the top 1 percent's share of total taxes paid has increased from 11.3 percent in 1997 to 14.7 percent in 2017.

When looking at a subset of total taxes, namely personal income taxes, the imbalance between taxes paid and income earned is even larger for both the top 20 and top 1 percent. The imbalance is larger primarily due to the progressivity of Canada's personal income tax system, which taxes higher levels of income at higher marginal tax rates.

Specifically, the top 20 percent pays nearly two-thirds of all income taxes (64.4 percent) while earning approximately half of all income (49.1 percent). Put differently, the share of income taxes collectively paid by the top 20 percent is 31.2 percent larger than the share of income earned. Meanwhile, the bottom 20 percent pays 0.6 percent of all personal income taxes even though its share of total income is nearly six and half times larger (4.1 percent). The share of income taxes paid by the top 1 percent (17.9 percent) is more than two-thirds (67.1 percent) larger than the share of total income earned (10.7 percent) by this group.

Canada's top income earners currently pay a disproportionate share of taxes relative to the share of income that they earn. Those who advocate higher taxes on top income earners are, in effect, arguing that top earners should be paying an even more disproportionate amount of taxes. This raises the question of how much is enough in terms of taxes paid by top income earners.

But it is also important to recognize that taxes cannot be continually raised on top income earners without economic consequences. The reality is that higher tax rates would further erode Canada's tax competitiveness, discourage economically productive activity (work effort, savings, investment, and entrepreneurship), hinder the country's ability to attract and retain top talent, and dampen the incentives for income mobility.

The first section of this study defines what a "fair" distribution of taxes is and then measures the distribution focusing only on federal and provincial personal income taxes. The second section broadens the distributional analysis to include all taxes beyond simply personal income taxes, since personal

income taxes are just one of the many taxes that Canadian families pay. In doing so, this section assesses fairness in the overall tax system. The final section discusses the unintended economic consequences of further raising taxes on upper earners.

Measuring the Distribution of Personal Income Taxes

Discussions about tax fairness often focus on a particular form of taxation: personal income taxes. This is despite the fact that personal income taxes constitute approximately 34 percent of the total taxes that average Canadian families pay (Palacios et al., 2017).[2] Indeed, Canadians pay many more taxes other than simply personal income taxes. However, since raising personal income taxes on upper earners is often proposed as a "solution" for inequality, this section first presents data on the distribution of personal income taxes before presenting data on the distribution of all taxes paid by families.

To calculate the share of taxes paid by income group, the analysis relies on the Fraser Institute's Canadian Tax Simulator (2017). The Canadian Tax Simulator draws upon SPSD/M and other government sources to estimate the amount of taxes that Canadians pay to all three levels of government (federal, provincial, and local).[3]

While personal income taxes are applied to individuals, the analysis focuses on families.[4] One reason for this is that family income better reflects an individual's economic well-being than individual income. An individual family member may earn a relatively modest income but contribute to an overall family income that is relatively high. In other words, someone may not be in the top 1 percent of earners as an individual but may belong to a family that is part of the 1 percent. For example, someone with an individual annual income of $20,000 would be among the bottom half of the distribution among individual earners. But if that person were married to someone with $170,000 of annual income, he or she would actually be among the top 20 percent of income-earning families. Membership in a particular income group (i.e. lowest or highest earners) is best determined by family income.[5]

2. For further reference, personal income taxes constitute about half of total federal revenues and between 16 and 26 per cent of provincial revenues (Statistics Canada, 2017).
3. For more details on the Canadian Tax Simulator, see Palacios et al. (2017).
4. An economic family is defined as a group of individuals sharing a common dwelling unit and related by blood, marriage (including common law relationships), or adoption/guardianship. Unattached individuals are included as economic families of size 1.
5. As a robustness check, the results have been compared to an alternative data source, which ends in 2014, that divides Canadians into income groups as individuals instead of families (Statistics Canada, 2016). The results are largely similar to what was found for families using the Canadian Tax Simulator. For instance, the top 1 percent of individual income earners paid 20.5 percent of personal income taxes in 2014 and earned 10.3 percent of all income.

