

Do Changes in Low-Income Rates Among Immigrants Account for Rising Low-Income in Canada?

By

Feng Hou and Garnett Picot
Business and Labour Market Analysis Division
Statistics Canada

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Low-income¹ and the economic performance of immigrants are both important social issues in Canada and each has separately stimulated a substantial body of research literature. Yet few studies focus on the changing patterns of low-income among immigrants and their impact on the low-income trend in Canada.

The Canadian literature on poverty tends to focus on groups that traditionally have a disproportional share of poverty, including children, lone-parent parents, the elderly; and more recently, on minority groups such as Aboriginal peoples, racial minorities and persons with disabilities. Immigrants, particularly recent arrivals, are also recognised as a group at risk of experiencing higher levels of low income. A US study suggests that the growth in immigrant-related poverty accounts for 75 percent of the total increase in the size of poor population between 1989 and 1997 in the United States (Camarota 1999). We may expect an even stronger effect of immigration on the poverty trends in Canada, since we have a much larger annual in-flows of immigrants relatively to its population and a larger proportion of foreign-born population than the United States (Citizenship and Immigration Canada 2001, Smith and Edmonston 1997). In 1996, immigrants accounted for 17.6 percent of the Canadian population, compared with 9.3 percent in US. Between 1981 and 1999, the period covered in the present study, the average annual inflow of immigrants approximate to 0.64% of the total population in Canada, compared with 0.33% in the US (OECD 1993, 2001).

Just as the poverty literature has mostly ignored immigrant-related poverty, studies on the economic performance of immigrants have been primarily confined to immigrants' earnings, labour market activities, and degree of reliance upon social transfers as relative to the comparable native-born Canadians. Since these studies often cover only a specific segment of immigrant population (e.g., those fully active in the labour force) or a specific aspect of immigrants' economic adjustment, they don't provide an overall picture of immigrants' economic circumstances and quality of life. The

¹ Canada does not have an official definition of poverty. Since the early 1970s, Statistics Canada has produced annual low-income rates, based on its Low Income Cutoffs (LICOs, see note 14 for more details). Statistics Canada has also released annual low-income rates based on the Low Income Measure (LIM), which is set at one-half of median adjusted family income. Although Statistics Canada repeatedly cautions that neither measures is intended as a poverty line, the media and many policy researchers have used LICOs as poverty-lines. Recently, the federal Human Resources Development Canada and the provincial/territorial Minister of Social Services have sponsored an initiative to devise a needs-based measure called the Market Basket Measure (MBM).

examination of the low-income status among immigrants would help to fill the gap in the existing literature. Low-income status is a simple yet comprehensive measure that reflects the joint effect of all income sources, income distribution, and the demographic structure of a population.

The present study examines the low-income trend among immigrants at the national, provincial and census metropolitan area level. The analysis covers the period between 1980 and 1999 using data from the 20% sample of the Canadian Census for years 1981, 1986, 1991, and 1996, as well as Survey of Consumer Finance (SCF) for 1980 to 1996, and Survey of Labour and Income Dynamics (SLID) for 1997 to 1999. This study also explores the impact of immigrant-related low-income on changes in low-income rate in Canada. Furthermore, this study evaluates the extent to which changes in the composition of immigrants in terms of source countries and other socio-demographic characteristics contributed to the low-income trend among immigrants.

Factors Affecting Immigrant Low-income: A Literature Review

Knowledge about immigrants' earnings, employment patterns, use of welfare, and demographic structure will help us better understand the low-income trend among immigrants. Employment earnings is the most studied area of immigrants' economic adjustment in Canada (Swan 1996). Both US and Canadian studies using data collected in the 1970s suggest that newly arrived immigrants generally have lower earnings than comparable native born workers, but their initial earnings gap narrows as they adjust to the labour market in the receiving society² (Carliner 1981; Chiswick 1978; Meng 1987; Tandon 1977).

Research results using data collected in the early 1980s, however, seem to indicate an overwhelming negative entry-cohort effect³. Although these are not consistent

² For instance, using the 1973 Canadian National Mobility Survey, Meng (1987) find that immigrant males had an earnings disadvantage of 15% one-year after immigration, the gap diminishes after about 14 years.

³ With pseudo-longitudinal or pooled data from two or more cross-sections, average entry effect and cohort-specific effect can be estimated separately (Borjas 1985; Bloom and Gunderson 1991).

findings about whether the assimilation rate has slowed⁴, newer waves of immigrants face a greater initial earnings deficiency, one that may take much larger to overcome⁵ (Abbott and Beach 1993; Bloom and Gunderson 1991; Borjas 1993; Fagnan 1995). The entry-cohort effect also varies with national origin groups. Immigrants from the United States and Europe are much less disadvantaged in employment earnings than those from Africa, Asia, and Latin America (Borjas 1991; Bloom, Grenier and Gunderson 1995).

The earnings differentials by national origin of immigrants has led some researchers to suggest that the shift of national origin composition of immigrants from Europe and United States to the Third World countries primarily or at least partially contributes to the falling earnings of each successive cohort of immigrants (Borjas 1991). For instance, Baker and Benjamin (1994) estimated that the changing composition in source countries accounted for 30 to 50 percent of the decline in the earnings of the post-1970 immigrant cohorts in Canada. Immigrants from non-traditional sources might have lower earning potentials than those from the US and Europe because they have less transferable skills and credentials, and face more discrimination in the labour market (Borjas 1991; Bloom, Grenier and Gunderson 1995).

More recent studies using data from the late 1980s questioned whether earnings potentials among successive cohorts of new arrivals continued to decline. Based on the 1991 census, Grant (1999) found that immigrants arriving in the late 1980s achieved a

⁴ Abbott and Beach (1993) analysed the 1973 Job Mobility Survey and found a flattening of the years-since-migration earnings profile. By comparison, based on the changes in the coefficient of years-since-immigration in cross-sectional earnings function models between two censuses, Chiswick and Miller (1988), Bloom and Gunderson (1991), and Fagnan (1995) found an increase in assimilation rates in the 1970s and early 1980s. However, assimilation rates estimated in cross-sectional models may reflect both immigrant labour market progress and the effect of the average difference in unmeasured factors across successive entry cohort (Borjas 1985; Bloom and Gunderson 1991). To address this issue, Baker and Benjamin (1994) used the 1971, 1981 and 1986 census data and considered assimilation in three different ways: a fixed-cohort approach to compare the cross-census earnings of an immigrant cohort, a fixed-years-since-immigration approach to compare the earnings differentials of immigrants with similar years in the country across two censuses; and a third approach to compare earnings growth of immigrants and natives. They found uniformly small rates of assimilation for most cohorts in the study period.

⁵ The estimates by Bloom and Gunderson (1991) based on the 1971 Census data indicate immigrant men earn about 7 percent less than comparable natives when they first arrive and they need about 13 years to narrow the gap. By comparison, similar estimates based the 1981 Census data indicate that new arrivals of immigrant men earn 16.6 percent less than natives and it would take 21.6 year to catch up. Chiswick and Miller (1988) found similar results from the 1971 and 1981 census data.

similar level of entry earnings differentials to those arriving in the early 1980s, although still lower than those who came in the late 1970s. Furthermore, immigrants arriving in the late 1980s were experiencing a higher assimilation rate than those arriving in the early 1980s. From their analysis of eleven consecutive cross-sections (1981-1992) of data from the Survey of Consumer Finances, McDonald and Worswick (1998) found that recent immigrant cohorts actually experienced a smaller earnings gap than earlier cohorts. More importantly, they indicated that immigrants' rate of earnings assimilation is sensitive to macroeconomic conditions. This observation echoes a view by Bloom and Gunderson (1991) who suggest that the within-cohort growth in immigrant earnings is primarily attributable to economic forces that affect both immigrants and natives. In addition, McDonald and Worswick (1998) illustrated that more recent immigrants were more negatively affected by the two recessions of the early 1980s and early 1990s than earlier cohorts or the Canadian-born.

