# Immigrant Composition and Wages in Canada

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**ABSTRACT**

This paper examines the relationship between immigrant-composition and wages of different occupations and different industries in Canada. It reports the effects of change in proportion of immigrants on the wage level in 1996 for both male and female Canadians and immigrants. First all immigrants are considered homogeneous and thereafter they are distinguished according to a wide array of criterion and a full spectrum of results are presented. These results suggest that for immigrants the aggregate relationship of income with immigrant composition is fairly small, unless they are subcategorised into specific groups (e.g. non-white immigrants, immigration after 1990). The corresponding wage penalties for Canadians are more uniform across the different subgroup specifications and decomposition of the data.

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# CHAPTER 1

# Introduction

While there is a large literature documenting the gender wage gap and occupational segregation based on sex, similar comparisons between Canadians by birth (henceforth Canadians) and Canadians by naturalisation (immigrants hereafter) are not that common. If the jobs in which immigrants participate the most are called 'immigrant jobs' and if there are systematic lower wages in 'immigrant jobs', it looms to be problem. It is also important to examine if there is any negative effect of the 'immigrantness' of occupations or industries on wages. An investigation of the latest available Canadian data will widen the empirical perspective and bring a new set of facts to support or refute theories about wages in 'immigrant jobs'.

Over the years literatures that have helped establish theories about wage differentials and occupational segregation can be divided into three major categories. First, studies on wage differentials based on gender/sex. Crucial studies on this topic have been performed by Baker, Benjamin, Desaulniers, and Grant (1993); Doiron and Riddell (1994); Drolet (1999); Filmore (1990), to name a few. Second, gender based occupational segregation, or as some of the researchers prefer to call it, occupational 'femaleness' and wage differentials. Leading Canadian studies on this issue have been carried out by Baker and Fortin (2001), Macpherson and Hirsch (1995), Baker and Fortin (2000 – comparing USA and Canada). If there are two major groups competing in

the labour force and one is a dominant group, interests build up to see how the lesser group is faring against them. This paves the way for our third category, where economists compare immigrants against the natives, similar to their comparison of women against men. Notable Canadian studies on wage differentials based on immigration status have been conducted by Baker and Benjamin (1994); Bloom, Grenier, and Gunderson (1995); De Silva (1992); Hum and Simpson (2004); Chiswick and Miller (2003).

This brings us to the related, in addition to being important, issue of occupational 'immigrantness' and wage differentials in Canada, relevant studies on which are not found. Therefore, it seems important to examine the relationship between immigrant-composition and wages of different occupations in Canada. Assessing the same relationship for different industries will help us crosscheck our findings, among which one important one is the answer to the suspicion of whether immigrants are getting clustered into any particular occupations or industries; and if so, are those the low-paying categories. In addition, we will also revisit some longstanding issues such as whether immigrants from developed countries perform better than immigrants from developing countries, whether or not the age of immigration the affects economic performance of immigrants, and how long it takes for immigrants' income to converge with that of Canadians.

In this paper we attempt to provide a comprehensive picture of the mid 1990s – 1996 to be exact, because that is the latest census data available – of the relationship between immigration-based occupational and industrial segregation and wages in Canada. We document the sensitivity of our estimates to various estimation strategies used in the literature and to the specification of the additional conditioning variables. In

the 1996 census data occupations have been divided into 25 categories and industries have been divided into 16 categories. We examine the effects of change in proportion of immigrants on the wage level based on occupations and industries separately. Separate estimates of the status of 'immigrant jobs' will be presented across workers distinguished by marital status, number of dependent children, visible minority status, as well as other demographic, sectoral and individual characteristics.

First, we assume that all immigrants are homogeneous and present our results. Thereafter, we distinguish among immigrants according to a wide array of criterion and present our estimates for immigrants and Canadians by different groupings to provide a full spectrum of results. Immigrants that were born outside Canada, United States or Europe are grouped together against the rest of the labour force (including immigrants from Europe and the United States). We also categorise immigrants who entered Canada after 1980 against the rest of the labour force (including immigrants who came prior to 1980) and do the same for immigrants who arrived after 1990. Finally, we attempt to investigate if there is any effect of immigrants coming in earlier or latter days of their lives. We assemble immigrants who migrated to Canada after age 12 against the rest of the labour force. Similarly, we categorise immigrants who migrated after 19, 24, 29, and 39.

Our estimates of the wage penalty in 'immigrant jobs' provide, by some measures, an upper bound on the potential benefits of any pay equity initiative to bridge any existing disparity between immigrants and Canadians. Therefore, the analysis this paper offers can serve as a baseline for future work in this area.

Analysis at finer levels of aggregation reveals some heterogeneity in the penalty across groups. In narrower specifications, immigrants who originated from places other

than Europe and the United States face significant penalties to working in immigrant jobs relative to co-workers in Canadian jobs. Larger negative penalties are also found for immigrants who have not been in Canada for a very significant period of time. Immigrants who enter Canada at an older age face massive penalties to working in immigrant jobs. Immigration at an earlier age reduces this penalty considerably and childhood immigration almost dissolves any penalty to be had. The corresponding penalties for Canadians are more uniform across the different subgroup specifications and decomposition of the data.

Our results suggest that for immigrants the aggregate relationship of income with immigrant composition is fairly small, unless they are subcategorised into specific groups (e.g. non-white immigrants, immigration after 1990). A simulation of the contribution of occupational and industrial immigrant segregation to the aggregate immigrant wage differential is correspondingly quite modest.

In section 2 we discuss the existing literatures on immigrants' economic performance over the years. This section is divided into two sections: 1) Canadian studies, and 2) Studies in other countries.

In section 3 we present the description of the data and their salient features. We also provide an overview of the immigration composition of occupational and industrial categories and its consequences for wages in Canada for all applicable groups.

In section 4 we outline our econometric strategy for estimating the correlation of occupational, as well as industrial, immigration composition and wages in the presence of grouped data.

In section 5 we present the results and examine the relationship between the wage 'penalties' in 'immigrant jobs' and the immigration-based wage gap.

In section 6 we summarise our findings and conclude with possible policy implications and scope for extension of this topic in the future.

# CHAPTER 2

# Literature Review

A number of researchers have studied various economic issues related to immigrants and immigration. In this section we study some of the prominent Canadian immigration literatures as well as literatures from around the world.

## 2. A. Canadian Studies

For Canada, there have been some studies of trends in immigrant earnings using few or no controls (Canada. Citizenship and Immigration Canada 1998; Ruddick 1999), studies estimating the time elapsed before the convergence of the earnings of immigrants and the native born (Bloom, Grenier and Gunderson 1995), and studies estimating the effect of entry-class composition on the differential between the earnings of immigrants and those of the native-born (Wright and Maxim 1993).

There are studies that evaluated the extent to which (1) the earnings of immigrants at the time of immigration fall short of the earnings of comparable Canadian-born individuals, (2) immigrants' earnings grow more rapidly over time than those of Canadian born, and (3) assimilation of immigrants' earnings vary in the labour market according to their gender and country of origin.

Another important topic that has been covered in the literature extensively is the reasons that had contributed to declines in the relative economic position of immigrants in Canada. In a related note, some researchers studied the inherent differences – both

observed and unobserved, including those related to the interruption of labour market activity and earning capacity – between Canadians and immigrants that lead to earning differences between these two groups.

There are studies that have addressed the issue of the effectiveness of the immigrant selection system, and in so doing, have provided indirect evidence on the economic adjustment of immigrant classes. Comparisons of the performance of immigrants in Canada and the United States also exist in the literature.

Researchers have looked at the effects of changes in Canadian immigration policy on the occupational composition of immigrants. Another issue that emerged in the literature is the point system used to screen immigration applicants and its effects on entry earnings of newly arrived immigrants. Also available are analysis of the effects of language practice on earnings among adult male immigrants in Canada.