Distribution of Personal Income Taxes

Before presenting data on the distribution of taxes, it is important to define what a "fair" distribution is, especially since proponents of raising taxes on top income earners—including the federal government—almost never define what constitutes a fair share of the tax burden. In the absence of a definition, it is impossible to assess claims such as the "rich don't pay their fair share" or "the rich get away with paying little tax." This paper adopts the definition of proportionality for fairness when comparing the share of taxes paid by various groups to the share of total income that each group earns. If the shares of taxes and income are equal, then this signals a fair distribution of taxes.[6]

To examine tax fairness across the income distribution, the analysis divides Canadian families into five groups based on total income.[7] Each group contains 20 percent of families and is referred to as a quintile. The first quintile represents the bottom 20 percent of income-earning families and the fifth quintile represents the top 20 percent.[8] The income range for each quintile is shown in **table 1**.

Figure 1 displays the share of total income in Canada earned by families in each quintile and the share of federal and provincial personal income taxes paid by families in each quintile. The top 20 percent of income-earning families are the only income group that pays proportionately more in income taxes than they earn in income. Specifically, the top 20 percent pays nearly two-thirds of all income taxes (64.4 percent) while earning approximately half of all income (49.1 percent). Put differently, the share of income taxes collectively paid by the top 20 percent is 31.2 percent larger than the share of income earned.

In contrast, the bottom 20 percent pays only 0.6 percent of all personal income taxes even though its share of total income is nearly six and a half times larger (4.1 percent). Similarly, the third (or middle) quintile pays a smaller share of personal income taxes (10.6 percent) than its share of total income earned (14.9 percent).

In short, even though the top 20 percent earns a sizable share of total income, this group of income earners collectively pays an even larger—and disproportionate—amount of the country's personal income taxes. By the standard of proportionately, the highest income group is paying more than its fair share of personal income taxes.

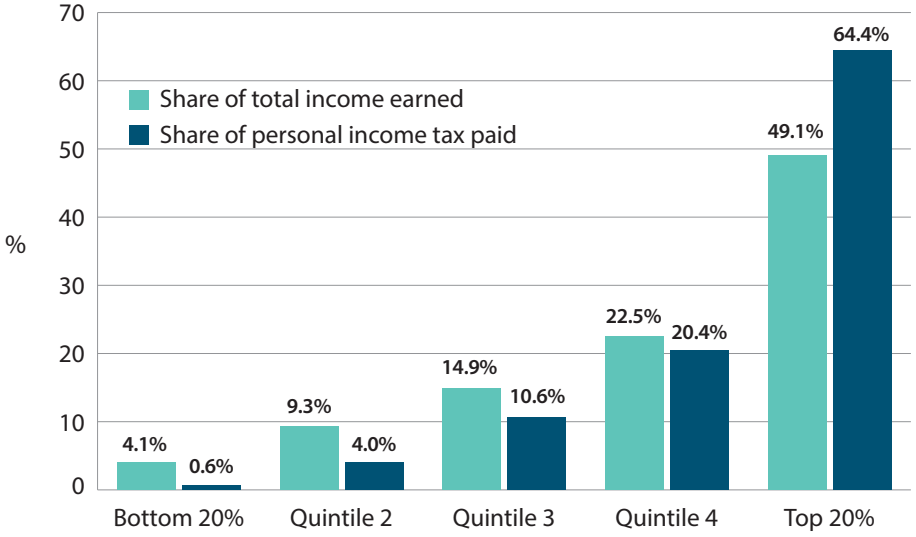
6. This definition of fairness is related to the concept of vertical equity, which refers to differences in how taxpayers of different income levels are taxed. This is distinct from horizontal equity, which refers to difference in how taxpayers of the same income level are taxed.
7. Total income includes income from market sources (employment/investment) and from government transfers.
8. An alternative, commonly used way to divide Canadian families by income is by decile (groups of 10 percent), and deciles were considered in an early stage of this analysis. However, quintiles are presented in the paper because they more clearly reflect the pattern found in the distribution of taxes in Canada. The top two deciles, which form the top quintile, are the only two deciles that pay a higher share of taxes than they earn in income.

