Income Inequality in Canada: The Role of Immigrants

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Abstract

In this paper, I replicate and update the work of Moore and Pacey (2003). Specifically, I examine the role of immigrants in changes in income inequality in Canada using the Census of Population for households for the 1990 to 2005 period. I find that recent immigrants experience the greatest level of inequality in the population compared to non-immigrants and longer-term immigrants. They contribute to the rise in income inequality, particularly in major cities such as Toronto and Vancouver where the concentration of immigrants is higher. My results also suggest that higher potential years of experience are linked to higher inequality levels for recent immigrants in Canada.

1. Introduction

There appears to be a growing consensus on the increasing trend of income inequality in developed countries over the last decades. According to a recent report published by the Organisation for Economic Co-operation and Development (OECD) in 2008, income inequality has increased substantially in developed countries such as Canada, Germany, Norway, the United States, Italy, and Finland since 2000. Furthermore, the 1970s and 1980s optimistic views about immigrants benefiting their host country are being questioned. This is due to their performance in the labour market in many western countries, as well as their reliance on social assistance (Ostrovsky 2012).

Using the Canadian Census of Population data for the period 1980-2000, Frenette, Green, and Milligan (2007) examine the trend of after-tax income inequality and they find evidence of steady growth in after-tax income inequality over the 1980s and 1990s. In addition, they find substantial increases in after- tax income inequality for the last decade leading up to 2000. Built on evidence such as rising income inequalities in Canada and using the Canadian census data covering the 1980 to 1995 period, Moore and Pacey (2003) aim to answer an important question; Whether or not immigrants make a significant contribution to this so-called rising income inequality? They find that recent immigrants play a key role and their most noticeable contribution to income inequality over the period of study is in the first half of the 1990s when Canada was experiencing a high level of immigrant inflow.

In this paper, I replicate and update the work done by Moore and Pacey (2003) who mainly try to identify the role played by immigrants in changes to income inequality in Canada. Using the public use micro-data on households' income from the Canadian Census of Population, I start by replicating their results for the 1990-1995 period. Subsequently, I update the results by expanding the period of study and taking advantage of the censuses 2001 and 2006. Then, I go one step further and study the relationship between inequality among recent immigrants and their potential years of experience.

First and foremost, my findings support the validity of the hypothesis that recent immigrants have contributed to rise in income inequality over the past two decades. Second, those immigrant cohorts that have stayed in Canada less than five years (i.e. recent immigrants) are the most vulnerable sub-group to income inequality over this period. Third, among all the age sub-groups, elderly recent immigrants have been the most disadvantaged group compared to longer-term immigrants and non-immigrants. Fourth, Toronto and Vancouver turn out to be major cities that contribute the most to change in income inequality in Canada since they are home to many immigrants. One could normally expect that Ontario and British Columbia, embracing these major cities, rank highest in contribution of immigrants to change in income inequality. Finally, I conclude that a higher number of years of potential experience is associated with higher levels of inequality for recent immigrants.

The rest of the paper proceeds as follows. In the next section, I review the relevant literature. Data used for the analysis is described in section three along with a brief discussion of summary statistics. Section four discusses inequality measures. Results will be presented in section five. Following a robustness check of the results in section six, section seven concludes.

2. Literature Review

In this section, I start by a brief exposition of the Canadian income inequality literature. Following that, I will look at the literature on the earnings of Canada's immigrants to motivate the objective of this paper, i.e. studying the role of immigrants in income inequality in Canada. Finally, I seek to look at an example of the American income inequality literature with regards to immigrants.

Amongst those who use the survey data to examine income inequality in Canada, Heisz (2007) studies the trends of family after-tax income inequality for the period 1976-2004. Given the rising trend of inequality over the recent years, he makes an attempt to examine if this evidence is due to a relatively less successful redistribution system or it is derived by an increase in the family market income inequality. In order to do so, he employs the Survey of Consumer Finances (SCF) for the first half of the period of interest (i.e. 1976-1997), and then the Survey of Labour and Income Dynamics (SLID) for the second half starting from 1993; since the SLID has been substituted for the SCF by Statistics Canada since 1996. As it is widely common in the literature, he takes the family size into account and adjusts the family income by assigning each member of the family an income equal to the total family income divided by the square root of the family size. He then refers to it as the adult-equivalent-adjusted (AEA) value. This enables one to take into consideration the economies of scale stemming from a large family size. Furthermore, this enables the researcher to conduct their research at the individual level. He also excludes economic families that include more than one census family. In order to weight individuals, he uses the product of economic family weights and the number of persons in the economic family. The main conclusion he draws from the analysis confirms a relatively stable family after-tax income inequality over the 1980s. That is, the family income was more equally distributed among people during the 1980s. However, starting from the late 1980s the family income inequality begins to rise.

Frenette, Green, and Picot (2006) study family income inequality with their focus of attention being on the evolution of inequality over the 1990s in Canada. What makes such exercise challenging over this particular period compared to other periods is the issue of data comparability and consistency and the choice of income data source among the three different available datasets: the survey data, the tax data, and the census. The survey data refers to the combination of the SCF up to 1996 and the SLID from 1996 which replaced the SCF. The tax data, commonly referred to as T1 Family Files (T1FF), provides income estimates from 1992 to 2000 while it also benefits from no discontinuity. Another advantage of the T1FF is its high coverage and large size. The final income data source is the census data which is available every five years; and similar to the T1FF, if not better, benefits from high coverage and large size. One characteristic that makes the census data more appealing to the researchers is the fact that although it is available only quinquennially, years 1980, 1990, and 2000 are comparable in terms of their business cycle positions. The census data resembles the survey data in data collection and the tax data in coverage. The disadvantage of the census, however, is that it has no information on income taxes available to the researchers and therefore, only gives post-transfer and pre-tax income data at best. In other words, the census is unable to answer questions with respect to the impact of changes in the tax system and the effectiveness of the Canadian income redistribution system.

Although all these three income data sources show an increasing trend in income inequality over this period, one can observe substantial differences in terms of the magnitude and timing of the peaks and troughs they predict. Hence, finding a perfect dataset that tells the closest story to reality is a big challenge for an economist who aims to study income inequality over the 1990s. For that reason, the goal of their paper is to put the pieces from different data sources together to provide the readers with a more comprehensive and accurate picture.

According to Frennet, Green, and Picot (2006), the survey data shows a slight increase in after-tax income inequality in this period. The tax data on the other hand, reflects considerably larger increases in the market income inequality originating from rises at the top end of the income distribution as well as a significant fall in the bottom end. For the reason mentioned earlier, i.e. the lack of tax information in the census, then they have to compare the results of pre-tax income inequality from the survey data and the tax data with the census data. Although the bottom end of the distribution in the census data is more similar to the tax data, the trend in income inequality suggested by them is not the same. In other words, the census data reflects a substantial increase at the top end, but this increase gets counterbalanced by an equal rise at the bottom end of the income distribution. Comparing the census and the survey data, one observes no substantial differences as they suggest a slightly increasing trend of income inequality.

For an extended period of time and in a more recent study, Frenette, Green, and Milligan (2007) examine the trend of after-tax income inequality for the period 1980- 2000 using a new data set they construct based on the census data. Built upon their previous work, i.e. Frenette, Green, and Picot (2006), they argue that the existing datasets do not divulge the most accurate image of income inequality since the top and bottom ends of the income distributions are likely to neglect important information that may lead to a misinterpretation of reality. This calls for constructing a dataset that is able to meet such concerns. Consequently, they present an exercise which leads to the introduction of a new dataset, what they call the Census After-Tax dataset (Census-AT), derived from the census.