Economic performance of the refugee class immigrants has been the source of significant speculation and studies are found that estimated the time required for refugees' earnings to converge with those of the independent class.

Baker and Benjamin (1994) examined the economic assimilation of immigrants to Canada using 1971, 1981 and 1986 census microdata files. They found that entry earnings were falling across successive immigrant cohorts, while their rates of assimilation are uniformly small. They revealed that immigrant and Canadian earnings profiles were becoming more dispersed. Recent immigrants started with earnings up to 20% lower than their predecessors and had assimilated at a very modest pace in their early years in Canada. If their future assimilation matched that of earlier cohorts, convergence with natives was to be unattainable. They found relatively robust estimates of significant and permanent differences across arrival cohorts to Canada, though their

identity was much less clear. The questions they found unanswered were these: Had the occupational composition of immigrant employment changed over time? Were they increasingly concentrated in a growing pool of "bad" jobs? Had trends from high-paying manufacturing jobs towards lower-paying service occupations disproportionately affected the immigrant population? Also, a growing proportion of immigrants were so called visible minorities, and discrimination could not be ruled out.

Bloom, Grenier, and Gunderson (1995) used pooled 1971, 1981, and 1986 Canadian census data to evaluate the extent to which (1) the earnings of Canadian immigrants at the time of immigration fall short of the earnings of comparable Canadian-born individuals, and (2) immigrants' earnings grow more rapidly over time than those of Canadian born. Variations in the labour market assimilation of immigrants according to their gender and country of origin are also analysed. The results suggested that recent immigrant cohorts have had more difficulty being assimilated into the Canadian labour market than earlier ones, an apparent consequence of then recent changes in Canadian immigration policy, labour market discrimination against visible minorities, and the prolonged recession of the early 1980s. Their analysis suggested that the Canadian labour market had not been able easily to assimilate more recent cohorts of immigrants given the changing nature of such immigration. Prior to 1965 complete assimilation within 15 years was the norm for both men and women regardless of region of origin. Thereafter, assimilation took longer and longer, with complete assimilation appearing completely out of reach for post-1970 immigrants. Assimilation had been particularly slow for immigrant men from Asia, Africa, and Latin America compared with those from Europe and the United States. Their results suggested that three major factors have contributed to the decline in immigrant assimilation, namely:

1. Reduced immigrant "quality" because of changing immigration policies;

2. Increased discrimination as the composition of immigrants changed towards visible minorities; and

3. Reduced absorptive capacity of the labour market, especially for less skilled groups, possibly reflecting the effect of prolonged recession.

De Silva (1992) provided evidence from the 1981 census indicating that there was little discrimination against immigrants purely on the basis of colour. In any event, increased discrimination could not be the full explanation for disparity, because the decline in assimilation occurred for immigrants from Europe and the United States as well as for visible minorities from Asia, Africa, and Latin America. Neither can "quality" changes (stemming from immigration policy) provide a full explanation, because assimilation deteriorated markedly in the early 1980s, and yet immigration policy did not change significantly at that time. At that stage it appeared that all three factors – immigration policy, discrimination, and macroeconomic forces – had contributed to declines in the relative economic position of Canadian immigrants.

Hum and Simpson (2004) suggested that immigrants differ from the native born in terms of unobserved factors, such as motivation; and observed factors, including those related to the interruption of labour market activity and earning capacity, which may bias estimates of immigrant integration. Using panel data from the Survey of Labour and Income Dynamics (SLID), they showed that using potential experience, rather than actual experience, exaggerates estimates of the disruption and recovery caused by immigration. Their results suggested that immigrants themselves never catch up to otherwise comparable native born workers, but that their children do just as well. These results were consistent with the omission of a variable such as motivation that is stronger

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for immigrants than the native born and that is partially inherited by succeeding generations.

Chiswick and Miller (2003) analyzed the effects of language practice on earnings among adult male immigrants in Canada using the 1991 census. Earnings were shown to increase with schooling, pre-immigration experience and duration in Canada, as well as with proficiency in the official languages (English and French). Using selectivity correction techniques, it was shown that there is complementarity between language skills and both schooling and pre-immigration experience. That is, greater proficiency in the official languages enhances the effects on earnings of schooling and pre-immigration labour market experience. Language proficiency and post-migration experience appear to be substitutes, that is, those with greater proficiency have a smaller effect of time in Canada on earnings.

Their study showed that language skills are a key determinant of earnings among immigrants in Canada. Immigrants who cannot conduct a conversation in an official language and those who, while being able to conduct a conversation in an official language, usually speak a nonofficial language at home, have earnings around 10 to 12% lower than immigrants who usually speak an official language at home, when other variables are the same. The earnings gap is larger, 12–14%, among those who completed their schooling prior to immigrating.

There was evidence of positive selection into the group that can conduct a conversation in an official language, but who usually speak a non-official language at home. The increment in earnings associated with an additional year of education is 5% among immigrants who usually speak an official language at home, around 3% for those who can conduct a conversation in an official language who usually speak a non-official

language at home, and zero for immigrants who cannot conduct a conversation in an official language. When evaluated at 10 years, the impact of pre-immigration experience for these three groups is around 2%, 1% and zero, respectively, while the impact of duration of residence in Canada for the three groups is around 1, 2 and 2.5%, respectively. The analysis of immigrant earnings presented in this paper has implications for immigration policy and absorption policy. An immigration policy that screens immigrants, in part, by their official language skills would result in higher earnings among the foreign born. An immigrant absorption policy that promotes investments in official language skills after migration and using these skills in the labour market and at home can enhance the value of the skills immigrants bring with them and hence the economic well-being of immigrants.

Green and Worswick (2002) found that while native born new entrants have experienced substantial declines in earnings across labour market entry cohorts, the cross–cohort declines for immigrants have been even greater. Returns to foreign experience in all education groups have gone from being significant and positive for the 1980–82 entry cohorts to insignificant and even, at times, negative for the 1990s entry cohorts. About half of these declines in returns to foreign experience can be attributed to a shift in the source country composition of the inflow away from countries from which we expect it would be easy to transfer human capital. The remainder is due to declines in returns to foreign experience even within country groups. The entire decline in immigrant entry earnings over the 1980s can virtually be explained by a combination of general falls in new entrant earnings, shifts in the source country composition and falls in returns to foreign experience. For the entire period (i.e., from the early 1980s to the mid to late 1990s), these factors account for about 80% of the overall decline with about

40% being attributed to general new entrant effects while source country and returns to foreign experience effects account for 20% each. For immigrants of all age and education groups, in general declines in entry earnings have been matched with a rise in returns to Canadian experience. Taken together, these results suggest that a large part of the decline in entry earnings for immigrants can be attributed to forces that are affecting all labour market entrants and thus might not be the direct purview of immigration policy. Much of the remaining relative decline appears to stem from an evaporation of the returns to foreign experience. However, this latter effect is offset by increases in earnings growth after arrival. Together, these suggest that more recent immigrants have greater difficulty transferring their post–schooling acquired human capital but that the transfer may ultimately happen. The issue then becomes whether and how such a transfer can be sped up.

Reitz (2001) has documented an 11% fall in entry earnings for immigrant men arriving in the five years before the 1991 Census as compared to those arriving within a similar span before the 1981 Census. As bad as this is, the 1990s are even worse: entry earnings for those arriving in the five years before the 1996 Census are 10% worse than for those arriving just before the 1991 Census. The earnings patterns for Canadian immigrants in the 1980s are well documented (e.g., Baker and Benjamin (1994) and Grant (1999)) but we know little about why the outcomes have been so much worse in the 1990s.