Table 1: Family Income Range by Income Group

Income group	Income range
Bottom 20%	$45,299 or less
Quntile 2	$45,300 to $80,843
Quntile 3	$80,844 to $121,659
Quntile 4	$121,659 to $186,874
Top 20%	$186,875 or more

Source: The Fraser Institute's Canadian Tax Simulator, 2017.

Figure 1: Share of Personal Income Taxes Paid and Total Income Earned by Quintile, 2017



Note: Families are the unit of analysis in the calculations.

Source: The Fraser Institute's Canadian Tax Simulator, 2017.

The primary reason for this is that higher levels of income in Canada are taxed at progressively higher rates. For instance, the top federal income tax rate is 33 percent on individual incomes over $202,800, more than twice the rate (15 percent) paid on income below $45,916. Similar progressive tax structures exist at the provincial level. Moreover, while members of top-earning families are subject to higher personal income tax rates, many members of families in the bottom 20 percent pay no income tax at all. This is because the value of the tax credits and deductions they claim is equal to or greater than the amount of income tax they would have owed. For example, every taxpayer receives the federal basic amount, which means the first $11,635 of earned income is tax exempt. Someone making $11,635 or less would thus not have to pay any federal personal income tax.

Personal Income Taxes Paid by the Top 1 Percent of Earners

The top 1 percent of income-earners is often criticized in the inequality debate and targeted as the group that should pay higher taxes, so this group warrants special focus in our analysis of the distribution of taxes.[9] For example, the federal government has repeatedly pointed to measures it has undertaken to increase taxes on the top 1 percent of income earners in Canada as part of its plan for "tax fairness" (e.g., Canada, 2017a). Moreover, academics and non-government organizations have proposed raising taxes on the top 1 percent as a way to alleviate inequality.[10] These calls are partly based on the notion that the top 1 percent generally gets away without paying personal income taxes.[11]

In reality, Canadian families in the top 1 percent of earners as a group pay a disproportionate share of income taxes relative to their share of total income. Families in the top 1 percent pay 17.9 percent of federal and provincial personal income taxes while earning 10.7 percent of total income (**figure 2**). The share of income taxes paid by the top 1 percent is more than two-thirds (67.1 percent) larger than the share of total income earned. A similar pattern holds when looking at families in the top 5 and 10 percent of earners.[12]

In contrast, the bottom 50 percent of income earners in Canada pay a proportionately small share of income taxes relative to their share of total income earned. Specifically, the bottom 50 percent earn 20.2 percent of total income but pay 9.0 percent of personal income taxes. This means that the top 1 percent are collectively paying twice the share of personal taxes as the bottom 50 percent.

The top 1 percent not only pays a disproportionate share of Canada's personal income taxes, but its share of personal income taxes paid has been increasing over time. **Figure 3** displays the share of personal income taxes paid by the top 1 percent of income-earning families and this group's share of total income earned from 1997 (the first year of available data using the Canadian Tax Simulator) to 2017. In 1997, the top 1 percent paid 14.0 percent of personal income taxes, almost the same share (14.2 percent) as in 2005. However, after 2005 the personal income tax share of the top 1 percent generally increased, reaching 17.9 percent in 2017. This is despite the fact that the share of total income earned by the top 1 percent is essentially the same in 2005 (10.0 percent) as 2017 (10.7 percent).