As mentioned earlier, one major shortcoming of the census prior to 2006 is the fact that it lacks information on taxes paid. In order to solve this problem and using the administrative tax data, Frenette, Green, and Milligan (2007) first estimate the regression coefficients from regressing taxes paid on the family characteristics that are commonly collected by both the tax data and the census. Then, they use those characteristics from the census to predict the taxes paid by each census family. This exercise allows them to obtain the disposable income and assess the validity of the evidence suggested by the existing datasets. While the Census-AT dataset suggests a steady growth in income inequality over the 1980s and 1990s, it records a relatively constant trend of disposable income inequality. It also points out to a substantial increase in disposable income inequality over the years leading to 2000.

Using the Census-AT dataset introduced in their previous work, Frenette, Green, and Milligan (2009) in their more recent work shed some light on the role of the changes in the tax and transfer system reforms introduced in 1980s and 1990s on inequality (now that they have access to the disposable income over an extensive period). They find that following a relatively stable after-tax income inequality in the 1980s, Canadians enjoyed the most successful redistributive tax and transfer system in 1995. In addition, in spite of the less redistributive nature of the tax and transfer system in 2000 relative to that of 1995, one can claim that the tax and transfer system in 2000 is still more redistributive than that of the 1980s. One other appealing conclusion drawn by this study is that most of the policy reforms with respect to the tax and transfer system have occurred at the provincial level. For instance, surtaxes on high-income earning individuals were first introduced at the provincial level in the late 1980s which then was eliminated in the late 1990s. It is also worth noting that the conclusions from this study which are drawn using the Census-AT dataset is aligned with those of Heisz (2007) which mostly is based on the survey data.

In a comparison study, Wolfson and Murphy (1998) perform an examination to evaluate Canada and the United States in terms of income inequality in the 1980s and 1990s. The objective of the paper is to determine if globalization leads to the convergence of income inequality between the two countries given that they are homogeneous in many aspects. Adjusting for the purchasing power parity, they find that in 1995, Canadians were better off than their American counterparts comparing their family incomes.

Since the objective of this paper is to focus on the role of immigrants in income inequality, the rest of this section seeks to review that part of the literature that examines the earnings' of Canada's immigrants relative to that of the Canadian born to motivate why there are concerns towards immigrants with respect to their contribution to income inequality. Green and Worswick (2010) for example, examine entry wage differentials for Canadian immigrants for the past three decades. They use the Immigrant Database (IMDB), a unique administrative dataset while they use the SCF and the SLID for their Canadian-born counterparts. They find that it is not only immigrants who experience declines in entry earning; new entrant natives are also challenged with these declines.

This shows a change in the Canadian economy which is not unique to immigrants. They also show that declines in returns to foreign experience are able to explain the declines in entry earnings across immigrant cohorts.

Likewise, Aydemir and Skuterud (2005) study the reasons why immigrants may experience lower entry earnings using Canadian census data.[1] They contribute to the literature by controlling for immigrant's knowledge of official languages and place of birth and find no significant decline in the return to foreign schooling for neither male nor female immigrants. However, they observe deterioration when it comes to the return foreign labour market experience, mostly amongst male immigrants. Interestingly, they show that lower returns to foreign labour market experience can roughly explain almost one-quarter to one-half of such deterioration.

Boudarbat and Lemieux (2010) in their paper, study the deteriorating immigrant to Canadian born mean wage ratio over the last two decades and they argue that this indicator is not enough to reveal the economic performance of immigrants. In order to obtain a more accurate picture, they compare the whole wage distribution of immigrants to that of the Canadian born and subsequently conclude that one should mainly concentrate on the bottom of the wage distribution. That is, the bottom end of the wage distribution can explain a large portion of the change in the gap between immigrants and the Canadian born labour workers, while this is not the case for the top end. This highlights the role of the large group of immigrants who have low earnings and are likely to affect the result of my paper. Following that, they show that this gap can be explained by elements such as experience, education, and country of origin of immigrants.

Therefore, one appealing exercise in studying income inequality in Canada and other immigrant-receiving countries would be the disaggregation of income inequality measures in order to answer the following questions; whether or not the deteriorating earnings' of immigrants in Canada has to

[1] They use the 1981, 1986, 1991, 1996, and 2001 Canadian Censuses of Population.

do with income inequality. That is, if the decreasing trend of the immigrant to Canadian born earnings ratio makes Canada's immigrants a disadvantaged group suffering from the inequality. If so, are any specific sub-groups of immigrants, whether in terms of the cohort or age range, more vulnerable? Are Canadian provinces and major cities that are known to be home to immigrants suffering more from inequality?

Moore and Pacey (2003) are among those who have focused on the issue of income inequality not only at the national level, but also in terms of different subgroups trying to answer the above questions. For instance, they study income inequality across individuals with different immigration status. Using the pre-tax household equivalized income data from the census for the years 1980, 1985, 1990 and 1995, they manage to disaggregate income inequality in Canada across some specific sub-groups. One of their main findings with respect to immigrants is that recent immigrants play a key role in inequality in Canada. They find that the contribution of the immigrants to inequality in Canada is most noticeable over the first half of the 1990s where high levels of immigration coincide with economic recession. According to Moore and Pacey (2003) during this period, recent immigrants explain 46% of the rise in inequality at the national level. For the same reason, Toronto and Vancouver, two metropolitan areas that were the first-choice destinations of immigrants in that period, experienced a twice the growth in inequality.

In the case of the US, Reed (2001) investigates the role of recent immigrants by looking at the earnings distributions of men. One important characteristic of immigrants to the US as opposed to those who immigrate to Canada is that the former are considerably less educated than the average native population. For that reason, recent immigrants are over-represented in the low-earning workforce. Using the Current Population Survey (CPS) as well as the Census he argues that immigration contributes to the increasing trend in inequality in the US through the channel of the structure of the workforce. That is, immigration leads to an increase in the size of the low-earning population.

Two general conclusions can be drawn from reviewing the literature on income inequality in Canada and the earnings' of immigrants compared to the Canadian-born. First, after a relatively stable trend of inequality over the 1980s, and early 1990s, inequality rises substantially during the mid-1990s. Also, the earnings' of Canada's immigrants are lower than those of the Canadian-born, mainly due to the lower return to the foreign work experience. Putting these two evidences together, this paper seeks to examine if the presence of immigrants leads to a more unequal society in Canada as their earnings are not as high as their Canadian counterparts ceteris paribus. Moreover, another contribution of this paper to the literature is to take advantage of the most recent Canadian Census of Population, i.e. the 2006 census, to perform such examination.

3. Data

The source of data used in this study is the Canadian Census of Population, Public Use Micro-data File (PUMF) for households for the following years: 1991, 1996, 2001, and 2006.[2] The Canadian Census of Population provides a rich and detailed collection of information on many different characteristics of Canadian population such as demographic, socio-cultural, housing, income and labour economic activities.[3] The PUMF for households contains a sample size of approximately 3%, 2.8%, 2.7%, and 1% of the total Canadian population for the census years 1991, 1996, 2001, and 2006 respectively. It comprises all private households living in occupied dwellings on census day excluding those located on Indian reserves or Indian settlements. In addition, those who were living in collective dwellings, or outside Canada, or were among temporary visitors or foreign residents are eliminated. A household includes economic families

[2] It is worth noting that the income reported in each census year refers to the income earned by households in the previous year. For that reason, all Tables and figures presented in this paper are ordered based on the income year.
[3] The data set was accessed through the Ontario Data Documentation, Extraction Service and Infra-Structure Initiative (ODESI) database.

based on Statistics Canada's definition as well as the unattached individuals living with them.[4] That is, an unattached individual living alone is considered as a household of size one.

The dataset provides a unique opportunity to examine various hypotheses with respect to immigrants in Canada since it provides its users with the legal citizenship status of the respondents not to mention its large size and high coverage. In addition, the PUMF gives researchers the opportunity to study different aspects of immigrant-related subjects in terms of the metropolitan area or the province they reside in. Moreover, the PUMF is the most consistent available dataset over time with the above characteristics regardless of the minor adjustments that have been made by Statistics Canada.[5]

The census dataset also has a few of shortcomings. One drawback is that it lacks information on taxes paid, except for the most recent census, i.e. census 2006. Hence, one can only discuss changes over time in pre-tax income inequality.[6] The second drawback is that the census is only conducted on 5 years intervals. However, this is not problematic when studying long term periods since there are enough points in time that are also comparable in terms of business cycle.