The fact that the 1980s cohorts fell behind earlier cohorts has been documented extensively in the literature. The fact that the 1990s entry cohorts have even lower entry earnings is also known, but the finding that these latter cohorts are actually on a path to catch up better is relatively new. The results also match those for the US, where declines

in entry earnings across cohorts have been the source of considerable debate since it was first identified by Borjas (1985).

There are a few other Canadian studies that have addressed the issue of the effectiveness of the immigrant selection system, and in so doing, have provided indirect evidence on the economic adjustment of immigrant classes. For example, Duleep and Regets (1992) tried to examine whether the Canadian immigrant selection system, which places heavy emphasis on economic criteria is more effective than the US immigration system, which is largely based on family reunification, by comparing the experience of immigrants in the two countries. The study looked only at immigrants from Asia and Europe, using the 1980 US census and the 1981 Canadian census. The authors found that although immigrants to Canada were younger at the time of arrival and reported greater language proficiency than those who entered the United States, this did not necessarily translate into an advantage in terms of education and earnings, once they controlled for observable characteristics. In other words, immigrants admitted for reasons of family reunification were found to do as well as those admitted on economic grounds. Hence the authors concluded that the Canadian immigrant selection system is no more effective than the US system.

However, as Green and Green (1995) have argued, the above conclusion may be somewhat premature because the study is based on a single census for each country and therefore, is unlikely to capture the effect of different policy regimes on immigrant performance.

Borjas (1993) also made a comparison of the performance of immigrants in Canada and the United States. However, unlike Duleep and Regets, his analysis dealt with immigrants from all countries and was based on pooled data from two census years.

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He found that immigrants to Canada were somewhat more educated and had higher entry earnings than those coming to the US, which in turn was interpreted as evidence that immigrants admitted on economic grounds tend to be more successful than those admitted for family-based reasons.

More recently, Green and Green (1995) and Green (1995) have looked at the effects of changes in Canadian immigration policy on the occupational composition of immigrants. Their main focus was on the 1967 changes to the *Immigration Act* which ushered in a regulatory system, including the points system. They found that the points system contributed to a shift in the occupational composition from less skilled categories such as labourers toward professionals. Despite this, the authors argued that the effectiveness of the points system was limited because of the large number of other characteristics the points system sought to control.

Wanner (2003) estimated models predicting log earnings from the entry class composition of each entry cohort by country of birth and its interaction with years since arrival controlling for other characteristics known to be related to earnings attainment using data from Citizenship and Immigration Canada's (CIC) Landing Information Data System (LIDS) for 1980 to 1995 merged with the 1996 Census of Canada Public Use Microdata File. The major finding from this analysis was that, while the point system used to screen both male and female immigrants to Canada for skills and labour market suitability does indeed select immigrants who have higher earnings upon arrival than those who are not screened, over time the earnings of the two groups converge. These models also provided evidence that even entry cohorts containing a large proportion of refugees eventually have earnings similar to the independent and family classes, which presumably have superior human and social capital at their disposal.

Having said this, it was noted that in the case of men, earnings convergence between the screened independent class and unscreened classes is observed only in models that control for country of birth and its interactions with the human capital variables. This implies that country of birth and country differences in returns to human capital and entry class composition are associated in such a way that suppresses both initial differences and convergence in the case of men. In other words, the shifting country-of-origin composition of immigrants to Canada over time and their unmeasured traits must be taken into account in a properly specified earnings model. The situation is a bit simpler for women in contrasting screened immigrants with those who are not screened: those coming in under the point system have earnings advantage over refuges.

Focusing on male principle applicants in the independent, assisted relative, and refugee classes entering Canada from 1981 to 1984, De Silva (1997) found that refugees' earnings converged with those of the independent class at an average of approximately 19 years. Using special tabulation from the IMDB, Li (2003) calculated the number of years for immigrants in various classes landing in Canada between 1980 and 1996 to achieve earnings parity with average Canadian male or female employment earnings. His estimates for refugees are an average of 11.9 years for men and 12.2 years for women. He observed that the convergence time for all entry classes was shorter in more recent cohorts than in those arriving in the 1980s and early 1990s.

Given that the evidence indicates rapid convergence in earnings and the relative lack of importance of many of the immigrant characteristics reported at landing, it follows that the younger the immigrant at the time of landing, the greater his chances of doing well in this country. Hence there is a strong indication that age at landing is

probably the single most important observable determinant of an immigrant's ultimate success.

## 2. B. Studies in Other Countries

The international research literature contains a number of studies on immigrants' earnings and adjustment to the labour market. Among such studies the works of Chiswick (1978, 1980) had been extremely influential. According to Chiswick, immigrant men in the U.S. have been successful in the labour market. He used a sample of cross-sectional data from the 1970 U.S. Census and found that immigrant men had lower income on their arrival in the U.S. than men in a native comparison group of the same social and ethnic origin. After 10-15 years of residence in the U.S. many immigrants have obtained the same incomes as the native comparison groups. Their incomes become even higher than the corresponding native groups over time.

Chiswick explained the result within a human capital approach. According to Chiswick's hypothesis the labour-force immigrants are positively selected. They have a higher capacity and motivation for work than the native population in the host country. The idea of positive selection is based on the assumption that for persons with great capacity the benefits from migration are higher than for persons with low capacity whereas the costs are about the same. The tendency to migrate will be great if the difference between benefits and costs is high. As regards refugees, it can be assumed that economic motives do not play the same role as for labour-force migrants. Refugees have lower initial earnings than labour-force migrants, but ceteris paribus, they have a steeper rise in earnings over time in the host country as their pre-immigration skills adjust to the labour market of the host country.

A great deal of literature borrows both the theoretical framework and the empirical methodology from Chiswick's work. Carliner (1980), De Freitas (1980) and Long (1980) used the same method as Chiswick on alternative data sets and focused on specific immigrant groups. These studies came, in all essentials, to the same conclusions as Chiswick and tend to confirm the fact that after 10-15 years immigrants do extremely well in the U.S. labour market. Chiswick's (1978) initial estimate of the entry effect for men in the U.S. was 16.4% with an initial assimilation rate of 1.5% per year that declined with time in the host country, implying that immigrants catch up to their native counterparts after 13 years. Subsequent studies have confirmed these basic results for many countries, including the United States (e.g., recently Funkhauser and Trejo 1995; Yuengert 1994), Canada (Baker and Benjamin 1997; Grant 1999), Australia (McDonald and Worswick 1999), and Israel (Friedberg 2000).

The result obtained by Chiswick was later called into question by Borjas (1985, 1987, and 1989). Borjas was critical in two different respects. Firstly, Borjas stated that cross-section regressions used in the literature mystified the true income assimilation of immigrants. Borjas is of the opinion that cross-sectional data give a far too positive picture of the immigrants' income trends. This is due to the fact that the human capital of the earlier immigrant cohorts is higher than that of the later immigration cohorts. Secondly, Borjas is critical of Chiswick's hypothesis that labour-market immigrants are positively selected. Borjas maintains that negative selection may also occur among labour immigrants. Whether positive or negative selection occurs depends on the economic and political circumstances in the emigrant and immigrant countries.

According to Borjas, an important political aspect is whether the immigrants come from countries with political repression. Immigrants from such countries have

great incentives to adapt to the host country's labour market, since they have no plans to re-emigrate. Borjas tested his hypothesis on data from the 1970 and 1980 U.S. Censuses and found a more complicated picture than Chiswick regarding immigrants' income assimilation in the U.S. Borjas found that assimilation took longer than 10-15 years. Furthermore, Borjas found declining cohort "quality" over time. However, Borjas' study is not a real longitudinal study. The individuals in the 1970 and 1980 samples are not the same. Thus there may be a bias in Borjas' studies, since the individuals have not been followed over time. Besides, Borjas' samples are restricted to men and also exclude self-employed men.