Results from the 1996 census data provided further support for the notion that microeconomic conditions affect immigrants' relative economic performance. Reitz (2001) found that the earnings ratio of the most recent male immigrants (0-5 years in Canada) to their Canadian-born counterparts declined from .796 in 1980 to .656 in 1985, then increased to .694 in 1990, but declined again to .600 in 1995. However, Reitz suggested that fluctuations in microeconomic conditions could not fully explain the general downward trend in immigrants' economic performance. He demonstrated that at least two other factors were at play: immigrants' relative advantage in educational levels has declined due to rising levels of the Canadian-born education; immigrants did not benefit to the same extent as the Canadian-born from increases in education.

Studies on immigrants' earnings differentials are normally restricted to those with full-time employment. However, immigrants' total earnings also depends on their individual and family employment patterns. Overall, immigrants' employment patterns can partially compensate their deficiency in full-time earnings relative to the Canadian-born. As a whole, immigrants labour force participation rate is similar to that of their Canadian-born counterparts (Badets and Chui 1994; Beaujot, et al.1988; Swan et al. 1991; CIC 2001). Among those who are in the labour force, immigrants generally experience less unemployment than comparable Canadian-born (McDonald and

Worswick 1997; Thomas and Rappak 1998). But there is a disturbing downward trend among recent immigrants. Reitz's (2001) data show that the most recent arrivals (5 years or less in Canada) had an employment rate similar to the native-born in 1981. By 1996, the most recent male and female immigrants had an employment rate 20% and 29% lower than their native-born counterparts. In the 1980s, recent immigrants' family employment patterns tended to narrow the gap in their family earnings relative to non-immigrant families. Recent immigrant women were relatively more successful in the labour market than immigrant men, and immigrant wives contributed more to family earnings than their non-immigrant counterparts (Baker and Benjamin 1997; Beach and Worswick 1993; Worswick 1996, 1999). By 1996, however, recent immigrant women had a larger gap in the employment level with (compared to native-born) than recent immigrant men, even though among the employed, earning differentials with the native-born were still smaller among recent immigrants women than among recent immigrant men (Reitz 2001).

In addition to employment earnings, social transfers are another income source that is particularly important to the low-income population. Immigrant families on average tend to receive fewer government transfers as a whole (Basavarajappa and Halli 1997), although households headed by working-age recent immigrants have a higher percent receiving government transfers and a larger amount of transfer per receiving household than compatible non-immigrant households (CIC 2001). As a study based on 1986 and 1991 data shows, immigrants, regardless of length of residence in Canada, participate less in unemployment insurance and social assistance than the Canadian born, especially after controlling for eligibility to these programs. However, immigrants' participation in these programs grows with years in Canada⁶. More recent cohorts of immigrants tend to use more social transfers than earlier cohorts, holding years in Canada constant (Baker and Benjamin 1994a, 1995b). There are significant differences in receiving social transfers across source regions and immigrant classes: immigrants from non-traditional source countries receive more social transfers than other immigrants, and

⁶ Baker and Benjamin (1994a, 1995b) used data from the 1986 and 1991 Survey of Consumer Finances. In contrast, Thomas and Rappak (1998) used data from the 1994 Survey of Labour and Income Dynamics and found immigrants receive more in social assistance and more in workers compensation than the Canadian born.

refugees and family class immigrants receive more than independent immigrants (deSilva 1997; Lui-Gurr 1995).

Accounting for income from all sources, recent immigrants tend to have a lower average total income than the Canadian born population (Basavarajappa and Halli 1997; Beaujot et al. 1988; CIC 2001). The gap has also been increasing. For instance, the most-recent immigrant men and women with income had an average total income about 20% and 15% lower than the Canadian born in 1980 (Beaujot et al. 1988). By 1995, their total income became 41% and 37% lower than the Canadian-born (CIC 2001).

This decline in total income among recent immigrants relative to the Canadian-born likely results in an increased relative probability of falling into low-income. The literature seems to suggest that recent immigrants are experiencing an increasingly higher level of low-income than non-immigrants. The low-income rate of economic families headed by immigrants who arrived within 5 years was about 20% higher than that of their Canadian born counterparts in 1970 (Richmond and Kalbach 1980), 45% in 1980 (Beaujot et al 1988), and 82% in 1985⁷ (Basavarajappa and Halli 1997). The gap in low-income rates increased not just among recent immigrants, but for immigrants as a whole as well. Data from the 1991 and 1996 censuses also showed that immigrants experienced a higher level of low-income than the Canadian-born (CIC 1996; Kazemipur and Halli 2001; Lee 2000). The assimilation pattern that frequently appears in other aspects of immigrants' economic performance also holds here: low-income status is much more common among recent immigrants than among long-term immigrants⁸. By national origin, low income is mostly a problem among immigrants from non-traditional source countries.

⁷ The corresponding numbers from 1991 and 1996 censuses were not found in the literature. These numbers are not fully compatible since the 1970 number included immigrants arriving in the census year and the year prior to the census, while the 1980 and 1985 numbers did not. Statistics Canada's LICOs were used in all the three studies, but the base years of the LICOs were different.

⁸ The oldest cohorts also tend to have a high level of low-income since they primarily consist of retired persons (Beaujot, Basavarajappa and Verman 1988).

Since the few previous studies on low-income among immigrants in Canada have focused on cross-sectional comparisons and used inconsistent measures⁹, more studies are needed to systematically identify the trend of differentials in low-income status between immigrants and the Canadian born. In particular, it is not clear whether the differentials in low-income status for each successive new cohort have increased over time. It is also not clear how a specific cohort of immigrants progresses over time regarding their differentials in low-income status with the Canadian born.

Of particular interest to Canada's immigration policies is the relationship between the low-income trend among immigrants and the changes in the composition of immigrants in terms of national origin, recency of immigration, and other socio-economic characteristics. This relationship is directly relevant to a general concern that immigrants from non-traditional source countries, who have formed the majority of newcomers to Canada, might experience more cultural and economic difficulties in their settlement than immigrants from the US and Europe.

Low-income among immigrants is a social cost that is borne not just by the immigrants themselves. Immigrants constitute a significant component of the Canadian population; high levels of low-income among immigrants might have a strong impact on changes in low-income rates in Canada as a whole.

Data, Measures and Methods

This study is based on the 1981, 1986, 1991, and 1996 census 20% sample micro-data, and Survey of Consumer Finance (SCF) for 1980 to 1996, and the Survey of Labour and Income Dynamics (SLID) for 1996 to 1999. The SLID is the replacement for the now discontinued SCF. Census data, with large samples, allow us to examine the differentials in low-income status by national source region and period of immigration at various

⁹ For instance, the three studies analysing the 1971, 1981, and 1986 census data (Richmond and Kalbach 1980; Beaujot et al 1988, Beaujot and Rappak 1988) presented low-income rates for economic families and unattached individuals separately. In contrast, the three studies using later census data (CIC 1996, Kazemipur and Halli 2001; Lee 2000) only presented low-income rates for all persons.

geographic levels¹⁰. The survey data provide a more current picture of economic outcomes.