The following restrictions have been imposed to the sample. First, only households whose primary household maintainer is 25 or above are considered. Second, non-permanent residents are excluded. Third, negative and zero values of equivalized income are removed from the sample when calculating the inequality measures; and finally, households with missing household size values are dropped from the analysis. It is also worth mentioning that the restrictions for categorizing the sample, such as age, immigration status, and etc., are based on the characteristics of the primary household maintainer in order to follow Moore and Pacey's (2003) approach.

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[4] The definition of the economic family will be presented in the robustness check section where the results of the household income inequality are compared to those of the economic families.

[5] Frenette, Green, and Milligan (2007) believe that the census data are superior to SCF/SLID data because of its high coverage. This provides the researchers with distribution that is more reliable in terms of the tails of the pre-tax income distribution. The census data are also preferable to tax data since it has been available a longer period of time.

[6] One could potentially use the Census After-Tax (Census-AT) dataset as proposed in Frenette, Green, and Milligan (2007) to discuss after-tax income inequality. This approach, however, is beyond the scope of this paper.

It is worth noting that the age restriction is imposed in order to allow for comparability of the results between my paper and those of Moore and Pacey (2003). They impose such constraint on their sample in view of the fact that the role of students in households where the student is financially responsible is not explicitly specified in the 1981 census. In addition, the time allocation between studying and working for a student is ambiguous, and therefore, including those under 25 may result in misleading outcomes.

Prior to the 1991 census, i.e. in 1981 and 1986, only one person could be indicated as the primary household maintainer. As of 1991, however, more than one person could be counted as household maintainer if they were 15 years old and above and related to person 1.[7] A primary household maintainer is defined as someone who pays the rent, the mortgage, property taxes, bills, and so on for the dwelling. If no person in the household is responsible for such payments, person 1 is considered to be the only household maintainer. The same applies if there is more than one household maintainer. For the 2006 census a variable called Primary Household Maintainer Indicator identifies if an individual should be considered as a primary household maintainer.

As of 1991, non-permanent residents are numerated in the census. Based on the definition presented by Statistics Canada, the non-permanent resident status refers to those who hold a student or employment authorization, Minister's permit and refugee claimants and their families. For the purpose of this study non-permanent residents are excluded from the analysis. The goal of this paper is to provide a comparison between immigrants and native Canadians in terms of their contribution to income inequality.

In dealing with immigrants, the "recent immigrant" status has been given to those landed immigrants that it has been 5 years or less since their arrival to the country. A landed immigrant is a person who has been granted the right to live in Canada permanently by immigration

[7] Person 1 is the first one listed in the census questionnaire and is also the one who is considered as the primary household maintainer

authorities. Appropriately, the sample is divided into three subcategories where respondents are either amongst non-immigrants, longer-term immigrants, or recent immigrants. A non-immigrant is also a person who is a Canadian citizen by birth. Those who do not belong to any of the subcategories, such as non-permanent residents or missing cases are excluded.

I start by using the total household pre-tax income as it is common in the literature.[8] Then, to capture the impact of household size on standards of living and quality of life and to compensate for economies of scale present in larger households, I use the equivalized income for each household using the following formula.

$$Household\ Equivalized\ Income = \frac{Household\ Income}{\sqrt{Household\ Size}} \tag{1}$$

This brings the level of study to individuals. Said differently, this brings the unit of observation to individuals. For example, a household including four individuals with the total household income of \$70,000 has an equivalized income of \$35,000 (i.e. $\frac{70{,}000}{\sqrt{4}}$).

In calculating the inequality measures prior to 2006, household size is the only weight variable used to weigh the equivalized income. This brings the level of study to individuals while using information only on primary household maintainers from the household's dataset.[9] Back to the example of the family of 4, the equivalized income of \$35,000 will be weighted by a factor of 4; i.e. the household size. The weight provided by the census is not used in my paper as it assigns a constant weight to all of the observations and accordingly, taking it into account would not change the results at all. [10]

[8] More precisely, it is common that when the unit of observation is not individuals (i.e. families or households instead) the size of the family/household is taken into account. Frenette, Green, and Picot (2006) and Heisz (2007) are examples that look into economic family and account for the economic family size while Moore and Pacey (2003) examine households and take the household size into consideration.
[9] In case of the 2006 census, the data is already presented at the individual level.
[10] The census weight, however, enables the researchers to obtain population measures where the interest is in counts.

For the year 2006 the inequality measures are calculated without taking the weight into account as the design of the 2006 PUMF is different from the previous ones. In the 2006 PUMF, each record in the dataset represents an individual and reports his/her corresponding income instead of a household and its corresponding total household income. This ensures that each household member (i.e. individual sharing the same household identifier) will be counted without considering the weights. Suppose that in the household of 4 mentioned earlier with the total household income of $100,000, person 1 has had an annual income of $20,000 in year 2005. This number for person 2 has been $21,000, for person 3 $22,000, and for person 4 $7000. Since each record in the 2006 PUMF represents an individual, the equivalized income of $35,000 assigned to each person will automatically be counted 4 times. Therefore, there is no need to use the household size as a weight.[11]

Table 3 presents descriptive statistics on equivalized income for household heads aged 25 and above since 1990 to 2005 categorized by the immigration status of the respondents. It reveals a huge gap between the equivalized income gained by an average non-immigrant or longer-term immigrant individual and a recent immigrant individual. At the last column of the table 3, where the income ratio of non-immigrants to recent immigrants is calculated, one can observe that there has always been a significant income difference between the two groups during the last two decades. Such observations support the hypothesis that recent immigrants contribute substantially to the rise in income inequality in Canada. This is also aligned with the human capital theory predictions in the sense that it assumes immigrants invest the first years after their arrival in acquiring country-specific human capitals.

[11] However, there is a numerically equivalent approach to the one used in this paper. One could use the adjusted income for only one person in each household, say primary maintainer of the household, and weight that observation by the household size.

4. Inequality Measures

In this section I provide a short discussion of income inequality measures used in the economic inequality literature. In order to characterize the dispersion of a variable, it is common in statistics to use the variance or its square root, the standard deviation. One drawback to using the variance of income in the context of inequality is that the variance is not scale invariant. Suppose in an economy of two individuals, a low income of \$5,000 and a high income of \$10,000 are reported. In this case, the standard deviation will be equal to 2,500. Now suppose both incomes increase by a factor of 2, i.e. to \$10,000 and \$20,000 respectively. The standard deviation will now be equal to 5,000. This implies that inequality in this economy will be doubled as well and therefore it can be interpreted as a rise in inequality. This can be problematic because the discussion of inequality for the same country in different currencies would lead to different results. In other words, an inequality measure needs to be independent of the unit in which income is measured. For this reason, it is necessary to employ scale invariant measures of inequality. One commonly used measure is the coefficient of variation which is equal to the standard deviation divided by the mean, i.e.

$$CV = \sqrt{\frac{(y_i - \bar{y})}{\bar{y}^2}} \tag{2}$$

where y is the income of the i^{th} individual and $\bar{y}$ is the average income.[12] The coefficient of variation is top-sensitive.

Another example of a widely-used scale invariant inequality measure is the log percentile ratios. The log of the ratio of the 50^{th} percentile to the 10^{th} percentile of the income distribution, for example, captures inequality movements in the lower half of the distribution, while the log of the ratios of the 90^{th} percentile to the 50^{th} percentile of the income distribution captures the movements in the upper half. Simple but useful, the log percentile ratios are effective when

[12] In some cases, the coefficient of variation squared is reported in economic paper instead.

interested in the tails of the income distributions. Frenette, Green, and Milligan (2007) and Frenette, Green, and Milligan (2009) mainly rely on the log percentile ratios to study changes in Canadian inequality.