Borjas' results for recent immigrant cohorts to the U.S. and Canada suggest very slow, if not negligible, assimilation. He finds an overall entry effect of 23% for the 1975–1980 cohort for the U.S. with an assimilation rate of 0.5%, and an entry effect of 18% for Canada with no significant evidence of assimilation (Borjas 1993b). For the 1985–1989 U.S. cohorts, Borjas (1996) estimates a comparable entry effect of 19% but no assimilation effect. Other studies, however, quite often conclude that immigrants assimilate within 20 years for the U.S. (e.g., Funkhauser and Trejo 1995, or Yuengert 1994) and for Canada (Baker and Benjamin 1997, or Grant 1999). Thus, no clear consensus has emerged.

In an answer to Borjas, Chiswick (1986) repeated his study using data from three different cross-sectional observations, the 1970 U.S. census, 1976 Survey of Income and Education and the 1980 U.S. Census. From all these sources he found a steeper upward earning profile for white immigrant men than for corresponding native groups. After about 15 years in the U.S. white immigrant men had higher incomes than corresponding

native men. Chiswick argues that this indicates that cross-sectional earnings profiles are reasonable proxies for longitudinal changes in income.

The issue of whether cross-section estimates give biased estimates of longitudinal changes in immigrant income adjustment has been tested in more recent U.S. studies as well. LaLonde and Topel (1991, 1992) and Duleep and Regets (1996, 1997) demonstrate that there has been no significant decline in cohort "quality" among immigrants in the U.S. when other variables are held constant. Shields and Wheatley Price (1998) studied male immigrant earnings in England and found a rather slow assimilation rate for immigrant workers.

Duleep and Regets (1992, 1994, 1996, and 1997) tried to compare the earnings profiles of immigrants admitted for humanitarian reasons (mainly family based immigrants) with those of immigrants brought in for their skills, relying on census data matched with Immigration and Naturalization Service Information on admission criteria for country of origin/immigrant cohorts. Their main findings were as follows: First, although recent immigrants start with low earnings, this initial disadvantage is more than offset by very rapid subsequent growth in earnings. As a result, their earnings tend to converge on the native-born level over time. This finding contradicts the earlier results reported by Borjas (1988) which showed no convergence. Second, Duleep and Regets found that, while the declines in admissions on the basis of occupational skills and the corresponding increases in family-based admissions have contributed to a decrease in initial earnings, the same factors have also produced a rapid increase in earnings growth. This leads the authors to reject the argument that the increased admissions of family-based immigrants (and the concurrent reduction in the admissions of skilled immigrants) are responsible for deterioration in the economic performance of immigrants. Third, the

authors also found that the earnings of demographically comparable immigrants, regardless of their country of origin, converge with time. The main policy implication of the Duleep-Regets analysis is to cast doubt on the usefulness of recent policy initiatives undertaken in the United States favouring skilled immigrants.

Other studies regarding immigrants' income assimilation are Al-Quadsi and Shah (1991), who studied immigrant men in Kuwait, and Poot (1993) who studied immigrant men in New Zealand. Both studies used cross-sectional data and the results tended, to some extent, to confirm the findings by Chiswick, although the assimilation rate was found to be slower.

European studies of income assimilation have been performed by Dustmann (1993), Pischke (1993) and Schmidt (1997), who studied assimilation among immigrant men in Germany. The studies showed that the immigrants did not reach the earnings level of the native population.

Wadensjo (1972) and Statistics Sweden (1977) showed that foreign citizens were underrepresented among high and low income earners in Sweden. More recent Swedish studies of income assimilation have been made by Ekberg (1990, 1994). Ekberg studied the immigrants' longitudinal adaptation to the Swedish labour market with the help of data on the total foreign-born population in the Swedish 1970 Census. These immigrants were followed in the 1975, 1980, 1985 and 1990 Censuses. To every foreign born individual a Swedish "twin" of the same age, gender, occupation and county of residence was selected. Ekberg found small differences between the immigrants who had an income from work between 1970 and 1990. If the income from work instead was divided among all the individuals in each of the two groups, the immigrants' relative income decreased between 1970 and 1990.

Hammarstedt (2003) using the 1985 and 1990 census data showed that in Sweden there are statistically significant differences in income from work between immigrants and natives even when controlled for variables such as schooling, experience, gender, civil status, and place of residence. He also showed that there are differences in income from work between immigrants from different regions and between immigrant cohorts when controlled for the above mentioned variables. The study finds that with exception for immigrants from the Nordic countries, immigrants do not reach the same level of income from work as the native population. Income from work is higher among immigrants from the Nordic countries than immigrants from other regions. Among non-Nordic immigrants, more recent immigrant cohorts have a lower income from work than the earlier cohorts. This study suggests that immigrants' incomes increase as time in Sweden increase and most immigrants do not reach the income level of natives even by 15 years after immigration.

There could be a number of explanations for the differences in income from work between immigrants and natives. Firstly, it is possible that natives work more hours than immigrants. Secondly, it might be that immigrants, holding schooling and experience constant, are working in sectors and positions on the labour market that have lower wages than those that the native population obtains. This could in turn be due to discrimination and/or the fact that immigrants' human capitals are not fully adjusted to the Swedish labour market.

Indeed, it is often argued that immigrants and natives do not have equal access to 'good' jobs, especially in countries having adopted a 'guest-worker' system. This form of discrimination against immigrants has been documented in many studies (e.g. Piore,

1979; Hammar, 1985).[1] Zimmermann (1994) documents this fact for the 'guest-worker' countries Germany and Switzerland where immigrants are heavily represented in construction and manufacturing. By contrast, the sectoral distribution of natives and immigrants are very similar in the United States.

There is discrimination against immigrants in the sense that only natives have long-term, implicit labour contracts, whereas immigrants are hired freely at the current wage rate. Schmidt et al. (1994) analyze the impact of immigration in the presence of trade unions in the market for unskilled labour. Winter-Ebmer and Zweimuller (1996) use an insider–outsider model of wage bargaining to evaluate the impact of immigration on wages of young natives. They assume the existence of a two-tier wage system, where immigrants (outsiders) receive lower wages than native workers (insiders).

**<u>CHAPTER SUMMARY</u>**

Many Canadian studies found that since early eighties newer immigrants were economically faring not as well across successive immigrant cohorts, while their assimilation rates are uniformly small. The entry earnings were tipped to be smaller for recent immigrants than their predecessors and estimates of this fall vary from 10% to 20% from study to study. Some of the remarkable findings of the existing literature on immigrants' earnings are that the points system contributed to a shift in the occupational composition from less skilled categories such as labourers toward professionals; Greater proficiency in the official languages enhances the effects on earnings of schooling and pre-immigration labour market experience; Immigrants themselves never catch up to otherwise comparable native born workers, but that their children do just as well.

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[1] One consequence of this form of discrimination is the different sectoral distribution of natives and immigrants.

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# CHAPTER 3

# Data and Descriptive Evidence

With arrival of new immigrants the situation in the labour market changes and this chapter recounts those theories. In this section we also elaborately discuss the nature of our data. But first, we focus on the effects of immigration on the labour market, particularly on income, using the basic labour supply and labour demand.