We excluded institutional residents and immigrants who entered Canada in the census year because their income information was not collected in the census. We also excluded immigrants who arrived in the year prior to the census year since they were instructed to report only income obtained in Canada in the 1981, 1986 and 1991 censuses. Thus, most immigrants arriving in the year prior to the census would not have a full year income (Beaujot, Basavarajappa and Verma 1988; Fagnan 1995). For the purpose of maintaining historical comparability, we excluded non-permanent residents¹¹ who were enumerated in the 1991 and 1996 censuses but not in previous censuses. We further excluded residents in the Yukon and Northwest Territories and on Indian reserves since the low-income cutoffs on which we determined low-income rates were not calculated for these regions.

The SCF and SLID data sources allow us bring the results forward to 1999. This is important because of the observation in the literature that the business cycle may have played a significant role in the under-performance of recent immigrants in the 1990s. If this is the case, the relative and absolute performance of recent immigrants may have improved during the late 90s expansion. The disadvantage of the SCF and SLID files are the relatively low sample sizes, which prevent us from conducting the more detailed analysis at the CMA (Census Metropolitan area) level, or an analysis of the contribution of, say, changes in the country of origin of immigrants in the results. Hence, the analysis based on the SCF/SLID is restricted to the national level, and the overall contribution of the rise in low-income among immigrants to the total increase in low-income in Canada.

However, the SCF and SLID allow us to focus on business cycle peaks, hence focussing on longer term structural change in the relative low income of immigrants and non-immigrants. Ideally we will conduct the analysis for years that are in common positions in the business cycle. The Canadian unemployment rates for the three years

¹⁰ Prior to 1997, Statistics Canada's primary data source for income statistics was from Survey of Consumer Finances (SCF). SCF does not collect information on ethnicity and country of origin. Starting from 1997, Statistics Canada's cross-sectional estimates of income statistics are derived from the Survey of Labour and Income Dynamics (SLID). See the note below.

¹¹ Non-permanent residents include persons in Canada on student authorizations, employment authorizations, and Minister's permits, and as refugee claimants.

chosen, 1981, 1989 and 1999, were virtually identical at 7.6%, 7.5% and 7.6% respectively. In the census data years, 1980, 85, 90, and 95, the unemployment rates were 7.5%, 10.5%, 8.1% and 9.5%. Hence, comparisons between the beginning and end of the period (1980 and 1995) could be misleading if, say, recent immigrants experience relatively poorer outcomes (compared to native born) during a recession than at the business cycle peak, as is suggested in the literature. The most valid periods for comparisons in the census data are 1980 and 1990, and 1985 and 1995.

We used Statistics Canada's low-income cutoffs (LICOs¹², 1992 base¹³, after government transfers, before income taxes) to determine low-income status. Before tax LICOs are used because the census only reports before tax income data. The LICO is adjusted only for changes in the CPI, and hence is a fixed cut-off.

In calculating low-income rates by immigrant status, we treated Canadian-born children who were younger than 18 and lived in an immigrant economic family as immigrants¹⁴.

To illustrate the impact of immigrants on changes in low-income rates at the national, provincial, and CMA levels, we decomposed changes in low-income rates into immigrant-related and non-immigrant-related components. We chose four different time frames for measuring changes in low-income rates. We used the period between 1981 and 1989 (or 1980 and 1990 with census data) to represent changes between business cycle peaks in the 1980s, the period between 1989 and 1999 to represent the trend in the 1990s. We used the period between 1985 and 1995 to represent changes between two relatively compatible years when the Canada economy started to recover from recession, and the period between 1996 and 1999 to represent changes in the last half of the 1990s.

¹² LICOs take into account income versus expenditure patterns in seven family-size categories and in five community-size groups. Compared with the average household, a family at or below the LICO spends 20 percent more of its income on food, clothing, and shelter. Economic families are the basic units in deciding a family or individual's low-income status. A family is in low-income if its total income is below the LICO, while an individual is in low-income if his/her total family income is below the LICO.

¹³ Statistics Canada has periodically re-based LICOs to reflect changes in family spending patterns. The most recent base year is 1992. Earlier base years include 1959, 1969, 1978, and 1986. To take inflation into account, the 1992 base cutoffs were adjusted for each census income year by applying the annual Consumer Price Index (CPI).

¹⁴ See Appendix 1 for a detail comparison of results from the different definitions of immigrants.

We also used both a simple standardization procedure and multivariate techniques to examine the impact of changes in the composition of immigrant population in terms of national origin, recency of immigration, and other socio-economic characteristics on changes in low-income rates among immigrants. We applied both the Oaxaca-Blinder method and the Even-MacPherson approach (Even and MacPherson 1994). The former uses an ordinary least-square (OLS) regression model to estimate the probability of being in low-income; the latter uses a logit model. The above three techniques all can decompose the change in low-income rate into three components: due to changes in the characteristic(s), due to changes in rates, and a third component that is due to the joint effect of changes in characteristic(s) and rates. The third component reflects the extent to which low-income rate changes were primarily confined to certain subgroups that had large changes in their proportions in the total population. In most mean-coefficients analyses, the third components are usually combined together with the second and treated as the “unexplained component”¹⁵. But the third component is also partially attributable to changes in composition. This component is very large in our study and it has important implications.

The above three techniques each has its advantages and limitations. The simple standardization procedure can reveal the detail changes in each selected characteristic and how these changes contribute to the overall changes in low-income rates. Its limitations, however, lie in its deterministic nature, and difficulty to discern overlapping effects of several characteristics. The two multivariate approaches are parsimonious by assuming some structures in the data. They can reveal the relative importance and statistical significance of each selected characteristic regarding the changes in overall low-income rates. Of the two, the Oaxaca-Blinder decomposition method can arithmetically decompose the overall changes in low-income rate into components due to composition, due to rates, and due to the joint effect of composition and rates. Its limitation lies in the

¹⁵ Suppose we have regression models $Y_1 = a + B_{1i}X_{1i} + E_1$ for group (time) 1 and $Y_2 = a + B_{2i}X_{2i} + E_2$ for group (time) 2. The difference in the means between Y_1 and Y_2 (ΔY) that can be attributed to the differences in the means between X_{1i} and X_{2i} is called “the explained” component in mean-coefficients analysis. The remained portion of ΔY is called “the unexplained” components. However, the size of the “explained” component may vary greatly depending on whether B_{1i} or B_{2i} are used as weights (Blau and Graham 1990). As we will show in Appendix 2, the differences in the “explained” components derived from B_{1i} or B_{2i} , equals the joint effect of means and coefficients.

well-known problems of fitting OLS models for a dichotomous dependent variable. The Even-MacPherson approach is statistically more appropriate for a dichotomous outcome but lacks an algebraic formula to directly derive the contribution due to the joint effect of composition and rates (which is estimated in this decomposition as a residual term). Both multivariate approaches usually do not include all the interaction terms between independent variables in their model construction. Consequently, they may incorrectly estimate the contribution of compositional characteristics when important interaction terms are excluded from the regression model.

In Appendix 2, we used examples to illustrate how each of the three techniques works and under what conditions that they yield identical results. We also show how to derive and interpret the contribution due to the joint effect of composition and rates.