One can also point out the exponential measure of inequality which can be calculated using equation (3) where N is the number of observations. The latter is sensitive to the changes in the bottom of the income distribution.

$$exp = \sum_i^N \frac{1}{N} \exp(\frac{-y_i}{\bar{y}}) \qquad (3)$$

Mathematically derived from the Lorenz curve, the Gini coefficient is a measure that is more sensitive to changes in the middle of the income distribution.[13] The Gini coefficient ranges from 0 (perfect equality) to 1 (perfect inequality) and graphically, is equal to the ratio of the area enclosed by the Lorenz curve and the perfect equality line to the total area below that line.[14]

$$G(Y) = 1 - 2 \int_0^1 L(p; Y) dp \qquad (4)$$

Reed (2001) uses the Gini index as well its growth over time in his paper to study inequality in the US. One could also point out to Frenette, Green, and Picot (2006) and Heisz (2007) who take advantage of the coefficient of variation, exponential measure of inequality and the Gini index to discuss income inequality in Canada.

While the Gini coefficient has many appealing characteristics, it is not easily decomposable when one is interested in studying the sources of inequality. The Theil index of inequality, classified as a bottom-sensitive index, allows for the decomposition of inequality between and within different sub-groups. Another measure that is sometimes used in inequality discussions is the Atkinson

[13] The curve sorts all of the observations and plots the cumulative percentage of the population (on the horizontal axis) against the cumulative percentage of income (on the vertical axis).

measure which is also more sensitive to the changes occurred at ends of the income distribution. The above mentioned inequality measures can be calculated using below formulas respectively.

$$T(Y) = \sum f_i.(\frac{Y_i}{\bar{Y}})\log(\frac{Y_i}{\bar{Y}}) \tag{5}$$

$$A(Y) = 1 - \frac{1}{\bar{Y}}\sum f_i.\log(Y_i) \tag{6}$$

where N is number of the individuals (or in the case of this paper households), and $f_i = \frac{w_i}{N}$ with $w_i$representing the weight.

Although there are more measures of inequality used in the income inequality literature depending on the objective and target of the discussion, since the goal of my paper is to replicate and update the evidence of Moore and Pacey (2003), I only present the measures reported by them in order to facilitate the comparison. Except for the national scale discussion of inequality, Moore and Pacey (2003) base the interpretation of their results on the Theil index of inequality since its values are between the Atkinson and Gini index.

5. Results

Replication

Since the objective of this paper is to replicate and update the evidence of Moore and Pacey (2003), this section seeks to discuss the results of replication for the census years 1990 and 1995.

One problem in replicating the inequality measures for the above-mentioned years is the fact that Moore and Pacey (2003) are not consistent in imposing the age restriction (i.e. restricting the primary household maintainers to those who are 25 years old and above) on their samples. For instance, when calculating the inequality measures at the national level, they only impose the age restriction for 1995. Even though such inconsistency does not change the inequality measures dramatically, all the inequality measures presented in table 4 are calculated using a restricted sample. Another example is regarding table 7 where the Theil index of inequality is presented based on the immigration status of the primary household maintainer. Likewise, the results are replicable for 1990 only if the age restriction is removed. Again, in order to remain consistent and to allow for the comparability of the results I present table 7 based on the restricted sample.[15]

Table 4 presents the Theil, Gini, and Atkinson indexes of inequality at the national level. Except for 1990, the replication results are perfectly similar to those of Moore and Pacey (2003) due to the reason mentioned above. For year 1990, however, these indices are slightly lower than what is presented in Moore and Pacey (2003). The table suggests an increase in the household equivalized income inequality at the national level from year 1990 to year 1995 according to all the inequality measures. The Theil and Atkinson measures indicate a higher percentage change in inequality than the Gini index since the formers are more bottom-sensitive to the income distribution.

Heisz (2007) who focuses on the family after-tax income inequality also records an increase in inequality over the 1990s. Frenette, Green, and Picot (2006) also argue that inequality increased significantly in the early 1990s due to a considerable decline at the bottom of the income distribution and no change at the top. Such evidence for the 1990s is also aligned with the findings of Frenette, Green, and Milligan (2007) who use the tax and benefit calculator approach in order to obtain the after-tax income.

Table 3 shows inequality dimensions by looking at the inequality measures determined based on whether the primary maintainer of the household is among the working population (i.e. aged 25-64). This shows how the Canadian pension plan system plays a role in alleviating inequality for

[15] Both series of inequality measures, with or without the restriction, can be found in the appendix in tables 1 and 2.

retirees. The replicated results are identical to those of Moore and Pacey (2003) except for the Theil index calculated for the working population in year 1990 which is slightly different.[16]

According to the results presented in table 5, those households whose primary household maintainer is of working age have become worse off in 1995 relative to 1990.This is while those households that are maintained by the elderly have become better off substantially compared to the early 1880s. According to Moore and Pacey (2003), the introduction of Canada and Quebec Pension Plans in 1966 plays key roles in changing the system, resulting in social change since the 1880s when early recipients of pensions were seen.

Table 6 aims to provide a more detailed picture of income inequality in Canada by classifying the sample using the gender and the age of the primary household maintainers as well as their corresponding household composition. The single status indicates a person who is not a member of an economic family and is living alone. The replicated results are perfectly matchable by those of Moore and Pacey (2003). According to table 6, inequality is larger among middle-aged primary household maintainers regardless of their gender. When it comes to economic families, however, the results for the male and female sub-groups are totally different. That is, amongst families where the maintainer is male, those who are headed by the elderly experience greater inequality whereas in case of female maintainers, those families that are run by young females are associated with greater inequality measures. It is also worth noting that the Theil index of inequality shows that singles are subject to more inequality regardless of age and gender. In general, one can observe an increase in inequality in case of almost all the sub-groups from 1990 to 1995.

Now that some insights have been revealed with respect to income inequality in Canada, the rest of this paper specifically seeks to figure out the role of immigrants and their contribution to income inequality in Canada. Table 7 exhibits the Theil index of inequality by immigration status

[16] The Theil index presented by Moore and Pacey (2003) for the working population in year 1990 is 0.187 whereas that of my paper is 0.183.

of the primary household maintainer. The replicated results for 1995 totally match those of Moore and Pacey (2003) whereas the replicated results for 1990 are very slightly different. Over this period, the highest levels of the Theil index of inequality are associated with recent immigrants. All the sub-groups experience a rise in inequality from 1990 to 1995.

In order to take a closer look at the importance of the immigration status in income inequality, table 8 classifies the sample population not only by immigration status, but also by age; to see whether they belong to the working population. The replication results presented in table 8 closely match the evidence of Moore and Pacey (2003). As it is expected, among those present in the working population, the recent immigrants are the worst off. Again, with regards to those who are at or above their retirement age, recent immigrants suffer the most. In general, elderly recent immigrants are associated with greatest inequality measures among all. Table 8 suggests an increasing trend in income inequality over the early 1990s except for the elderly non-immigrants and longer-term immigrants. According to Moore and Pacey (2003), the reason behind such a substantial increase in inequality with respect to recent immigrant at the retirement age is the government changing its eligibility criteria for immigrants to receive retirement benefits. It is required that immigrants satisfy a ten-year residency criterion in order to be able to gain such benefits.

The evidence suggesting immigrants play a role in income inequality calls for an examination regarding inequality at provincial and metropolitan levels since the concentration of immigrants is higher in major metropolitan areas than the other. Table 9 provides the reader with results of Theil index calculation at the provincial level. Although the replication results are not perfectly identical to those of Moore and Pacey (2003), they acceptably match. In 1990, Alberta, Quebec, and British Columbia were the provinces with the highest level of inequality in Canada. In 1995, this rank changes to the following with Ontario ranking third after Quebec and British Columbia.