### 3.A. Labour Market Effect of Immigration: Theory

In a competitive labour market supply and demand for labour determine the equilibrium wage and employment level. In Figure 1, $LS_0$ is the original labour supply

**Figure 1: Labour Supply Effect**
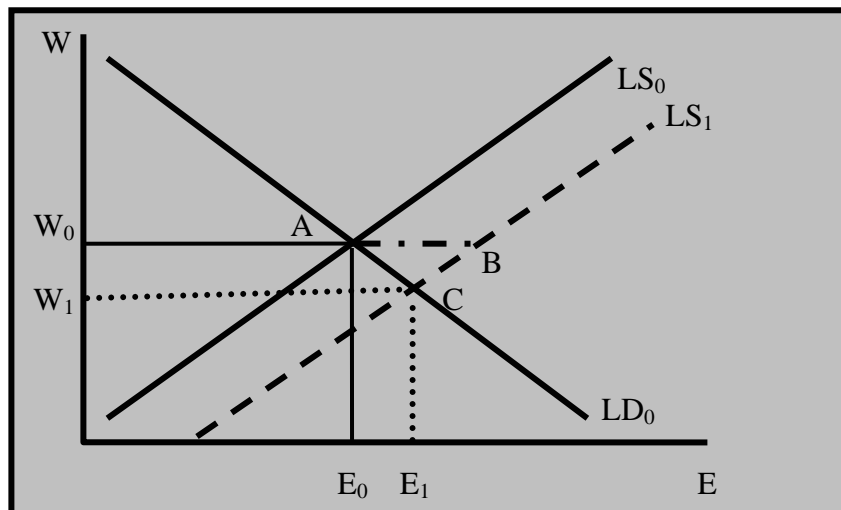


curve and $LD_0$ is the labour demand curve before immigration. Labour and supply

curves intersect at point A and the equilibrium wage level is $W_0$ and equilibrium employment level is $E_0$.

The supply side effects suggest that if immigrants and Canadians are substitutes of each other in the labour market, influx of new immigrants AB will shift the supply of labour to the right to $LS_1$. Point C will be the intersection of the original demand curve $LD_0$ and the new supply curve $LS_1$. It is evident that although the employment level rises from $E_0$ to $E_1$, the equilibrium wage decreases to $W_1$.

If immigrants and Canadians are complements in the labour market, the inflow of immigrants comes into a different labour market and increases the demand for complementary Canadian workers, as can be seen in Figure 2.

**Figure 2: Labour Demand Effect**
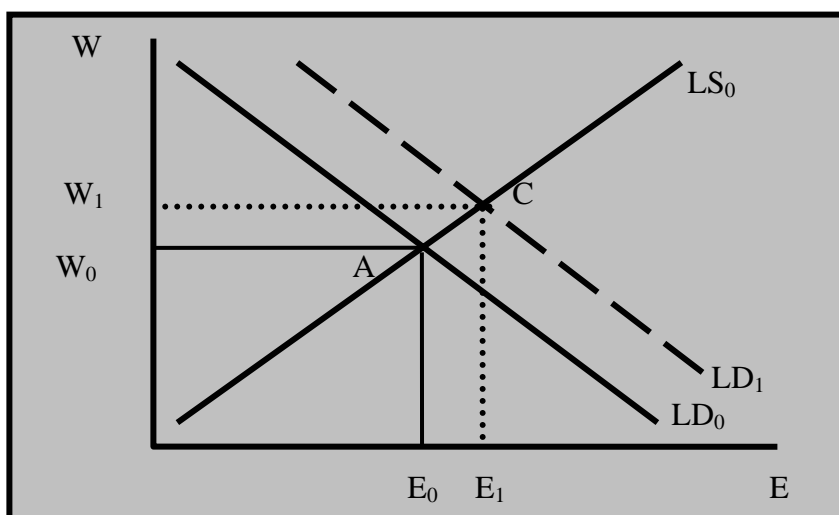


There will be, therefore, an increase in demand for labour and $LD_1$ will become the new labour demand curve. The intersection point of the labour supply and labour demand curve will move from A to C. Consequently, wage level increases to $W_1$ from $W_0$ and employment level also increases to $E_1$.

The demand side effects suggest that with more immigrants coming in, their will be an increased demand for goods and services, which in turn, will increase the product prices and consequently labour demand and wages as is evident from Figure 2. The demand side effects are similar to that of supply side when immigrants are complements to Canadians and opposite to the supply side effects when immigrants are substitutes to Canadians. In the substitute case the overall effect, therefore, depends on which of the effect is more dominant over the other.

The empirical analysis of this study uses Canadian data drawn from the 1996 census microdata files. A person is defined to be an immigrant if he or she was born abroad and then immigrated to Canada, including naturalised citizens; all other persons are classified as Canadians (visitors are not considered).

Workers are sorted into particular skill groups using their education level: persons who are high school dropouts are in group 1 (i.e., they have less than twelve years of schooling), high school graduates are in group 2 (they have exactly twelve years of schooling), persons who have some college are in group 3 (they have between thirteen and fifteen years of schooling), and college graduates are in group 4 (they have at least sixteen years of schooling).

Statistics Canada refers to people younger than twenty five years as 'youth'. By and large people's careers start shaping up from the age of twenty five (most people start settling down on their jobs at that age) and mid-sixties is the customary retirement age. Accordingly, this analysis is restricted to men and women aged 25-64 who participate in the civilian labour force. One of the objectives of this study is to compare earnings of comparable Canadian and immigrant labours. To warrant homogeneity among labours we only consider full-time (thirty or more hours of work per week), full-year (fifty or

more weeks of work per year) workers. Since we only consider wage earners, income of an individual is determined by his/her wage earnings (minimum yearly income of $7,500 with 1500 hours of work per year at a minimum wage of $5).

In the 1996 census data occupations have been divided into 25 categories and industries have been divided into 16 categories. We examine the effect of change in proportion of immigrants on the wage level based on occupations and also on industries. To control for job environment and individual characteristics, we use dummy variables for provinces, metropolitan areas, visible minority status, having of dependent children, language efficiency, and marital status.

### 3. B. Average Effect on Income Based on Occupation

In Table 1 we provide an overview of the immigration composition of occupational categories and its consequences for wages in Canada for both sexes jointly. The statistics are reported for all occupations as well as separately for 'immigrant', 'mixed', and 'Canadian' occupations. We measure the 'immigrantness' of occupations as the proportion of employment that is immigrant (hereafter referred to as PIMM).

The calculation of average PIMM can be described using the following example.

|  | Occupation 1 | Occupation 2 | Total |
|---|---|---|---|
| N of Canadians | 80 | 20 | 100 |
| N of Immigrants | 20 | 80 | 100 |
| Total | 100 | 100 |  |
| PIMM | .2 or 20% | .8 or 80% |  |
| **AVG. PIMM Canadians** | (80*.2+20*.8)/100 |  |  |
|  | 32/100=.32 or 32% |  |  |
| **AVG. PIMM Immigrants** | (20*.2+80*.8)/100 |  |  |
|  | 68/100=.68 or 68% |  |  |

There are two occupations in the economy. Out of 100 workers in occupation 1 there are 80 Canadians and 20 immigrants implying the PIMM for occupation 1 to be 20% 0.2. 20

Canadians and 80 immigrants out of 100 workers in occupation 2 imply a PIMM of 80% or 0.8 for occupation 2. Therefore, the average PIMM of Canadians for all jobs is $\frac{(80 \times 0.2) + (20 \times 0.8)}{100} = 0.32$ or 32%. Similarly, the average PIMM of immigrants for all jobs is $\frac{(20 \times 0.2) + (80 \times 0.8)}{100} = 0.68$ or 68%. When we calculate the average PIMM for 'immigrant' occupations, we only consider the occupations with PIMM of 24.67% or higher. Calculation of average PIMM for 'mixed' and 'Canadian' occupations follows similar process with their respective range of PIMM.

We also report the estimated coefficient $\hat{\phi}$ using OLS from the regression,

$$LN(W_i) = \delta + \phi.(PIMM)_i + \varepsilon_i.$$

Using the average income and the estimated coefficients we can measure the effect on average annual income with any changes in PIMM in occupations. We report $\exp^{\phi} - 1$ to calculate the percentage change in the coefficients. Multiplying this percentage change with the average income of a group gives us the estimated effect on annual income of that group when PIMM changes.