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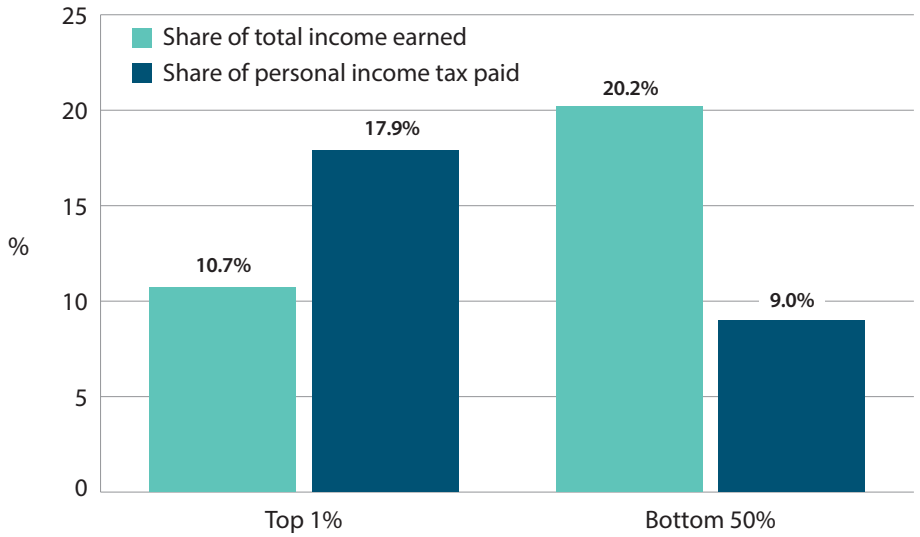
9. The 2017 threshold for Canadian families in the top 1 percent of earners is $646,720. Note that this threshold reflects the contribution of each member of the family to total family income, and not necessarily the income of individuals in the top 1 percent.

10. See for example Osberg (2015) and Broadbent Institute (2012).

11. For more discussion, see <https://www.fraserinstitute.org/blogs/cbc-s-misleading-tax-analysis-a-disservice-to-canadians-and-the-inequality-debate>.

12. The top 5 percent pay 35 percent of income taxes and earn 22.8 percent of total income. The top 10 percent pay 47.1 percent of income taxes and earn 33.1 percent of total income.

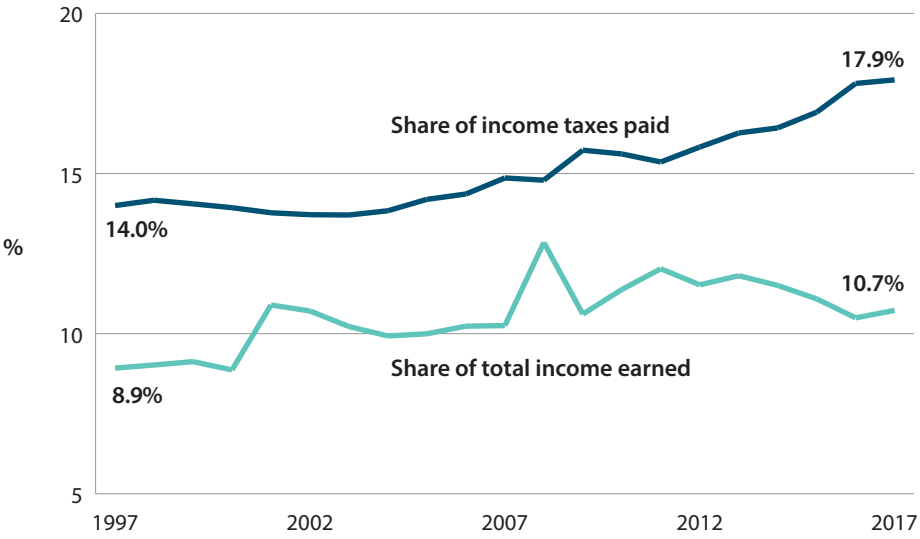
Figure 2: Share of Personal Income Taxes Paid and Total Income Earned by Top 1% and Bottom 50%, 2017



Note: Families are the unit of analysis in the calculations.

Source: The Fraser Institute's Canadian Tax Simulator, 2017.

Figure 3: Share of Personal Income Taxes Paid and Income Earned by Top 1% of Income-Earning Families, 1997–2017



Source: The Fraser Institute's Canadian Tax Simulator, 2017.

The gap between the share of personal income taxes paid and income earned by the top 1 percent has also been increasing over time. In 1997, the top 1 percent earned 8.9 percent of total income and paid 14.0 percent of personal income taxes—a difference of 56.9 percent. By 2017, that difference had increased so that the share of income taxes paid by the top 1 percent is 67.1 percent higher than the share of income earned. This means that the share

of taxes paid by the top 1 percent of income-earning families has grown more disproportionate over the past two decades.