This is expected since these provinces are major recipients of immigrants. In total, however, all provinces have experienced a rise in inequality over the first half of the 1990s.[17]

Finnie (1997) who studies the distribution of earnings by province at the individual level also confirms an increasing trend in inequality captured by the Gini index of inequality from late 1880s to mid-1990s. Although the rankings of the provinces do not match with that of Moore and Pacey (2003), he reaches the same conclusion; Newfoundland experienced the highest growth in inequality over this period.

In an attempt for a more specific examination, table 10 presents the Theil index of inequality by the CMA the respondents reside in. Aligned with the results presented in the last table, Montreal, Toronto, and Vancouver rank as major cities with the highest income inequality in Canada from 1990 to 1995 period. In addition, all CMAs have experienced a growth in inequality over this period with Toronto and Vancouver experiencing the highest growth.

Moore and Pacey (2003) discuss the absolute contribution of recent immigrants to change in income inequality in Canada using the following formula:

$$C_{ik} = \frac{T_{ik} - L_{ik}}{T_{ik-1}} \times 100 \tag{7}$$

where the subscript ik represents province i and census k. C_{ik} is the absolute contribution of recent immigrants to inequality while T_{ik} is the total inequality and L_{ik} inequality for non-immigrants as well as the longer-term immigrants.[18]

The results of recent immigrants' contribution to change in income inequality are represented in tables 11 and 12 with respect to the province of residence and census metropolitan area respectively. The replication results for the period 1990 to 1995 closely match those of Moore and

[17] In Saskatchewan, however, there was a slight decline in equality over the first half of 1990.

[18] As Reed (2001) points out, this is a strong assumption in that the presence of recent immigrants has no impact on the income distribution.

Pacey (2003). One can observe that in all cases, immigrants have had a contribution to the rise in income inequality. Again, British Columbia and Ontario are the leading provinces with Vancouver and Toronto being the dominant major cities located in them. According to table 11, Alberta and Quebec have the second most contributing recent immigrant to change in income inequality. Table 12 suggest that Ottawa-Hull and Montreal are also amongst major cities where recent immigrants play a key role.

Update

In this section, I proceed to the next step, presenting and interpreting the results of updating the evidence of Moore and Pacey (2003) using the Canadian Census of Population for the years 2000 and 2005.

The most challenging part in updating the results of Moore and Pacey (2003) is assuring consistency of the results over the period of interest while including the 2006 census. This is due to the fact that the 2006 census is different in many aspects in terms of the presentation of the variables from the previous censuses. Although this issue requires defining the variables of interest in an indirect way in the statistical software, it does not result in a data inconsistency issue.

For that reason, it is worth mentioning two important examples of such difference in the presentation of the variables. In 2006, the Census of Population provides researchers with data on households and families combined in one single file as opposed to the previous censuses where there are two distinct files, one for families and one for households, for each census year. In this case, a unique household identifier is provided to differentiate between households and individuals.[19] This may seem problematic at first since contrary to the previous censuses variables are not merely reported for the primary household maintainer of each household but for all the individuals present in the sample. In other words, such presentation of the dataset requires defining the variables of interest and restricting the sample for creating various sub-groups based on another variable that indicates whether or not each individual is a primary household maintainer.

Another example is the fact that the 2006 census does not report the total household income and household size, two key variables for defining the household equivalized income which obviously is the key variable for discussing income inequality; the purpose of this paper. Consequently, these variables have to be calculated indirectly in the software using the unique household identifier mentioned earlier.

Furthermore, one can point out to the way variables associated with geographic characteristics, including province and the Census Metropolitan Area (CMA), are reported in the 2006 census. As opposed to the previous censuses, Statistics Canada has done a general classification in the 2006 census reporting only major CMAs and provinces with higher population.[20] For that reason, in reporting the inequality measures by the area of residence of the primary household maintainer I can only report those of the major cities.

Table 4 presents the three commonly-used inequality measures in the income inequality literature, Theil, Gini, and Atkinson indices at the national level for the period 1990 to 2005. Based on the evidence presented in table 4, one can observe a smooth increasing trend in inequality measures since early 1990s. According to Figure 1, there exist two inequality peaks with the first one being

[19] Likewise, there is a unique economic family identifier to generate variables regarding to economic families. This variable is used in the robustness check section of this paper to obtain the economic family variables of interest for the 2006 census.

[20] Canadian Provinces have been classified into the following categories for the 2006 census: Eastern Canada, Quebec, Ontario, Prairies, British Columbia, and Northern Canada. In terms of CMAs, only the data for the following major cities are reported: Montreal, Toronto, Calgary, Edmonton, and Vancouver.

on 1995 and the second one on 2005. The increase in inequality leading to the 2005 peak, however, is much sharper; as table 2 shows a 63% growth in the Theil index of inequality has occurred over the 2000 to 2005 period. This number is 7.5 times larger than the inequality growth over the 1990 to 1995 period based on the same inequality index, i.e. 8.3%. This is while Canada experienced a decline in inequality in the 1990s.

Table 5 presents the Theil measure of inequality for the working population as well as those who are at their retirement age or above. The results of this table documents that as of 1995 one can observe a converging trend among the elderly and non-elderly inequality measures up to the early 2000s. In fact, in 2000 the Theil index of inequality reports an identical level for the two sub-groups. While both sub-groups experienced a rise in inequality in the mid-2000s, an opposite change to the trend over the 1990s occurred. Those who are in the labour force became better off than the elderly.

The Theil index of inequality for sub-groups classified by the gender and age of the primary household maintainer as well as the composition of their corresponding household are presented in table 6. Compatible with the results presented in the last table, the elderly in almost all categories experience a decreasing trend of inequality up to the early 2000s.[21] In terms of younger respondents, including both single and primary maintainer of the economic families, we can observe a decrease in inequality over the years leading upto 2000. That being said, all the sub-groups faced a substantial increase in inequality in 2005. Among all the sub-groups, male primary family maintainers had the highest growth in inequality, i.e. 87%, over the 2000-2005 period. Among single individuals, those who are in the age range of 45-64 are the most vulnerable group over the period of our interest. Furthermore, one can state that men are more subject to income inequality over the last two decades than women excluding the elderly. This matches the findings of Fortin and Schirle (2006) who study the gender dimensions of changes in earning inequality in

[21] In case of the single female elderly, however, the Theil index of inequality remained virtually stable.

Canada. They find that male earning inequality experienced a higher rise than female earning inequality using the survey data.

Results of table 7 show that in each census year, recent immigrants possess the highest inequality index which leads us to their potential role in income inequality in Canada. In 2005 it is the longer-term immigrants who experience the highest growth in inequality. Interestingly, in years leading to 2005, although all the sub-groups went through a rise in inequality, non-immigrants and longer-term immigrants faced a higher percentage change while recent immigrants experienced a 4.8% percentage change from the early 2000s to the mid-2000s. Boudarbat and Lemieux (2010) who look at the wage distribution of immigrants and the Canadian born also document that immigrant wages increased by almost 20% at the top of the distribution, it declined by 30% at the bottom of the distribution in real terms in 2000 relative to 1980. This is while the Canadian born experienced the same level of increase at the top of the distribution and only a 20% decline at the bottom of the distribution. According to Boudarbat and Lemieux (2010), this led to a dramatic increase in inequality among immigrants relative to their Canadian counterparts. They also argue that immigrants at the bottom end of the income distribution suffered most.

Table 8 decomposes the sample into six sub-groups in terms of whether individuals are in their labour force years as well as their immigration status. The table suggests that during the 1990 to 2005 period, recent immigrant seniors have the greatest inequality among all. This seems reasonable since recent immigrant cannot be entitled to many benefit programs for seniors based on the eligibility criteria set for those programs as discussed earlier. Regarding younger individuals, we can observe that those who are categorized as recent immigrants are subject to considerably higher degrees of inequality. In a not very unrelated scheme and in explaining why the entry earnings of immigrant men has declined over the 1980 to early 2000s period, Green and Worswick (2010) assign an important role to the returns to foreign labour market experience. In a similar study by Aydemir and Skuterud (2005) on the deteriorating entry earnings of Canada's immigrants, they argue that almost one-third of this decline can be explained by the returns to foreign labour market experience.