Immigrants made up approximately 20 – 19.647 to be exact – percent of the workforce in Canada in 1996 when we restrict our data to only full-time, full-year workers. Standard deviation of occupational PIMM is 5.03; thus, occupations comprising between (19.64+5.03=) 24.67 and (19.64-5.03=) 14.61 percent of immigrants are categorised as 'mixed'. These occupations represented 72 percent of immigrant employment and 77 percent of Canadian employment. 'Immigrant' occupations are defined as those with an immigrantness rate of 24.67 percent or higher. These occupations represented 24 percent of immigrant employment as opposed to 14

percent of Canadian employment. 'Canadian' occupations are defined as those with an immigrantness rate of less than 14.61 percent. These occupations represented 4 percent of immigrant employment and 9 percent of Canadian employment. Across all occupations, the immigrantness rate, PIMM, is about 21 percent for immigrants while for Canadians it is 19 percent. We also report average wages for all occupations and for occupations by type, which allows us to compare the average immigrant wages to that of Canadians. Note that the averages do not account for differences in personal characteristics (e.g. age, education) and differences among groups may be instigated by these pertinent factors. This will be explored more in detail later.

**Table 1: Effect on Annual Income by Occupation Type (Both Sexes)**

| OCCUPATIONS | TOTAL | N | % of TOTAL | PIMM | AVG. INCOME | COEF. | $e^{(COF)}$-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|---|---|
| ALL JOBS | CANADIANS | 126,284 | 100.00 | 19.33 | $ 39,865 | -0.006 | -0.006 | -$ 252 |
| | IMMIGRANTS | 30,878 | 100.00 | 20.94 | $ 39,108 | -0.018 | -0.018 | -$ 696 |
| IMMIGRANT JOBS[2] | CANADIANS | 18,165 | 14.38 | 28.69 | $ 31,150 | 0.034 | 0.035 | $ 1,083 |
| | IMMIGRANTS | 7,326 | 23.73 | 28.85 | $ 28,063 | 0.019 | 0.019 | $ 524 |
| MIXED JOBS | CANADIANS | 97,059 | 76.86 | 18.53 | $ 41,697 | 0.041 | 0.042 | $ 1,760 |
| | IMMIGRANTS | 22,183 | 71.84 | 18.92 | $ 42,923 | 0.039 | 0.039 | $ 1,686 |
| CANADIAN JOBS | CANADIANS | 11,060 | 8.76 | 10.98 | $ 38,100 | -0.049 | -0.047 | -$ 1,806 |
| | IMMIGRANTS | 1369 | 4.43 | 11.31 | $ 36,398 | -0.013 | -0.013 | -$ 476 |

For all occupations average income of immigrants is $39,108 compared to $39,865 of Canadians, difference of round about $757. This comparison makes a far more interesting reading when we inspect it by occupation types. In 'immigrant' occupations, where there is the highest concentration of immigrants among all types of occupations, average immigrant income is $28,063 compared to $31,150 of Canadians, a

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[2] List of occupations under each category can be found in appendix 1.

difference of more than $3,000. Contrastingly in 'Canadian' occupations, where there is the lowest concentration of immigrants among all types, difference in average income between the groups is $1,700 in favour of Canadians, although income of both groups is significantly higher (about $8,000 more) than in 'immigrant' occupations. Surprisingly, immigrants make $1,226 more than Canadians in 'mixed' occupations.

For all types of occupations altogether for men and women combined, an increase in PIMM leads to a decline in average annual income for both Canadians and immigrants, although not by very much, $250 and $700 respectively. For 'immigrant' occupations this effect is positive and large. For Canadians in 'immigrant' occupations the increase in average annual income is $1,083. But, immigrants in the same occupational category gain significantly less, mere $524. For 'mixed' occupations the effect on average annual income is positive with an increase in PIMM. Rise in income in 'mixed' occupations is substantial, $1,760 for Canadians and $1,686 for immigrants. In 'Canadian' occupations increase in PIMM makes Canadians pay penalty in the amount of a galloping $1,800, far more than it does immigrants ($476).

**Table 2: Effect on Annual Income by Occupation Type (Male)**

| MALE | | N | % of TOTAL | PIMM | AVG. INCOME | COEF. | $e^{(COF)}$-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|---|---|
| ALL JOBS | CANADIANS | 75,247 | 100.00 | 19.54 | $44,947 | -0.002 | -0.002 | -$ 80 |
| | IMMIGRANTS | 18,648 | 100.00 | 21.18 | $44,104 | -0.014 | -0.014 | -$ 599 |
| IMMIGRANT JOBS | CANADIANS | 11,502 | 15.29 | 28.78 | $36,295 | 0.060 | 0.062 | $ 2,254 |
| | IMMIGRANTS | 4,252 | 22.80 | 29.04 | $32,386 | 0.015 | 0.015 | $ 501 |
| MIXED JOBS | CANADIANS | 53,618 | 71.26 | 19.16 | $47,933 | 0.018 | 0.019 | $ 894 |
| | IMMIGRANTS | 13,161 | 70.58 | 19.56 | $48,511 | 0.021 | 0.021 | $ 1,029 |
| CANADIAN JOBS | CANADIANS | 10,127 | 13.46 | 11.04 | $38,967 | -0.050 | -0.049 | -$ 1,894 |
| | IMMIGRANTS | 1235 | 6.62 | 11.37 | $37,492 | -0.017 | -0.017 | -$ 622 |

Table 2 above and Table 3 below show the same comparisons as in Table 1, but separately for males and females respectively. Although the actual numbers are of course different for males from both sexes together, it follows a very similar pattern. In 'immigrant' occupations Canadian males gain a significantly higher benefit than immigrant men and in 'Canadian' occupations Canadian men pay a significantly higher penalty than immigrant males with an increase in PIMM. There appears a twist in the tale when we examine women.

**Table 3:** **Effect on Annual Income by Occupation Type (Female)**

| FEMALE | | N | % of TOTAL | PIMM | AVG. INCOME | COEF. | $e^{(COF)}$-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|---|---|
| ALL JOBS | CANADIANS | 51,037 | 100.00 | 19.03 | $32,372 | -0.022 | -0.022 | -$ 716 |
| | IMMIGRANTS | 12,230 | 100.00 | 20.58 | $31,490 | -0.030 | -0.029 | -$ 918 |
| IMMIGRANT JOBS | CANADIANS | 6,663 | 13.06 | 28.54 | $22,270 | -0.018 | -0.018 | -$ 403 |
| | IMMIGRANTS | 3,074 | 25.13 | 28.59 | $22,083 | -0.008 | -0.008 | -$ 170 |
| MIXED JOBS | CANADIANS | 43,441 | 85.12 | 17.76 | $34,001 | 0.038 | 0.039 | $ 1,319 |
| | IMMIGRANTS | 9,022 | 73.77 | 18.00 | $34,772 | 0.032 | 0.033 | $ 1,145 |
| CANADIAN JOBS | CANADIANS | 933 | 1.83 | 10.31 | $28,692 | -0.119 | -0.112 | -$ 3,217 |
| | IMMIGRANTS | 134 | 1.10 | 10.72 | $26,318 | -0.062 | -0.060 | -$ 1,585 |

Canadian females pay a substantial penalty in 'immigrant' as well as in 'Canadian' occupations with an increase in PIMM; the knock on their annual income is well over twice as much the hit that immigrant females take, although in 'mixed' occupations, both groups reap high benefits with increase in PIMM.

The results vary significantly if we categorise immigrants according to their place of birth, year of immigration, or the age at which they immigrated. The following Tables show us the effect on annual income of male immigrants and compare that to the effect on income of men from the rest of the labour force.

Not categorising occupations allows us to see the overall picture and make relevant comparisons. Average income of non-European, non-US immigrant males is $38,796 compared to $45,861 of rest of the male in the labour force, difference of more than $7000.