One reason why top earners are paying a growing share of personal income taxes is that top personal income tax rates at the federal and provincial levels have been increasing (Lammam et al., 2016). At the federal level, the government created a new top personal tax rate of 33 percent in 2016, which now applies to individual incomes above $202,800. This is 4 percentage points higher than the previous top rate of 29 percent (which is still applied to incomes from $142,353 to $202,800). This tax rate hike comes on top of similar rate increases at the provincial level. For example, Ontario's top tax rate has increased from 17.41 percent in 2011 to 20.53 percent. Overall, the combined federal and Ontario provincial top personal income tax rate has increased from 46.41 percent to 53.31 percent. Top income earners in other provinces typically pay marginal income tax rates of nearly 50 percent or more.

Overall, the evidence shows that the top income-earning families (i.e. the top 20, 10, 5, and 1 percent) collectively pay a disproportionate share of personal income taxes relative to their share of total income earned. And the gap between the shares of personal income tax paid and income earned has been growing over time.

Measuring the Distribution of All Taxes

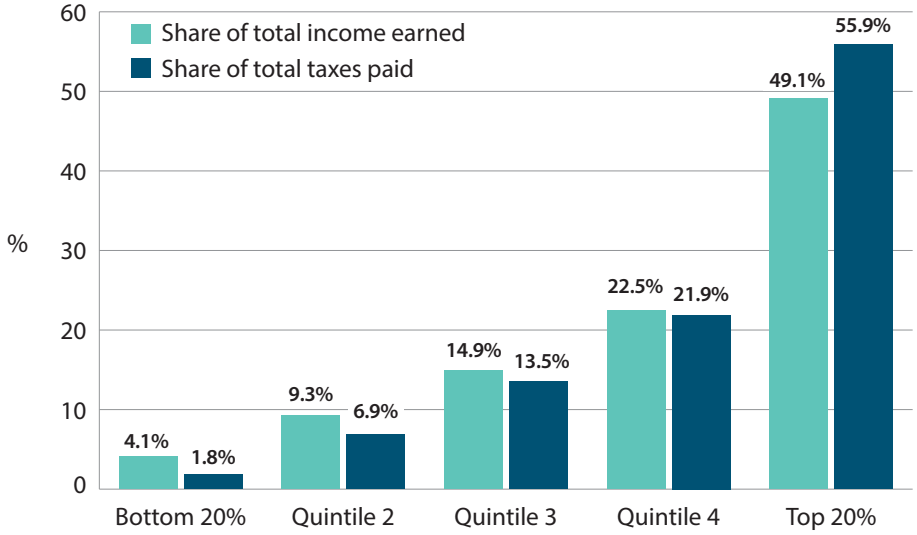
While discussions about "tax fairness" typically focus on personal income taxes only, this is just one of the many types of taxes that Canadian families pay. To more comprehensively measure the share of taxes paid by top earners—and to assess the overall fairness of the tax system—these other types of taxes must be accounted for. The Fraser Institute's Canadian Tax Simulator is used to calculate the share of all taxes paid by income groups. This includes the following taxes: income taxes, payroll taxes, sales taxes, property taxes, profit taxes, fuel taxes, carbon taxes, vehicle taxes, import duties, liquor taxes, tobacco taxes, and a host of other levies.

Distribution of Total Taxes

As was done with personal income taxes, the distribution of total taxes is measured by dividing Canadian families into five equally-sized income groups. The shares of all taxes paid and income earned for each quintile is displayed in **figure 4**. The income ranges for each quintile are the same as those displayed in table 1.

Similarly to personal income taxes in figure 1, the top 20 percent of families is the only income group that collectively pays a greater share of total taxes than it earns in income. Specifically, the top quintile pays 55.9 percent of all Canadian taxes and earns 49.1 percent of income. The gap between the

Figure 4: Share of Total Taxes Paid and Total Income Earned by Quintile, 2017



Note: Families are the unit of analysis in the calculations.

Source: The Fraser Institute's Canadian Tax Simulator, 2017.