Results

1. The Increasing Gap in Low-income Rates between Immigrants and Non-immigrants

We focus on the difference in the low-income rate between immigrants, particularly recent immigrants, and the native born. This difference increased over the 1980s and 1990s. Among *all* immigrants, the low-income rate was roughly the same as among non-immigrants in the early 1980s, at .99 that of native born. By the end of the 80s, this had changed little, as the overall immigrant rate was only 1% higher than that of the native born in 1989 (SCF), but by 1999 this had risen to 33% higher.

But focusing on the immigrant population as a whole can be misleading. As noted in the literature review, economic outcomes for recent immigrants have been deteriorating relative to native born during the 1990s. Immigrants who have been in Canada for longer periods, say over 20 years, generally have outcomes that are comparable or better than those of native born. These patterns are evident in the data.

Immigrants in Canada less than 5 years had a low-income rate only 1.29 times that of native born in 1981. By the 1989 business cycle peak, their rate was more than twice that of native born (2.18), and by 1999, almost three times higher (2.93). The low-income rate among recent immigrants in 1999 was a remarkable 43.8% (up from 20.3% in 1981), compared to the low-income rate of non-immigrants of 15.0% (after transfer,

before tax rate). Chart 1 displays the rise in the low-income gap for immigrant groups by five-year period of immigration. There is considerable variability in the results due to the small sample sizes, but nonetheless, there is an unmistakable and continuous rise in the gap over time, particularly for more recent immigrants.

Moving to ten-year periods of immigration to increase sample size, chart 2 displays actual low-income rates. In 1980, recent (10 years or less) mid-term (11 – 20 years), and non-immigrants all had about the same low-income rate, at around 15%. The *recent* immigrant rate rose through the 1980s and early 1990s (particularly during the recessions), and remained flat through the remainder of the decade, reaching 35% to 40%. Hence, the relative rate (relative to non-immigrants) rose from around 1 in 1980 to approximately 2.5 by the late 90s (chart 3). *Mid-term* immigrants continued to match the lower non-immigrant rate through the 1980s, but as the 1980s “recent immigrant” cohort became mid-term immigrants in the 90s, the rate rose (chart 2). *Longer-term* immigrants (more than 20 years) outperformed the non-immigrant population throughout the entire period, with lower rates.¹⁶ The non-immigrant population remained a stable benchmark aside from cyclical variation, their low-income rates changed little over the two decades.

The census data show similar patterns (table 1). In 1985, recent immigrants (5 years) displayed a low-income rate 1.85 times that of native-born, by 1995 it was 2.68. Immigrants in the country for six to ten years displayed a similar increase in their relative rate: rising from par with native born in 1981 (1.02), to 14% higher in 1989, and more than double in 1999 (2.15 times that of native born).

Of course, the recent immigrant population was not the same across dimensions such as language, age, education, source country, and family type in the late 90s as it was in 1980s, and some of the rise in the gap could be accounted for by this change in composition. To anticipate later results, we show that between 1980 and 1995, when most of the rise in the gap occurred, somewhere between 14% and 40% of this increase is associated with change in these characteristics of recent immigrants. Hence, from 60% to 86% persists after controlling for compositional changes.

¹⁶ Of course, like are not being compared to like here. The characteristics of longer term immigrants would not necessarily be the same as those of non-immigrants. This is simply a comparison of two populations, without controlling for differences between them.

A Pseudo-Cohort Approach

The increased gap of immigrants was primarily a result of a greater gap at entry experienced by each new cohort of immigrants compared with earlier cohorts (Figure 4). A crude picture of this phenomenon can be obtained by focusing on the relative low-income rates (immigrants relative to native born) for quasi-cohorts in the data. Based on the census data, one can observe the relative rates of five cohorts entering between 1970-74 to 1990-94¹⁷. Figure 4 shows that for each successive cohort, the relative low-income rate at entry increased, from 1.3 among the 75-79 cohort, to over 2.5 for the 90-94 cohort. Differences in the composition of these populations is not controlled for here, but as noted above, these differences account for less than half of the rise in the low-income rate over this period for recent immigrants.

There is little evidence of a “catch-up” as successive cohorts accumulate additional years in Canada. The relative rates do fall for each cohort as they remain in Canada longer, but these relative rates remain higher for the more recent cohorts than for earlier cohorts. There is some evidence that the gap between recent immigrants and non-immigrants closes faster during expansions than recessions (Table 2). The drop in the relative low-income rate (recent immigrants relative to native-born) was always greater during a period of expansion (i.e. 1986-90, when relative rates for different cohorts fell by between -8% and -16%) than periods dominated by a recession (i.e. 1991-95, when relative rates changed from -7% to + 3%). Thus, the expansion of the late 1990s, which is not covered in these data, may result in a substantial decline in the relative rates once again. Macro-economic conditions appear to influence the rate at which the gap is closed.

The Rising Gap by Source Country

None of the analysis to this point accounts for changes in the characteristics of the immigrants over time, such as education, age, language, and country of origin, and the

¹⁷ As noted earlier, the cohort of “recent” immigrants observed in the 1996 census is in fact those entering between 1990 and 1994. 1995 and 1996 are excluded because people arriving during these years may have been in the country for only part of a year by the June, 96 census, and hence their low-income rate would be overestimated (based on part year income data). This is true for each cohort.

potential effect of this on their low-income rate, particularly that of recent immigrants. These characteristics are accounted for in the standardization results reported later in the paper. However, one of the major shifts in the past decade has been in country of origin. Relative low-income rates vary tremendously by country of origin. This likely reflects educational, language, and cultural differences, and the extent to which education credentials are recognized by Canadian employers. In terms of *level*, in 1995 the *most recent arrivals* (five years or less) from elsewhere in North America (mainly the U.S) and Northern Europe had low-income rates comparable to native born. All others had rates significantly higher (table 3). The rate was approximately three times higher among the *most recent arrivals* from East Asia, Western Asia, Africa, Eastern Europe, South and Central America, and the Caribbean. The *most recent arrivals* from these countries had low-income rates over 50% in 1995.

In terms of *change*, the relative rate rose among the *most recent arrivals* from all countries except elsewhere in North America (mainly the U.S.). However, immigrants from non-traditional source regions experienced more substantial increases in their gaps in low-income rates (notably Africa, Asia –except western- and Eastern Europe). Not only did the *most recent arrivals* from non-traditional source regions experience large increases in their gaps in low-income rates, those who were in the country for up to 20 years also experienced substantial increases in their gaps. This likely occurred as recent immigrants from earlier periods (with higher low-income rates) moved into the mid-term immigrant category.

As noted earlier, the increase in the low-income rate is associated with an increased low-income rate gap at time of entry. The rise in this gap is observed in all major source regions except North America (Chart 5). The smallest increase in the gap at entry was observed among European immigrants (excluding Eastern Europe), the largest among African and Asian immigrants, where the increase in shares of immigrants was also the largest. As will be seen later, the correlation between rising shares and rising rates plays an important role. However, this rising gap at entry is observed among most source countries.

In summary, relative low-income rates rose among the *most recent arrivals* from almost all countries (except the U.S.) over the 1980 to 1995 period, reaching levels that

were three times that of native born, and reaching levels of over 50% among the *most recent arrivals* from a number of source countries. By comparison, in 1980 the highest low-income rate among the *most recent arrivals* was around 38% (Caribbean), and this was 2.2 times the level of the native born.