Table 9 shows the Theil index of inequality for individuals based on the province of residence while table 10 presents the Theil index of inequality by the census metropolitan area. As the calculations presented in table 9 suggests, in the 2000s all Canadian provinces experienced a decline in income inequality except for Nova Scotia. In the years leading to 2005, however, inequality rose noticeably in many provinces with Alberta, Ontario, Manitoba, and British Columbia being dominant. Although due to the presentation of the variable indicating the province of residence of the primary household maintainer in the 2006 census, the Theil index of inequality is just an estimation of the reality; interesting conclusions can be drawn from the results. For example, one could propose that the concentration of immigrants in Canadian provinces has been dynamically changing since the early 2000s. With regards to major cities, one could claim that they experienced a decrease in inequality in the early 2000s. In accordance with the results of the last table, Toronto, Calgary, and Vancouver are the major cities with the highest levels of income inequality in the mid-2000s.

Like all other decompositions indicating a decline in inequality over the early 2000s, table 11 presents the results regarding the absolute contribution of immigrants to change in inequality by the province of their residence. This table also indicates such decrease. However, the level of contribution to the rise in inequality has always been positive since the early 1990s. Following the same trend as presented in the replication of the results, recent immigrants to British Columbia and Ontario have the largest contribution to the rise in income inequality over the 1995-2000 period. The last column of the table showing such contribution over the 2000-2005 period suggests a decline for British Columbia. On the other hand, Quebec ranks first with substantial absolute contribution of 4.5% to change in income inequality. Ontario then, stands on the second position with an absolute contribution of 4.0%. As one expects, immigrants living in Montreal, Toronto, and Vancouver contribute the most to change in income inequality over the 2000-2005 period based on the results presented in table 12.

Extension

In this section, I go one step further beyond the work of Moore and Pacey (2003) by examining how inequality measures are associated with the foreign experience of recent immigrants; i.e. the experience that is gained outside Canada. This is of interest given that the immigrants' earnings literature finds that lower return to foreign experience is a key factor in declining immigrants' earnings (e.g. Green and Worswick 2010, Aydemir and Skuterud 2005). Therefore, I aim to answer the following question: whether or not higher inequality measures are linked to higher foreign experience, i.e. lower domestic experience.

Potential experience of an individual is defined as age minus years of schooling minus 6 while foreign experience is defined as potential experience minus years since migration. The calculation of foreign experience involves three problems. First, age of the primary household maintainer is reported in categories in the household PUMF prior to 2006. Therefore, I pick the mid-point of each category as an estimate of the age for each primary household maintainer. Second, the PUMF file for households only reports the highest level of education. That is, years of schooling can be obtained with assigning appropriate number of years to levels of education. Third, based on the definition presented earlier, the "recent immigrant" status is given to those landed immigrants for whom it has been 5 years or less since their landing in the country. Since the exact year when immigrants obtained their status is not available in the PUMF for households; an average number of 2.5 years must be assigned to all recent immigrants as years since their migration if interested in calculating foreign years of experience. This implies that in this case, foreign experience is basically equal to potential experience minus 2.5 for all households. For this reason, inequality measures are calculated based on the potential experience of the primary household maintainer of each household.

In 2006, a new number of education levels were introduced to the PUMF, such as Master's and doctorate degrees. There are also new mid-categories (e.g. degree in medicine, dentistry, veterinary medicine or optometry). In order to have clearer results, the 2006 census is dropped for this particular analysis. The sample is again restricted to the primary household maintainers of 25 years old or above; and only recent immigrants are included. Furthermore, those of retirement age (i.e. 65 and above) are also excluded since the discussion of the impact of return to experience on their earnings is less relevant.

Table 15 shows the Theil index of inequality associated with the potential experience of recent immigrants. The table suggests that in the years 1990 and 1995, the highest levels of inequality among recent immigrants are linked to those with 25 to 35 years of experience; and for the year 2000, those who have 35 to 45 years of experience were subject to more inequality. Since all these immigrants have at most 5 years of domestic experience (based on the definition of a recent immigrant), this implies that higher potential experience can be translated into higher foreign experience. As mentioned earlier, Green and Worswick (2010) and Aydemir and Skuterud (2005) suggest that the mean return to foreign experience is not as high as that of domestic experience. Although my paper focuses on the spread of inequality, my results are not in contrast with their results.

6. Robustness Check

Following Frenette, Green, and Picot (2006) and Heisz (2007), I seek to calculate the inequality measures using data on economic families rather than households to check the robustness of the results.[22] Studying inequality based on economic family in a common tendency in income inequality literature. An economic family is defined as a group of two or more persons who are living in the same dwelling and who are related by blood, marriage, common-law or adoption. This implies that unattached individual will not be excluded from the analysis when checking for the robustness of the results. In order to do so, I use the economic family total income as well as its size to calculate the equivalized income using the following formula:

$$Economic\ Family\ Equivalized\ Income = \frac{Economic\ Family\ Total\ Income}{\sqrt{Economic\ Family\ Size}} \tag{8}$$

The intuition behind measuring inequality based on economic family characteristics is the fact that a household comprises all the individuals living in a dwelling who are not necessarily related. For instance, a family of a husband and wife plus their two children living with an unrelated individual in the same dwelling forms the concept of household. The concept of economic family, however, only embraces that family of 4 individuals. Now suppose that the total income of this economic family for a given year is \$80.000. Using equation (8), the equivalized income for this economic family will be equal to \$40,000 ($\frac{80,000}{\sqrt{4}}$). In addition, the unrelated individual living with this economic family earns an annual income of \$20,000. These numbers reflect the fact that the unrelated individual living with this economic family is subject to a lower level of living standards. Based on the household concept, however, the total house income of these 5 individuals living in the same dwelling will be \$100,000. As a result, the equivalized income assigned to each individual will be equal to \$44,843 ($\frac{100,000}{\sqrt{5}}$). This could be a misrepresentation of the living standards experienced by the unattached individual stemming from using the concept of household income. It is for the same reason that according to Frenette, Green, and Milligan (2007), economic families are the most preferable unit of observation for economic well-being

[22] A further restriction would be to use the concept of Census Family. Census family is defined as a now-married couple, a common-law couple or a lone-parent with a child or youth who is under the age of 25 and who does not have his or her own spouse or child living in the household.

analysis and hence, they base their income inequality examination on the economic family concept.

In is worth noting that similar restrictions have been imposed on the sample in analyzing income inequality based on the economic family concept. In other words, the sample is restricted to maintainers aged 25 and above and missing, zero, and negative values of income are eliminated. Non-permanent residents are also excluded.

Tables 13 and 14 represent the robustness check results at the national level and based on immigration status of the respondents over the 1990 to 2005 period. As one can observe, neither the magnitude and nor the timing of the peaks employing the economic family concept is dramatically different from the results for households.[23] The inequality measures calculated in table 13 at the national level are aligned with the results of Heisz (2007) who finds a rise in income inequality over the 1990s based the economic family concept and using the survey data. Therefore, one can claim that they are virtually the same. The same general conclusions hold, no matter which concept is used.