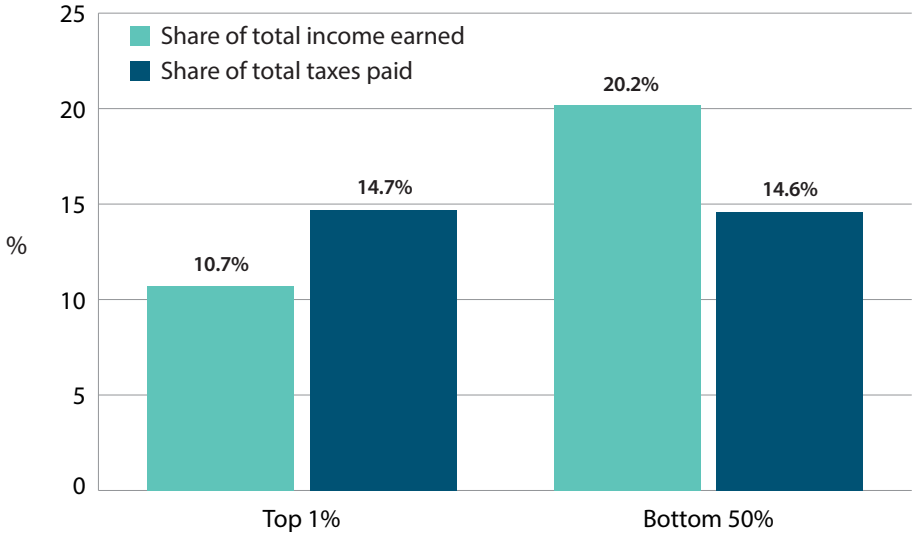
share of total taxes paid and income earned (a 13.9 percent difference) is less than the gap for personal income taxes (31.2 percent), reflecting the fact that personal income taxes are more progressive than most other forms of taxation in Canada. For every other quintile, the share of total taxes paid is less than the share of income earned. For instance, families in the lowest quintile collectively pay 1.8 percent of all taxes while earning a larger share of total income (4.1 percent). Indeed, Canada's overall tax system disproportionately taxes the top 20 percent of earners, which runs contrary to the misperception that top income earners in Canada are paying less than their fair share of taxes.

Total Taxes Paid by the Top 1 Percent of Earners

Figure 5 displays the share of total taxes collectively paid by the top 1 percent of income earning families compared to the bottom half of Canadian families. As a group, the top 1 percent pays 14.7 percent of all taxes, compared to earning 10.7 percent of all income.[13] That is a difference of 36.9 percent, again less than the difference with personal income taxes (67.1 percent). Notably, the share of taxes paid by the bottom 50 percent is approximately the same (14.6 percent) as the share paid by the top 1 percent. However, the bottom 50 percent earns twice the share of total income (20.2 percent) than the top 1 percent. The concern that top earners, as a collective group, are not paying their fair share is clearly misplaced.

13. A similar pattern is observed for families in the top 5 percent and 10 percent of earners. Families in the top 5 percent of earners pay 28.8 percent of all taxes and earn 22.8 percent of total income. Families in the top 10 percent pay 39.6 percent of all taxes and earn 33.1 percent of total income.

Figure 5: Share of Total Taxes Paid and Total Income Earned by Top 1% and Bottom 50%, 2017

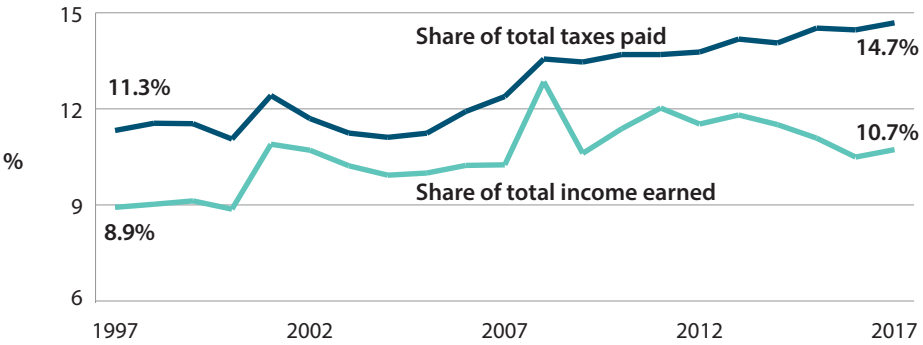


Note: Families are the unit of analysis in the calculations.