Does the Rise in the Immigrant Low-Income Rate Account for the Increase in Low-Income in Canada Observed in the 1990s?

There are two reasons why much of the increase in low-income in Canada during the 90s might be associated with recent immigrants in particular. First, their share of the population increased during the 1990s, and since they tend to have higher low-income rates, this alone would drive up the aggregate low-income rate. Immigrants in Canada for ten years or less accounted for 4.2% of the population in 1990, and 6.1% in 1995 (census data). The SCF/SLID suggests an increase from 3.8% in 1989 to 4.5% in 1999 (the household surveys underestimate the proportion of the population who are immigrants relative to the census)

The second and principal reason, however, is that their low-income rates are increasing much faster than that of the native born, as noted in the previous section. Increases in recent immigrants' population share and their low-income rate enlarged their share in Canada's low-income population. Recent immigrants (ten years or less in Canada) accounted for 7.5% of the low-income population in 1990, and 13.2% in 1995 (census data). The SCF/SLID data show an increase in recent immigrants' share in the low-income population from 6.3% in 1989 to 10.3% in 1999 (Table 4). By comparison, non-immigrants' share in the low-income population decreased from 81.7% in 1989 to 70.3% in 1999.

Increases in either recent immigrants' population share or their low-income rate can also increase their contribution to change in Canada's overall low-income rate. This contribution is determined in a very straightforward manner. The percentage contribution to the overall rise in the rate over the period y_1 to y_2 for any immigrant group i is simply:

$$\% \text{ contribution} = [R_{(i, y_2)} * S_{(i, y_2)} - R_{(i, y_1)} * S_{(i, y_1)}] / [R_{(y_2)} - R_{(y_1)}] * 100$$

where $R_{(i, y1)}$ is the low-income rate for immigrant group i in the year $y1$, and $S_{(i, y1)}$ is immigrant group i 's share of the population in the same year, and $R_{(y1)}$ is the low-income rate for the population as a whole in the year $y1$.

The results depend upon the time period selected and the data sources. During the 1980s, the low-income rate in Canada declined, and this change was associated primarily with improvements in low-income among the non-immigrant community. Census data show that between 1980 and 1990, the low-income rate decreased 2.02 percent points among non-immigrants. Within non-immigrants, single parent families and seniors experienced particularly large decreases in low-income rates. By comparison, the low-income rate remained stable among immigrants (although increasing among recent immigrants, and falling among longer-term immigrant. table 5). As a result, the majority (97%) of the decrease in low-income in Canada in this period was attributable to non-immigrants. SCF data provide a similar result. Between the business cycle peaks of 1981 and 1989, low-income declined almost 2 percentage points, and the majority (75%) of this improvement was registered among the non-immigrant community (table 5). Again, low-income rates rose among recent and declined among the longer-term immigrants.

Aside from business cycle fluctuations, low-income in Canada rose in the late 1990s in particular. Focusing on years that are in a similar position in the cycle (89 and 99, with unemployment rates of 7.5%) using SCF/SLID data, the low-income rate in Canada rose 2.3 percentage points (or 17%). The low-income rate of non-immigrants rose only 1 percent point. Among recent immigrants (10 years or less in Canada), the low-income rate rose about 14 percent points. As a result, 68% of the rise was associated with changes in the immigrant low-income rate, and 55% with that of recent immigrants (arriving during the previous 10 years). However, there may be other population groups besides immigrants that have experienced a substantial rise in their low-income rate. These groups could be hidden within the "non-immigrant" population. It is conceivable that they contributed as much to the rise in the overall low-income rate as did immigrants. To determine if this is the case, we look to other population groups that have above or below average low-income rates, notably simple parents, young families and seniors. Table 8 shows that over the decade 1989 to 1999, the rate fell among single parents and

seniors and rose among young families. However, the increase among young families was not large, compared to immigrants, and it only accounted for 6% of the rise in the low-income rate.

The decline in the low-income rate among seniors and single parents offset, to some extent, the rise among immigrants and young families. Hence, the population groups that are the most likely candidates within the non-immigrant population account for little of the rise in the low-income rate when compared to immigrants. Other than immigrants, it is unlikely that there is any large population group that experienced the rapid change in their rate, and contributed significantly (compared to immigrants) to the rise in low-income.

The 1990s saw significant relative and absolute increase in low-income rates among recent immigrants in particular, and perhaps two-thirds of the rise in the low-income rate in Canada over the 1990s was associated with the deteriorating position of recent immigrants.

The late 1990s was a period of substantial economic growth, in contrast with the early 1990s. It may be that the change in the economic position of recent immigrants was related in part to the business cycle, with substantial relative decline during the prolonged economic stagnation of the early 90s, and some relative improvement in the late 90s. To see if there is any evidence of this, we focus on the 1996 to 1999 period, when the unemployment rate declined from 9.7% to 7.6%. During this period, the overall low-income rate declined by 2.5 percent points. But the low-income rate declined more among recent immigrants (5.8 percent points for the most recent arrivals, and 4 percent points for those had stayed for 6 to 10 years) than among non-immigrants (2 percent points) (table 5), supporting the notion presented earlier that the *relative* position of recent immigrants improves more quickly during expansions. However, the sample size for recent immigrants is quite small, and there is not a statistically significant difference between these rates of decline (Standard error is .057 for the 0-5 year group and .049 for the 6-10 year group). Hence, as reflected in the related low-income rates, and without any controls for the changing characteristics of recent immigrants, these data suggest the relative economic outcomes of recent immigrants stabilized during the last half of the 1990s, and possibly improved.

Regional Variation

The extent to which a rising low-income rate among recent immigrants contributes to a region's overall low-income rate depends, of course, on the size of the recent immigrant population in the region. The Atlantic region attracts relatively few immigrants. In 1996, only 0.3 percent of the population were immigrants who had arrived during the past five years. The comparable numbers for Ontario and British Columbia were over 4%, as they attract more immigrants. Notably, Toronto and Vancouver dominate, as almost 9% of the population in 1996 were recent immigrants in these cities. Hence, the importance of the rise in low-income among recent immigrants varies tremendously by region and city. This variation is shown in table 6, where the analysis discussed above is replicated for the 1980 to 1995 period based on census data for six regions and three cities. Small sample sizes for recent immigrants precluded extending this analysis to 1999 using the SCF/SLID data.

In Ontario, between 1980 and 1995 the low-income rate increased 1.8 percentage points overall, but 22 percentage points (from 23% to 45%) among the most recent arrivals (5 years or less). The rate among non-immigrants actually declined by 0.5 percent points. Hence, rising rates among recent immigrants accounted for 84% of the overall increase, and rising low-income among all immigrants accounted for more than 100% of the aggregate increase. The results for Toronto are, not surprisingly, very similar. A 22 percent points rise in low-income (from 23% to 45%) among the most recent arrivals accounted for three quarters of the increase in that cities rate overall.

In Vancouver, the low-income rate among both non-immigrants and immigrants increased (2 and 10 percent points respectively), but immigrants dominated nonetheless. Sixty two percent of the rise in low-income was accounted for by the most recent arrivals, and 93% by all immigrants. Other regions where the rise in low-income among immigrants accounted for the majority of the increase in the aggregate rate included B.C overall (58% accounted for by all immigrants), Quebec (67%) and Montreal (74%).