7. Conclusion

In this paper, I replicate and update the results of Moore and Pacey (2003) who mainly make an attempt to identify the role of immigrants in income inequality in Canada. Using the rich Canadian Census of Population PUMF for the 1990-2005 period, I find evidence of rising income inequality over the past two decades. The rise in inequality in the years leading to 2005, however, is considerably larger than the rise in the mid-1990s, when the first peak of income inequality occurred. Comparing those in the labour force and those who are at their retirement age, one can

[23] The only exception is the Theil index of inequality for the elderly recent immigrants ; The results of the calculation based on the economic family concept shows a slight decrease (- 1.8%) in the inequality measure over the 2000-2005 period whereas the same calculation based on the household concept results in an increase (4.8%) in inequality for this sub-group.

conclude that a reverse of the roles has been occurred. That is, in early 1990s the elderly were less subject to income inequality than those in the labour force. In the early 2000s, they became equally well off and in the mid-2000s, those who were in the labour force were experiencing less inequality than the elderly; although both sub-groups experienced a rise in inequality.

Over the period of study, recent immigrants experienced the largest inequality compared to longer-term immigrants and non-immigrants. One could expect such a result since immigrants spend the first years since their arrival to the host country gaining the country-specific human capital in order to be able to find their place in the labour market. It is also said that lower returns to foreign labour market experience can partially explain why immigrants have lower earnings than their Canadian counterparts (e.g. Aydemir and Skuterud 2005, Green and Worswick 2010). It is worth noting that the elderly recent immigrants are the least advantaged group of immigrants when classifying based on age.

In terms of the area of residence, Ontario, British Columbia, and Quebec are among the provinces that have been experiencing high levels of inequality over the last two decades. This can be due to the fact these provinces are characterised by higher concentration of immigrants. Toronto and Vancouver, located in the provinces named earlier, are the metropolitan areas which are home to many immigrants and rank highest in terms of income inequality.

The findings of this paper suggest that immigrants have always had a contribution to the rise in income inequality over the last two decades. Over the 1990-1995 period, immigrants residing in British Columbia and Ontario had the highest contribution to the rise in income inequality respectively; and as it is expected, Toronto and Vancouver are the dominant major cities over the 1990-1995. Over the 2000-2005 period, however, Quebec ranks second after Ontario. Surprisingly in terms of Canadian major cities, the order is the following: Montreal, Toronto, and Vancouver. It would have been interesting to study the reason behind such observation if one had access to income data on other CMAs in Ontario in the 2006 PUMF. Moore and Pacey (2003) argue that the impact of immigration on income inequality, that of recent immigrants in particular, is short-run. They believe this is the case since recent immigrants become better off after they adjust themselves to the host-country and they gain the required skills.

It is also worth noting that even though British Columbia experience a large increase in inequality (i.e. 40.6%) over the 2000-2005 period, the contribution of recent immigrants to change in inequality is not that significant during this period. Although discussing such observation requires a more in depth demographic exploration, factors such as the source country of the immigrants, or change in the composition of the population residing in this province could be in play.

In order to shed more light on the issue, I also study the relationship between recent immigrants' potential years of experience and the level of inequality they experience. For recent immigrants who at most have lived in Canada for 5 years, higher years of potential experience translate into higher years of foreign experience. My findings suggest that the return to foreign experience is not as high as the return to domestic experience. In other words, more years of foreign labour market experience for recent immigrants are associated with higher inequality level. This finding is aligned with the results of Green and Worswick (2010) and Aydemir and Skuterud (2005) as mentioned earlier.

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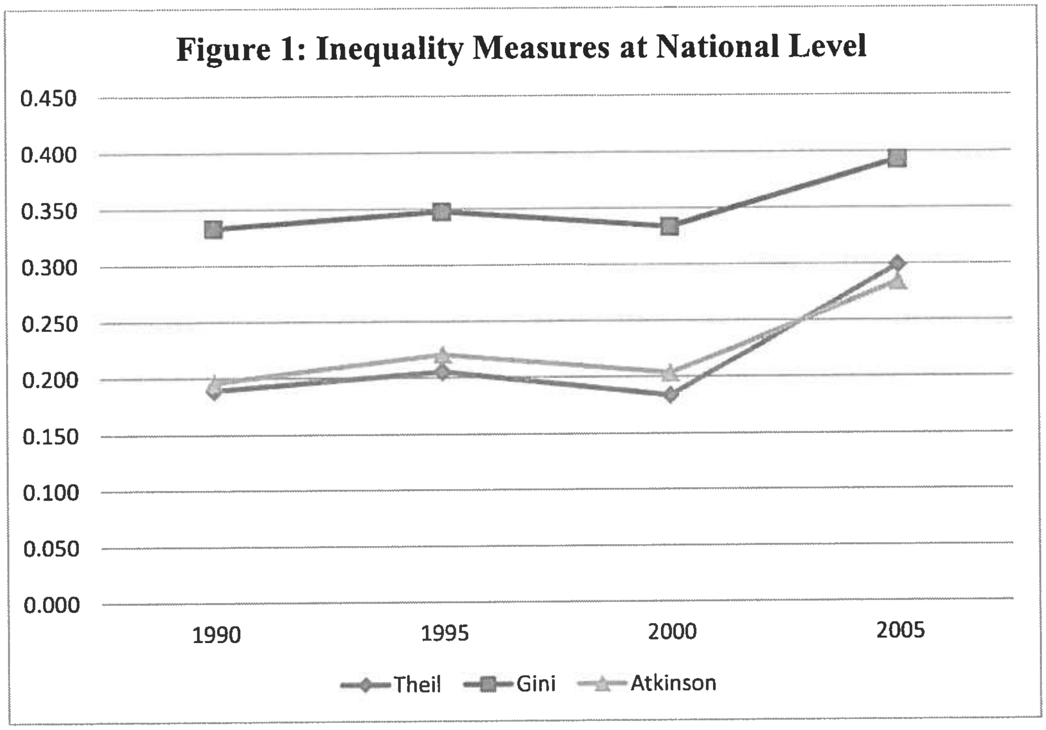
Figure 1: Inequality Measures at National Level
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
1990
1995
2000
2005
Theil
Gini
Atkinson

Table 1: Inequality Measures for year 1995 at the National Scale

	Sample restricted to individuals aged 25 and over	Unrestricted sample
Theil	0.205	0.210
Gini	0.348	0.352
Atkinson	0.221	0.228

Table 2: Inequality Measures for year 1990, by Immigration Status

	Sample restricted to individuals aged 25 and over	Unrestricted sample
Non-immigrants	0.186	0.191
Longer-term Immigrants	0.182	0.183
Recent Immigrants	0.256	0.259

Table 3: Descriptive Statistics, Equivalized Income by Immigration Status, 1990-2005

	Non-Immigrants	Longer-term Immigrants	Recent Immigrants	$\frac{Non-immigrant}{Recent\ Immigrant}$
1990	29,068.98	30,656.98	19,620.37	1.5
1995	31,068.6	31,514.72	17,878.22	1.7
2000	36,300.21	36,549.97	23,540.92	1.5
2005	48763.15	46400.11	29773.14	1.6

Table 4: Theil, Gini, and Atkinson Indices Based on Households Equivalized Income at the National Scale, 1990-2005

	1990	1995	2000	2005
Theil	0.189	0.205	0.183	0.299
Gini	0.333	0.348	0.334	0.393
Atkinson	0.196	0.221	0.203	0.284
		Percentage Change in Inequality		
	1990-1995	1995-2000	2000-2005	1990-2005
Theil	8.4%	-10.5%	63%	58.2%
Gini	4.3%	-4.0%	17.8%	17.9%
Atkinson	12.7%	-7.9%	39.8%	45.1%

Table 5: Theil Index of Inequality Based on Households Equivalized Income by Age of Household Maintainer, 1990-2005

Age of Household Maintainer	1990	1995	2000	2005
Aged 25-64	0.183	0.204	0.181	0.257
Aged 65 and over	0.221	0.203	0.181	0.280
		Percentage Change in Inequality		
	1990-1995	1995-2000	2000-2005	1990-2005
Aged 25-64	11.5%	-11.0%	41.7%	40.6%
Aged 65 and over	-8.3%	-10.6%	54.5%	26.7%

Table 6: Theil Index of Inequality Based on Household Equivalized Income; by Gender, Age, and Household Composition, 1990-2005

	1990	1995	2000	2005
Male single 25-44	0.228	0.288	0.256	0.348
Male single 45-64	0.335	0.379	0.329	0.421
Male single 65+	0.277	0.259	0.205	0.296
Female single 25-44	0.192	0.247	0.244	0.258
Female single 45-64	0.281	0.314	0.318	0.324
Female single 65+	0.205	0.169	0.171	0.296
Male PM Fam 25-44	0.147	0.167	0.149	0.231
Male PM Fam 45-64	0.167	0.177	0.150	0.282
Male PM Fam 65+	0.212	0.195	0.170	0.259
Female PM Fam 25-44	0.258	0.256	0.228	0.242
Female PM Fam 45-64	0.220	0.221	0.193	0.279
Female PM Fam 65+	0.182	0.171	0.154	0.244
Within Group Inequality	17.8%	19.3%	17.2%	25.1%
Between Group Inequality	1.05%	1.1%	1.1%	1.6%

Notes. PM stands for Primary Maintainer.