**Table 4: Effect on Annual Income by Birthplace and Year of Immigration (Male)**

| MALE (OCCUPATION) | N | PIMM | AVG. INCOME | COEF. | e(COF)-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|
| NONWHITE IMMIGRANTS | 14,370 | 16.03 | $38,796 | -0.025 | -0.025 | -$ 974 |
| OTHERS | 79,525 | 15.20 | $45,861 | -0.015 | -0.015 | -$ 684 |
| MIGRATED AFTER 1980 | 5,954 | 7.76 | $35,989 | -0.032 | -0.032 | -$ 1,144 |
| OTHERS | 87,941 | 6.27 | $45,375 | -0.021 | -0.021 | -$ 945 |
| MIGRATED AFTER 1990 | 1,943 | 2.59 | $31,514 | -0.087 | -0.083 | -$ 2,615 |
| OTHERS | 91,952 | 2.01 | $45,060 | -0.077 | -0.074 | -$ 3,324 |

Difference in income of immigrant men who came to Canada after 1980 and other men is close to $10,000. The same difference for men of post 1990 cohorts and other men is an astounding over $13,500.

**Table 5: Effect on Annual Income by Age of Immigration (Male)**

| MALE (OCCUPATION) | N | PIMM | AVG. INCOME | COEF. | e(COF)-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|
| MIGRATED AFTER AGE 12 | 13,994 | 16.65 | $43,055 | -0.019 | -0.019 | -$ 802 |
| OTHERS | 79,901 | 14.71 | $45,082 | -0.007 | -0.007 | -$ 308 |
| MIGRATED AFTER AGE 19 | 11,260 | 13.45 | $43,019 | -0.023 | -0.023 | -$ 981 |
| OTHERS | 82,635 | 11.79 | $45,020 | -0.007 | -0.007 | -$ 334 |
| MIGRATED AFTER AGE 24 | 7,760 | 9.19 | $42,428 | -0.032 | -0.031 | -$ 1,334 |
| OTHERS | 86135 | 8.00 | $44,992 | -0.011 | -0.011 | -$ 477 |
| MIGRATED AFTER AGE 29 | 4474 | 5.36 | $41,387 | -0.058 | -0.056 | -$ 2,338 |
| OTHERS | 89421 | 4.61 | $44,950 | -0.025 | -0.025 | -$ 1,102 |
| MIGRATED AFTER AGE 39 | 969 | 1.24 | $37,639 | -0.248 | -0.220 | -$ 8,269 |
| OTHERS | 92926 | 0.99 | $44,855 | -0.154 | -0.142 | -$ 6,387 |

The older the entry ages of immigrant men the higher the penalty of an increase in PIMM for them and for other men. This penalty ranges from $800 for migrating after age 12 to $8,200 for migrating after age 39 for immigrant men. The same range for other men is from $300 to $6,300.

### 3. C. Average Effect on Income Based on Industry

This section, in effect, is an extension of the previous chapter with the exception that instead of dividing the labour force according to their occupations, we do it according to the industries they work in. The statistics are reported for all industries as well as separately for 'immigrant', 'mixed', and 'Canadian' industries. Standard deviation of industrial PIMM is 5.05; thus, industries comprising between (19.64+5.05=) 24.69 and (19.64-5.05=) 14.59 percent of immigrants are categorised as 'mixed'. These industries represented approximately 60 percent of both immigrant and Canadian employments. 'Immigrant' industries are defined as those with an immigrantness rate of 24.69 percent or higher; 'Canadian' industries are defined as those with an immigrantness rate of less than 14.59 percent. They represented 10 percent of immigrant jobs and 20 percent of Canadian jobs.

Across all industries, the immigrantness rate, PIMM, is about 21 percent for immigrants while for Canadians it is 19 percent. In 'immigrant' industries average immigrant income is $36,457 compared to $40,055 of Canadians, a difference of more than $3,500. Contrastingly in 'Canadian' industries difference in average income between the groups is $1,600 in favour of the immigrants, although income of both groups is significantly higher than in immigrant industries. Immigrants make more than

Canadians in mixed industries as well, which account for most immigrants and Canadians, approximately 60 percent of both.

**Table 6: Effect on Annual Income by Industry Type (Both Sexes)**

| INDUSTRIES | TOTAL | N | % of TOTAL | PIMM | AVG. INCOME | COEF. | e(COF)-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|---|---|
| ALL INDUSTRIES | CANADIANS | 126,284 | 100.00 | 19.33 | $ 39,865 | -0.014 | -0.013 | -$ 535 |
| | IMMIGRANTS | 30,878 | 100.00 | 20.95 | $ 39,108 | -0.021 | -0.021 | -$ 824 |
| IMMIGRANT INDUSTRIES[3] | CANADIANS | 24,821 | 19.65 | 26.66 | $ 40,055 | -0.104 | -0.099 | -$ 3,953 |
| | IMMIGRANTS | 9,059 | 29.34 | 26.94 | $ 36,457 | -0.073 | -0.070 | -$ 2,563 |
| MIXED INDUSTRIES | CANADIANS | 76,989 | 60.96 | 19.26 | $ 38,545 | -0.016 | -0.016 | -$ 599 |
| | IMMIGRANTS | 18,438 | 59.71 | 19.59 | $ 39,254 | -0.023 | -0.022 | -$ 877 |
| CANADIAN INDUSTRIES | CANADIANS | 24,474 | 19.38 | 12.11 | $ 43,826 | -0.016 | -0.016 | -$ 699 |
| | IMMIGRANTS | 3381 | 10.95 | 12.33 | $ 45,416 | -0.021 | -0.021 | -$ 937 |

We also report the estimated coefficient $\hat{\phi}$ using OLS from the regression,

$$LN(W_i) = \delta + \phi.(PIMM)_i + \varepsilon_i .$$

Using the average income and the estimated coefficients we can measure the effect on average annual income with any changes in PIMM in industries. For all industries altogether for men and women combined, an increase in PIMM leads to a decline in average annual income for both Canadians and immigrants, although, not by very much, $535 and $824 respectively. For 'immigrant' industries this effect is very large. Canadians in 'immigrant' jobs pay a penalty in the amount of $4000. Immigrants in the same category are penalised in the amount of $2500. For 'mixed' industries the effect on average annual income is also negative with an increase in PIMM. Fall in income in 'mixed' industries is not as substantial, $600 for Canadians and $877 for immigrants. In

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[3] List of industries under each category can be found in appendix 1

'Canadian' industries increase in PIMM makes Canadians pay penalty in the amount of $700, less than it does immigrants ($937).

Table 7 and Table 8 below show the same comparisons separately for males and females respectively. Although the actual numbers are of course different for males from both sexes together, it follows a very similar pattern. In 'immigrant' industries Canadian males pay a significantly higher penalty than immigrant men and in 'Canadian' industries immigrant men pay higher penalty than Canadian males with increase in PIMM. There appears a small twist in the tale when we examine women separately.

**Table 7: Effect on Annual Income by Industry Type (Male)**

| INDUSTRIES | MALE | N | % of TOTAL | PIMM | AVG. INCOME | COEF. | e(COF)-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|---|---|
| ALL INDUSTRIES | CANADIANS | 75,247 | 100.00 | 19.29 | $ 44,947 | -0.008 | -0.008 | -$ 345 |
| | IMMIGRANTS | 18,648 | 100.00 | 21.11 | $ 44,104 | -0.018 | -0.018 | -$ 806 |
| IMMIGRANT INDUSTRIES | CANADIANS | 17,978 | 23.89 | 26.28 | $ 44,669 | -0.088 | -0.084 | -$ 3,759 |
| | IMMIGRANTS | 6,305 | 33.81 | 26.76 | $ 41,194 | -0.080 | -0.077 | -$ 3,158 |
| MIXED INDUSTRIES | CANADIANS | 40,803 | 54.23 | 19.14 | $ 43,998 | -0.001 | -0.001 | -$ 62 |
| | IMMIGRANTS | 10,139 | 54.37 | 19.51 | $ 44,600 | -0.009 | -0.009 | -$ 399 |
| CANADIAN INDUSTRIES | CANADIANS | 16,466 | 21.88 | 12.04 | $ 47,603 | -0.017 | -0.017 | -$ 800 |
| | IMMIGRANTS | 2204 | 11.82 | 12.30 | $ 50,150 | -0.024 | -0.024 | -$ 1,192 |

Canadian females pay substantial penalty in immigrant industries with an increase in PIMM; the knock on their annual income is well over twice as much the hit that immigrant females take. But, in Canadian industries immigrant females suffer ever so slightly, where as Canadian females actually reap some benefit with increase in PIMM.