Regions like Atlantic Canada, Manitoba/Saskatchewan and Alberta resembled the others in the sense that the low-income rate rose much more quickly among recent immigrants than others (table 6). However, since immigrants represented a small share of

the population, their rising low-income rate had relatively little effect on overall low-income trends, although in Alberta it accounted for 43% of the rise.

2. Do compositional changes explain the rise in low-income among recent immigrants?

The rapid rise in low income among recent immigrants could result from changing characteristics of immigrants, or rising low-income rates among immigrants with the same characteristics. If the characteristics of immigrants are shifting towards those associated with higher levels of low-income (e.g. fewer with English or French as their home language, more from poorer countries where the labour market skills are less developed, more in single parent families, etc.), this would cause the aggregate low-income rate among recent immigrants to rise. Conversely, increases over time in low-income rates for immigrants with the same characteristics reflect changes in macro economic conditions, the relative success of recent immigrants in the labour market, and possibly government policies related to social welfare and immigrant settlement.

To obtain a sense of the effect of compositional shifts, we conduct a number of univariate decompositions. Between 1980 and 1995, the percentage of Northern, Western, and Southern European, US, and Caribbean recent immigrants (0-10 years) decreased significantly, while the percentage of immigrants from Eastern Europe, Asia, South and Central America, and Africa increased substantially. Changes in source country could reflect changes in language and education, and even if there are controls for these factors (as later in the paper), cultural differences and differences in the extent to which employers recognize educational credentials could affect labour market outcomes for people from different source countries. However, the shifting distribution of recent immigrants by source country accounted for little of the rise in the aggregate low-income rate among recent immigrants. Assuming no changes in low-income rates of recent immigrants from source countries between 1980 and 1995, we find that about 5.7% of the rise in the low-income rate were associated with changes in the composition of source regions (bottom of panel 1, table 7). On the other hand, assuming no changes in the composition of source regions between 1980 and 1995 for recent immigrants, and

allowing source-country specific rates to change, we find that increases in source-country specific low-income rates would account for about 71.3% of the rise in overall low-income. The interaction term in this decomposition, the combination of increased shares of immigrants from the Third World countries and large increases in source-country specific low-income rates among them, accounted for the 23% of the rise in the overall low-income rate among recent immigrants. Hence, somewhere between 5.7% and 28.7% (sum of the first term and the interaction term-see appendix 2) can be accounted for by changes in the composition of immigrants by source region.

Among the selected characteristics in Table 7 (source region, recency of immigration, education, home language, age, and family status), only changes in the distribution of immigrants by source region had a significant interaction with changes in low-income rate within groups. This interaction term suggests that immigrant groups from various source countries that had large increases in their shares in the population also had large increases in low-income rates. The changing composition of the other variables in table 7 had a very limited effect on the rise of the overall low-income rate among immigrants.

A Multivariate Decomposition

Using multivariate decomposition methods, we can examine the combined effects of changes in all the selected characteristics (years since immigration, source region, home language, education, family type, and age). As explained in Appendix 2, the results of multivariate decomposition methods may be sensitive to whether the model includes the interaction terms among independent variables. We found that only the interactions between source regions and recency of immigration had a major effect on the decomposition results. Therefore, we only included the interaction terms between these two variables in our multivariate models¹⁸.

¹⁸ The other interaction that we focused on was between source country and education. For example, a university degree may have a very different effect on the likelihood of being in low-income for people from Western Europe (large negative effect) and people from Africa (smaller effect). This is related to the “credentialism” issue. When we included interaction terms between education and source country, many terms were significant, with large differences between country that one would expect. However,

In order to check whether decomposition results are sensitive to study periods, we performed our analyses for the periods 1980 to 1995, 1980 to 1990, and 1985 to 1995. We conducted the analysis separately for all immigrants and recent immigrants. Appendix 3 presents the logistic regression models for recent immigrants in 1980 and 1995. The regression models for recent immigrants in other years and all immigrants are available upon request.

As Table 8 shows, the decomposition results from the Oaxaca-Blinder method and Even-MacPherson method are very close in most cases. Only for the 1980 to 1990 period did the results from the two methods appear different in magnitude, and this difference was primarily a statistical artefact (the very small change in low-income rates in this period). In the following discussion, we focus on the results from the Even-MacPherson method since it was more statistically appropriate for the dichotomous dependent variables in the study.

Multivariate Results for all Immigrants

The impact of compositional changes on the rise in immigrants' low-income rates was dependent on the study period and whether the population was all immigrants or recent immigrants. Over the entire period (1980 to 1995) and for *all* immigrants, compositional changes alone accounted for about 10% of the increase in low-income rates between 1980 and 1995 and the interaction between compositional changes and group-specific rates accounted for another 39%. Hence, somewhere between 10% and 49% of the rise was associated with compositional changes. Between 1980 and 1990 when the increase in the overall low-income rates among immigrants was barely noticeable, the impact of compositional changes was minimal, while the interaction between compositional changes and changes in group-specific rates offset the large effect of changes in group-specific rates.

Between 1985 and 1995, compositional changes alone accounted for one third of the increase in low-income rates among immigrants, while the interaction between

whether one included these interaction terms or not had little effect on the outcome of the decomposition.

compositional changes and changes in group-specific rates accounted for about another one third. During this period, low-income rates decreased among the US and Northern European immigrants, but increased among immigrants from other parts of Europe and from non-traditional sources.

Multivariate Results for Recent Immigrants

Among recent immigrants (arrived within 10 years), the impact of compositional changes on their increase in low-income rates was strongest between 1980 and 1990, when they accounted for 37% of the rise in low-income, and 22% by the interaction term. Over the entire period from 1980 to 1995, compositional changes accounted for 14% of the rise in overall low-income rates, and the interaction between compositional changes and changes in group-specific rates accounted for an additional 27%. Hence, over the entire period the change in the composition (as captured by the variables used here) accounted for somewhere between 14% and 40% of the rise in low-income among recent immigrants. Over half was related to other factors affecting the low-income rates within groups.

Changing Class of Immigrants

One variable that we were unable to include in the decomposition is the immigrant class: refugee, economic, family, or other. These data are not included in the data sets used here. Economic class immigrants have superior labour market outcomes to others (chart 6). For example, among the 1986 cohort of the most recent arrivals (during the past five years), the relative earnings of those employed (relative to all employed native born) of the economic class was .85 in the first year of entry, and rose to about 1.0 after 10 years. Among all other classes, relative earnings started at between .5 and .6, and rose to .8 to .9 after 13 years. Similar differences are noted in other cohorts, although most of the decline in relative earnings outcomes occurred among the economic class (Dougherty, 1999). Given these differences in economic outcomes among classes, a shift in composition by class would affect the aggregate low-income rate. Some of this shift

may be correlated with source country, and hence that variable may pick up some of the effect. However, the extent of this is unknown at the time of writing.

It is important to know, therefore, to what degree has there been a shift in the composition of recent immigrants by class of immigrant. Since we tend to focus on recent immigrants defined in terms of entry during past 5 or 10 years, we will display the data for these groups. Chart 7 shows the distribution by class for the most recent arrivals (in Canada five years or less) for the census intervals covered by our analysis on census data (1981 to 1996 census). There were not dramatic compositional shifts that are consistent with the steady rise of low-income rate among recent immigrants up to the mid-90s. The share that were in the economic class increased from about 37% in the five years prior to the 1986 census, to 44% in the five years before the 1991 census, and fell back to 41% before the 96 census. The major change was during the 1995 to 1999 period, when the share of economic migrants rose to about 54%. These cohorts of the most recent arrivals are not included in the decomposition analysis conducted above because census data are not yet available. Hence, for the decompositions conducted here, it is unlikely that missing the economic class variable had a significant impact on the results.