Single status refers to those who are living alone according to the household composition variable.

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

Table 7: Theil Index of Inequality Based on Household Equivalized Income; by Immigration Status, 1990-2005

Immigration Status	1990	1995	2000	2005
Non-Immigrant	0.186	0.197	0.176	0.270
Longer-term Immigrant	0.182	0.205	0.186	0.306
Recent Immigrant	0.256	0.300	0.275	0.288
	Percentage Change in Inequality			
	1990-1995	1995-2000	2000-2005	1990-2005
Non-Immigrant	5.8%	-10.3%	53.0%	45.2%
Longer-term Immigrant	12.8%	-9.1%	64.0%	68.1%
Recent Immigrant	17.4%	-8.5%	4.8%	12.6%

Table 8: Theil Index of Inequality Based on Household Equivalized Income, by Immigration Status and Age, 1990-2005

Age/Immigrant Status	1990	1995	2000	2005
Non-Immigrants<65	0.180	0.195	0.173	0.202
Non-Immigrants>=65	0.217	0.199	0.178	0.245
Longer-term Immigrants<65	0.171	0.204	0.185	0.230
Longer-term Immigrants>=65	0.228	0.205	0.185	0.287
Recent Immigrants<65	0.253	0.296	0.273	0.258
Recent Immigrants>=65	0.365	0.407	0.339	0.288

Table 9: Theil Index of Inequality Based on Household Equivalized Income; by Province, 1990-2005

Province	1990	1995	2000	2005	Percentage Change		
					1990 -1995	1995 -2000	2000 -2005
Newfoundland	0.174	0.198	0.196	0.171	13.8%	-1.0%	-12.7%
Nova Scotia	0.175	0.180	0.188	0.171	2.9%	4.4%	-9.0%
New Brunswick	0.177	0.185	0.176	0.171	4.5%	-4.9%	-2.8%
Quebec	0.187	0.206	0.182	0.215	10.2%	-11.7%	18.1%
Ontario	0.179	0.199	0.175	0.261	11.2%	-12.1%	49.3%
Manitoba	0.181	0.195	0.179	0.258	7.7%	-8.2%	43.9%
Saskatchewan	0.195	0.194	0.185	0.258	-0.5%	-4.6%	39.2%
Alberta	0.188	0.193	0.167	0.258	2.7%	-13.5%	54.2%
British Columbia	0.183	0.204	0.183	0.257	11.5%	-10.3%	40.6%

Table 10: Theil Index of Inequality Based on Household Equivalized Income; by CMA, 1990-2005

CMA	1990	1995	2000	2005	Percentage Change		
					1990-1995	1995-2000	2000-2005
Halifax	0.162	0.168	0.171		3.7%	1.8%	
Quebec City	0.158	0.178	0.161		13.9%	-10.6%	
Montreal	0.198	0.222	0.190	0.258	13.6%	-14.7%	34.3%
Ottawa Hull	0.171	0.189	0.173		11.1%	-8.4%	
Toronto	0.187	0.221	0.183	0.320	18.7%	-16.7%	72.8%
Hamilton	0.166	0.183	0.169		10.8%	-6.5%	
St. Catherines, Niagara	0.162	0.179	0.158		10.5%	-11.7%	
Kitchener	0.163	0.171	0.152		4.9%	-11.1%	
London	0.172	0.186	0.171		8.1%	-7.0%	
Winnipeg	0.172	0.188	0.166		9.3%	-11.7%	
Calgary	0.182	0.196	0.158	0.314	8.2%	-19.8%	98.6%
Edmonton	0.177	0.186	0.158	0.207	5.6%	-15.5%	31.1%
Vancouver	0.187	0.220	0.191	0.298	18.7%	-13.1%	54.5%

Table 11: Absolute Contribution to Change in Inequality by Recent Immigrants by Province, 1990-2005

Province	1990-95	1995-2000	2000-2005	1990-2005
Newfoundland	0.47%	0.33%	0.81%	0.91%
Nova Scotia	0.34%	0.17%	0.84%	0.90%
New Brunswick	0.70%	0.24%	0.90%	0.89%
Quebec	1.83%	1.41%	25.04%	24.37%
Ontario	4.91%	3.03%	52.33%	51.16%
Manitoba	0.90%	1.41%	2.01%	1.98%
Saskatchewan	0.75%	0.34%	1.94%	1.84%
Alberta	2.04%	1.17%	2.15%	1.91%
British Columbia	4.98%	3.27%	2.43%	2.43%

Table 12: Contribution to Change in Inequality by Recent Immigrants by CMA, 1990-2005

CMA	1990-95	1995-2000	2000-2005	1990-2005
Halifax	0.69%	0.5%		
Quebec City	0.44%	1.0%		
Montreal	4.01%	2.2%	8.33%	7.99%
Ottawa Hull	4.51%	3.8%		
Toronto	10.72%	5.7%	5.83%	5.70%
Hamilton	2.56%	7.22%		
St. Catharines, Niagara	1.23%	0.74%		
Kitchener	2.18%	3.20%		
London	2.53%	3.46%		
Winnipeg	1.60%	1.97%		
Calgary	3.54%	1.99%	4.27%	3.70%
Edmonton	2.79%	1.37%	2.76%	2.46%
Vancouver	10.50%	6.31%	4.59%	4.68%

Table 13: Theil, Gini, and Atkinson Indices Based on Economic Family Equivalized Income at the National Level, 1990-2005

	1990	1995	2000	2005
Theil	0.183	0.198	0.174	0.267
Gini	0.327	0.341	0.325	0.369
Atkinson	0.189	0.211	0.190	0.244
	Percentage Change in Inequality			
	1990-1995	1995-2000	2000-2005	1990-2005
Theil	8.2%	-12.0%	53.4%	46.0%
Gini	4.3%	-4.7%	13.6%	12.9%
Atkinson	11.5%	-10.0%	28.2%	28.7%

Table 14: Theil Index of Inequality Based on Economic Family Equivalized Income, by Immigration Status, 1990-2005

Immigration Status	1990	1995	2000	2005
Non-Immigrant	0.180	0.189	0.165	0.276
Longer-term Immigrant	0.174	0.199	0.180	0.310
Recent Immigrant	0.257	0.297	0.269	0.295
	Percentage Change in Inequality			
	1990-1995	1995-2000	2000-2005	1990-2005
Non-Immigrant	5.1%	-12.3%	67.3%	53.3%
Longer-term Immigrant	13.8%	-9.3%	72.2%	78.1%
Recent Immigrant	15.8%	-9.4%	9.7%	14.78%

Table 15: Theil Index of Inequality Based on Equivalized Income of Recent Immigrant Households, By Potential Experience of Primary Household Maintainer

Potential Experience	1990	1995	2000
5-15 years	0.248	0.265	0.284
15-25 years	0.241	0.252	0.263
25-35 years	0.282	0.330	0.253
35-45 years	0.264	0.327	0.326