Source: The Fraser Institute's Canadian Tax Simulator, 2017.

In addition, the share of total taxes collectively paid by the top 1 percent has been increasing over the course of two decades. **Figure 6** displays the share of total taxes paid and total income earned by the top 1 percent of income-earning families from 1997 to 2017. Over that period, the share of total taxes that the top 1 percent pay has increased from 11.3 percent in 1997 to 14.7 percent in 2017. This represents a growing share of the tax burden being borne by the country's highest income-earning families. Moreover, the difference between the share of total taxes paid and total income earned widened from 26.9 percent to 36.9 percent over the same period.

Figure 6: Share of Total Taxes Paid and Income Earned by Top 1% of Income-Earning Families, 1997–2017



Source: The Fraser Institute's Canadian Tax Simulator, 2017.

Economic Consequences of Increasing Taxes on Top Earners

Canada's top income earners are currently paying a disproportionate share of total taxes relative to the share of income that they earn. Those who advocate higher taxes on top income earners are, in effect, arguing that top earners should be paying an even more disproportionate amount of taxes. This raises the question of how much is enough in terms of taxes paid by top income earners. But it is also important to recognize that taxes cannot be continually raised on top income earners without economic consequences.

Consider the economic consequences of further increasing marginal income tax rates on upper earners, which is the main driver of progressivity in Canada's tax system. Doing so would further discourage individuals from undertaking productive economic activities such as working, saving, investing, and being entrepreneurial (Murphy et al., 2013). This is because higher marginal tax rates reduce the reward that individuals receive from earning more income. Since earning more income generally involves effort and/or risk taking, reducing the after-tax benefits makes such endeavors less worthwhile for many individuals.

Discouraging productive activities such as entrepreneurial risk taking has widespread implications for Canada's economy. Entrepreneurship leads to innovation, which results in novel ways of combining resources to better serve customers through new and improved products and services. By reducing the rewards to risk taking, higher marginal tax rates hinder innovation and this hampers productivity growth. Productivity is a key driver of long-term economic growth and the compensation of workers, so higher marginal tax rates ultimately negatively affect the prosperity of Canadians.

There are also implications for Canada's competitiveness as a place to work and do business. Raising marginal tax rates on upper earners makes it harder for Canada to attract and retain highly skilled, educated workers such as business professionals, scientists, doctors, and engineers. Canada is part of a global marketplace that competes for top talent and tax rates play a role in the decision of where highly skilled workers choose to live and work (Kleven et al., 2013; Akcigit et al., 2015). In this regard Canada is already at a competitive disadvantage, with one of the highest top marginal tax rates among industrialized countries—in fact, 8th highest of 35 countries (OECD, 2017).

Taxing top income earners may appear to be a simple solution to inequality but it comes with considerable costs. Further increases to marginal tax rates on upper earners would have deleterious consequences on the economy and the general prosperity of Canadians. And the evidence suggests there will be little gained in terms of reducing inequality.[14] In addition, higher marginal tax

14. For instance, Milligan and Smart (2015) found that increasing the highest provincial income tax rates by 5 percentage points would yield only a 6 percent reduction in the concentration of income in the top 1 percent.

rates on upper earners send a negative signal—that success will be penalized with higher rates—to Canadians who are currently not part of the top 20 or top 1 percent. By discouraging those in lower income groups from becoming top earners, higher marginal tax rates discourage income mobility.

Conclusion

Raising taxes on top income earners is often proposed as a solution for reducing inequality in Canada. This argument is fueled, in part, by a misconception that top income earners are not paying their fair share of taxes. However, the reality is that top income earners already collectively pay a disproportionate, and growing, share of both personal income taxes and total government taxes. Proponents of raising taxes on top earners must recognize that there are considerable economic costs to such policies.

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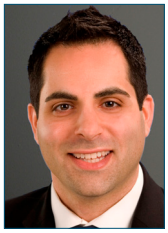

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