However, for analyses of the last half of the 1990s, immigrant class could be a very significant variable, unless it was highly correlated with country of origin. We do report relative low-income rates earlier in the paper to 1999. These are for recent immigrants, defined as having arrived in the past 10 years (to maintain sufficient sample). Chart 8 shows the composition of these recent immigrants for each year between 1990 and 2000, e.g. the population included for the year 2000 is all immigrants arriving between 1990 and 1999, for the year 1990 it is immigrants arriving between 1980 and 1989, etc. There is an upward shift in the proportion in the economic class, from around 43% in the early 90s to 49% by 1999. This could have some effect on the results in the last half of the 90s.

Summary and Discussion

Census data show that the low-income rate (after government transfers, before income taxes) of immigrants was about the same as the Canadian-born in 1980, but was

41% higher in 1995. The most recent arrivals (in Canada 5 years or less) saw difference in the low-income rate rise from 1.43 in 1980 to 2.68 by 1995.

SCF/SLID data suggest that among recent immigrants (last 10 years), this relative rate rose from about 1.0 in 1980 to 2.3 by the late 90s. Essentially, the low-income rate among native born did not change, at around 15%, but among recent immigrants it rose from 15 % to around 37 %.

The gap in low-income rates increased not just among the most-recent arrivals (although the increases were greatest here), but also among mid-term immigrants (in Canada 11-20 years) during the 1990s, as the recent immigrant cohort of the 1980s moved into the mid-term category during the 1990s. The increased gap for recent and mid-term immigrants alike primarily reflects a greater gap at entry experienced by each newer cohort of immigrants. After arrival, the gap between native born and immigrants declined with years in Canada for each cohort, but there was little evidence that the more recent cohorts “caught up” to previous cohorts in terms of having lower gaps. Macroeconomic conditions may influence the *relative* progress of immigrants, however, as the fall in the relative low-income rate (with years in Canada) appeared to be greater during economic expansions than periods dominated by a recession.

For recent immigrants, the increase in their gap was more pronounced in the periods of economic contraction, but persisted even during economic expansion. In contrast, previous studies observed that recent immigrants’ differentials in employment levels and earnings increased during period of economic contraction but decreased during economic expansion (McDonald and Worswick 1997, 1998; Reitz 2001).

This dramatic increase in both absolute and relative immigrant low-income rates means that much of the change in aggregate low-income in Canada was associated with the immigrant community, particularly with recent immigrants. SCF/SLID data suggest that of the 2.3 percent points increase in low-income between 1989 and 1999, two-thirds was accounted for by the rising low-income rates among immigrants (and an increasing share of immigrants). This effect was of course concentrated in regions with high immigrant populations, notably Toronto, Montreal and Vancouver, as well as the provinces where these cities are located. Between 1980 and 1995, the rise in low-income

among immigrants accounted for from 75% to over 100% of the increase in the aggregate low-income rate in these regions.

While it is possible that other population groups such as single parents, seniors or young families could also contribute significantly to the rise in low-income between the 80s and 90s, we found no evidence of that. It is unlikely that any relatively large population groups contributed to the rise during the 90s in any way similar to that observed for immigrants.

This paper focuses on the contribution of immigrants to the *change* in low-income. In terms of *levels*, approximately 27% of the low-income population were immigrants in 1995, up from 20% in 1980. Recent immigrants (last 10 years) accounted for 13% of the low-income population in 1995 (up from 5.7% in 1980), although only 6% of the population. Hence, even in terms of levels, the immigrant population has a significant impact on low-income in Canada.

These results are similar to those observed for the U.S. Camaroto (1999) found that the gap between immigrant and native poverty almost tripled between 1979 and 1997 in the U.S.. The poverty rate among native-born households changed little at around 12% over this period¹⁹, while those for immigrant households rose from 15.5% to 21.8%. He found that this accounted for the majority of the rise in poverty in the U.S. Furthermore, the increase was widespread, affecting families with different education levels, and from different source countries.

Some of this increase in the absolute and relative (to native born) low-income rate can be associated with shifts in the composition of recent migrants in particular. There have been major changes in the source country and other factors. However, between 1980 and 1995 (when the largest increase in relative rates occurred) more than 60% of the increase remains unaccounted for when controlling for compositional shifts in home language, education, age, source country, and family type. Compositional shifts accounted for between 15% and 40% (depending upon how to interpret the interaction term) of the rise.

¹⁹ These results are based on the U.S. definition of poverty, which is quite different from the definition of low-income in Canada. Hence, although the trends are likely comparable, the levels are not.

Rising low-income rates among immigrants, particularly recent immigrants, are related both to a shift in immigration towards source regions and family types that tend to have higher rates, and increasing low-income within most groups associated with the well documented economic and labour market deterioration of recent immigrants. Changes in government social policy could also play a role, although its effect is likely marginal. Over most of the period when immigrant low-income rates were increasing (1980 to 1995), social transfer payments were rising, not falling, at last for the population as a whole.

Low-income increased in spite of a general rise in the educational attainment of immigrants. However, the simple classification of education used here, particularly university education, could be misleading. Canadian employers may tend to discount university education from some countries. The economic returns to a university degree for immigrants from the more recent source countries is likely much lower than that from the more traditional countries (notably Europe). In the regression results, there were large differences among source countries in the extent to which a university education was negatively associated with the likelihood of being in low-income. Among recent immigrants, a degree had a large effect for some source countries, little for others.

Other studies have noted the general rise in low-income in Canada during the 1990s (Osberg, 2001). At least one project concluded that the increase was largely associated with deteriorating employment earnings outcomes among lower-income Canadian except in Alberta (Picot, Morissette, Myles). The current paper suggests that much of that effect was concentrated among recent immigrants. During the 80s and 90s Canadian low-income trends appear to be firmly linked to outcomes for immigrants, which in turn are related to immigration policy, issues such as the recognition of foreign credentials, language competency, the spatial settlement patterns of immigrants (concentration in a few cities), and general macro-economic conditions in the cities that absorb most immigrants.

Appendix 1: How do different definitions of immigrants affect our results?

To determine immigration status, we treated Canadian-born children who are younger than 18 and live in an immigrant economic family as immigrants (family-based approach). Alternatively, we could simply base the classification on an individual's own immigrant status (individual-based approach). We believe that the family-based approach is more appropriate since young children usually have no independent income sources and have to depend on their families. The following highlights the differences in results from these two approaches.

Compared with the individual-based approach, the family-based approach increased the sizes of immigrants and low-income immigrants. Family-based approach yield lower low-income rates among immigrants in 1980, 86, 90, but higher rates in 1995 than individual based definition, although the differences are small (see Appendix table 1.1). Consequently, the family-based approach revealed a more pronounced increase in the gap in low-income rates between immigrants and the Canadian-born. The family-based approach also allocated more of increase in low-income population and low-income rates to immigrants than the individual-based approach.

Compared with the individual-based approach, the family-based approach produced higher low-income rates for some immigrant groups but lower for others. While the difference in low-income rates from the two approaches was within the range of .5 percent points for most immigrant groups, it was over one percent point for three groups. Immigrants from Caribbean and from South and Central America had much higher low-income rates from the family-based approach (37.0% and 35.2% respectively) than from individual-based approach (33.8% and 34.0%). In contrast, immigrants from East Asia had a lower low-income rate from the family-based approach (33.0%) than from the individual-based approach (34.6%).

Appendix 2: Decomposition methods

1. A standardization procedure

As Appendix Table 2.1 shows, the contribution of compositional changes to the overall change in low-income rates is the sum of the differences in group proportions between 1980 and 1995, weighted by 1980 group-specific low-income rates. Similarly, the contribution of changes in rates is the sum of the differences in group-specific low-income rates between 1980* and 1995, weighted by 1980 group proportions. The joint effect of characteristics and rates is computed using the sum of products between differences in proportions and differences in group-specific low-income rates in the two time points.

When calculating the contribution of compositional changes, or the “explained” component in mean-coefficient analyses, one could use 1995 group-specific low-income rates (rather than the 1980 values) as weights. In this case, the “explained” component would become 0.04385 (or 57%) rather than 0.00856 (or 11.1%) as weighted by 1980 group-specific low-income rates. This difference relates to the “joint” effect of composition and rates. The difference between 0.04385 and 0.0085 equals 0.03529 (45.9%), the component due to the joint effect of characteristics and rates.

When 1980 group-specific low-income rates are used as weights, the “explained” component is $LI_1 * \Delta P$. When 1995 group-specific low-income rates are used as weights, the “explained” component is $LI_2 * \Delta P$, or $(LI_1 * \Delta P + \Delta LI * \Delta P)$. It is clear that when $LI_1 * \Delta P$ is used to represent the “explained” component, the contribution from compositional changes is underestimated since $\Delta LI * \Delta P$ also contains compositional changes. On the other hand, when $LI_2 * \Delta P$ is used to represent the “explained” component, the contribution from compositional changes is overestimated since $\Delta LI * \Delta P$ contains changes in rates or coefficients. One can take the average of $LI_1 * \Delta P$ and $LI_2 * \Delta P$ as the “explained” component assuming half of the $\Delta LI * \Delta P$ is from compositional changes. Or one can treat $LI_1 * \Delta P$ as the minimum effect of compositional differences and $LI_2 * \Delta P$ as the maximum. Alternatively, one can treat $LI_1 * \Delta P$ as the pure effect of compositional differences and interpret $\Delta LI * \Delta P$ separately.

We can use Appendix Table 2.1 as an example to illustrate the significance of ΔLI * ΔP . Between 1980 and 1995, if there were no changes in group-specific low-income rates, the changes in the composition of immigrants' source regions would account for 11% of the increase in the low-income rate of all immigrants. If there were no changes in the composition of immigrants' source regions, the changes in group-specific low-income rates would account for 43% of the increase. However, both composition and group-specific rates changes, and immigrants from non-traditional source regions experienced large increases both in their shares in the total immigrant population and in their low-income rates. This joint effect of changes in composition and group-specific rates accounted for 46% of the increase in the low-income rate of all immigrants.

The standardization procedure can be extended to include two or more compositional characteristics. For instance, we included both source regions (13 categories) and recency of immigration (5 categories). We first arranged group proportions and group specific low-income rates for all the combinations between source regions and recency (55 categories) and then repeated the same procedure as in Appendix Table 2.1. The results showed that changes in characteristics, changes in rates, and the joint effects of characteristics and rates accounted for 1.9%, 54.3%, and 43.8% respectively.

2. The Oaxaca-Blinder decomposition method

Suppose we have regression models $Y_1 = a + B_{1i}X_{1i} + E_1$ for time 1 and $Y_2 = a + B_{2i}X_{2i} + E_2$ for time 2 for the same set of variables measured at time 1 and 2. The contribution of compositional changes to differences in the means of Y_2 and Y_1 equals the sum of the differences in the means of X_{2i} and X_{1i} , weighted by B_{1i} . The contribution of changes in coefficients equals the sum of the differences in B_{2i} and B_{1i} , weighted by X_{1i} . The joint effect of changes in means and coefficients equals the sum of $(B_{2i} - B_{1i}) * (X_{2i} - X_{1i})$. As shown in Appendix Table 2.2, the three components accounted for 11.1%, 43.0% and 45.9% of ΔY . The result is exactly the same as that from the standardization procedure.

If we used B_{2i} instead of B_{1i} to weight changes in means, the contribution due to changes in means would become 57%. Again the difference in the size of the “explained component” by using B_{2i} and B_{1i} as weights is the joint effect of changes in means and coefficients. Blau and Graham (1990) suggest that a large difference between B_{2i} and B_{1i} often results in a large difference in the size of the “explained component”. However, if a large difference between B_{2i} and B_{1i} equally distributes among ΔX_i , the size of the “explained component” will not be affected by the choice of the two weights. The choice between the two weights matters only when ΔB_i is highly correlated with ΔX_i .

When more than one independent variable was used, the OLS regression model will still produce the same results as the standardization procedure as long as the model includes all the possible interaction terms among the independent variables. For instance, we included source regions (12 categories + one reference group), recency of immigration (4 categories + one reference group), and their interaction terms (12x4=48) in the model. The contribution of changes in means, changes in the coefficients, and their joint effect to ΔY was 1.9%, 54.3%, and 43.8% respectively. These are the same as those from the standardization procedure. However, when the interaction terms were not included in the model, the contribution of changes in means, changes in the coefficients, and their joint effect was 15.9%, 60.9%, and 23.2% respectively. Thus, the contribution due to changes in means would be over-estimated here if the interaction terms were not included in the model.

3. The Even-MacPherson decomposition method

Based on logistic regression estimates, the average low-income rate for the study population at time 1 and time 2 are $Y_1 = \exp(B_{1i}X_{1i}) / (1 + \exp(B_{1i}X_{1i}))$ and $Y_2 = \exp(B_{2i}X_{2i}) / (1 + \exp(B_{2i}X_{2i}))$. The contribution of changes in means to ΔY equals $[\exp(B_{1i}X_{2i}) / (1 + \exp(B_{1i}X_{2i}))] - [\exp(B_{1i}X_{1i}) / (1 + \exp(B_{1i}X_{1i}))]$. The contribution of changes in coefficients to ΔY equals $[\exp(B_{2i}X_{1i}) / (1 + \exp(B_{2i}X_{1i}))] - [\exp(B_{1i}X_{1i}) / (1 + \exp(B_{1i}X_{1i}))]$. The contribution due to the joint changes in means and in coefficients cannot be derived directly from the regression parameter estimates because of the complex functional form. But it can be computed by taking the difference between the actual ΔY

and the sum of the above derived contributions due to changes in means and in coefficients (i.e. the residual).

Appendix Table 2.3 presents the decomposition results. The direct effects due to changes on the B_s and changes in the X_s (composition) are estimated directly. The joint effect of changes in X_s and B_s is estimated as a residual, but its size is very close to that estimated using OLS, when this term was measured directly. When the logistic models include only one independent variable (source regions), the decomposition result is exactly the same as those from the standardization procedure and from OLS estimates. When the model includes both source regions and recency of immigration, but not their interaction terms, the contribution of changes in means, changes in the coefficients, and their joint effect was 15.9%, 59.7%, and 24.5% respectively. These results are very close to those from OLS estimates with the same model specification, but very different from those derived from the standardization procedure. When the logistic models included all the interaction terms between source regions and recency of immigration, the decomposition results become exactly the same as those from standardization procedure.

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