**Table 8:** **Effect on Annual Income by Industry Type (Female)**

| INDUSTRIES | FEMALE | N | % of TOTAL | PIMM | AVG. INCOME | COEF. | e(COF)-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|---|---|
| ALL INDUSTRIES | CANADIANS | 51,037 | 100.00 | 19.38 | $ 32,372 | -0.024 | -0.023 | -$ 756 |
| | IMMIGRANTS | 12,230 | 100.00 | 20.71 | $ 31,490 | -0.030 | -0.029 | -$ 926 |
| IMMIGRANT INDUSTRIES | CANADIANS | 6,843 | 13.41 | 27.67 | $ 27,932 | -0.081 | -0.078 | -$ 2,165 |
| | IMMIGRANTS | 2,754 | 22.52 | 27.37 | $ 25,614 | -0.040 | -0.039 | -$ 1,005 |
| MIXED INDUSTRIES | CANADIANS | 36,186 | 70.90 | 19.39 | $ 32,396 | -0.028 | -0.028 | -$ 900 |
| | IMMIGRANTS | 8,299 | 67.86 | 19.68 | $ 32,722 | -0.037 | -0.037 | -$ 1,198 |
| CANADIAN INDUSTRIES | CANADIANS | 8008 | 15.69 | 12.26 | $ 36,059 | 0.008 | 0.008 | $ 297 |
| | IMMIGRANTS | 1177 | 9.62 | 12.39 | $ 36,552 | -0.003 | -0.003 | -$ 92 |

The results vary significantly if we categorise immigrants according to their place of birth, year of immigration, or the age at which they immigrated to Canada. The following Tables show us the effect on annual incomes of male immigrants and compare that to the effect on income of men of the rest of the labour force.

**Table 9: Effect on Annual Income by Birthplace and Year of Immigration (Male)**

| MALE (INDUSTRY) | N | PIMM | AVG. INCOME | COEF. | e(COF)-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|
| NONWHITE IMMIGRANTS | 14,370 | 15.90 | $ 38,796 | -0.032 | -0.031 | -$ 1,213 |
| OTHERS | 79,525 | 15.20 | $ 45,861 | -0.018 | -0.018 | -$ 808 |
| MIGRATED AFTER 1980 | 5,954 | 7.84 | $ 35,989 | -0.035 | -0.034 | -$ 1,234 |
| OTHERS | 87,941 | 6.25 | $ 45,375 | -0.022 | -0.022 | -$ 976 |
| MIGRATED AFTER 1990 | 1,943 | 2.67 | $ 31,514 | -0.090 | -0.086 | -$ 2,698 |
| OTHERS | 91,952 | 2.02 | $ 45,060 | -0.074 | -0.071 | -$ 3,214 |

Increase in PIMM penalises non-European, non-US immigrant males by $1,200 and other males by $800. Immigrant men who came to Canada after 1980 are penalised by $1,200 with an increase in PIMM and other men pay a penalty of approximately

$1,000. Immigrant men of post-1990 cohorts face a penalty of $2,700 with an increase in PIMM and other men face a penalty of $3,200.

Average income of immigrant males who migrated after age 12 is $43,000 compared to $37,000 of immigrant men who migrated after age 39. The older the entry ages of immigrant men the higher the penalty of an increase in PIMM for them and for other men. This penalty ranges from $900 for migrating after age 12 to $9,300 for migrating after age 39 for immigrant men. The same range for other men is from $400 to $8,100.

**Table 10: Effect on Annual Income by Age of Immigration (Male)**

| MALE (INDUSTRY) | N | PIMM | AVG. INCOME | COEF. | e(COF)-1 | EFFECT on ANNUAL INCOME |
|---|---|---|---|---|---|---|
| MIGRATED AFTER AGE 12 | 13,994 | 16.48 | $ 43,055 | -0.021 | -0.021 | -$ 907 |
| OTHERS | 79,901 | 14.47 | $ 45082 | -0.010 | -0.010 | -$ 431 |
| MIGRATED AFTER AGE 19 | 11,260 | 13.30 | $ 43,019 | -0.025 | -0.025 | -$ 1,068 |
| OTHERS | 82,635 | 11.60 | $ 45,020 | -0.011 | -0.011 | -$ 487 |
| MIGRATED AFTER AGE 24 | 7,760 | 9.10 | $ 42,428 | -0.034 | -0.034 | -$ 1,437 |
| OTHERS | 86135 | 7.84 | $ 44,992 | -0.015 | -0.015 | -$ 654 |
| MIGRATED AFTER AGE 29 | 4474 | 5.29 | $ 41,387 | -0.054 | -0.053 | -$ 2,188 |
| OTHERS | 89421 | 4.54 | $ 44,950 | -0.030 | -0.029 | -$ 1,315 |
| MIGRATED AFTER AGE 39 | 969 | 1.24 | $ 37,639 | -0.286 | -0.249 | -$ 9,370 |
| OTHERS | 92926 | 0.99 | $ 44,855 | -0.200 | -0.181 | -$ 8,131 |

## CHAPTER SUMMARY

We see that increase in percentage of immigrants in jobs have non-negligible effects on the annual income at the micro level. This is truer for the leaner definitions of immigrants. We are going to find out more about these effects in the subsequent sections.

# CHAPTER 4

## Econometric Framework

This study draws inspiration from well-publicized work of Baker and Fortin (2001), who studied the relationship between 'femaleness' and wage differentials of occupations for men and women in Canada. They used proportion of females in occupations (PFEM) and studied the effects of change in PFEM on wages for both males and females. This thesis employs similar technique, only use proportion of immigrants (PIMM) in occupations to study the effects of change in PIMM on wages for both male and female immigrants and Canadians. It also uses the PIMM in industries to study comparable effects.

Our main objective is to investigate the effect of an increase in occupational as well as in industrial PIMM on income of immigrants and Canadians. This will also allow us to conjecture whether there is any discrimination against immigrants or if they are segregated into low paying occupations or industries. We start our proceedings with dividing individuals into 25 occupational categories.

### *4. A. Occupational Categories*

A standard wage equation captures the effects of wage determining factors on income. Income of individual $i$ is therefore:

$$LN(W_i) = X_i\beta + V_i,$$

where $LN(W_i)$ is the log of yearly income, $X_i$ are characteristics that vary by individuals, and $V_i$ is an individual specific error term.

This study is investigating if the occupation that a person works in has any influence in determining his or her income and whether percentage of immigrants working in an occupation has any relevance in determining the wages of that occupation. We, therefore, include a dummy variable for occupations in our wage equation and specify the income of individual $i$ as

$$LN(W_i) = X_i \beta + \alpha_k (OCC_k) + V_i, \tag{1}$$

where $OCC_k$ are occupational category dummy variables that take the value 1 if the individual is in occupation $k$ ($k = 1$ to 25) and 0 otherwise. The occupational category wage effects, $\alpha_k$, captures the impact of various characteristics of occupation $k$ on individual wages, controlling for the individual characteristics $X_i$. The interest here is one characteristic in particular: the percentage of employment in occupation $k$ that is immigrants, denoted $PIMM_k$. Therefore, we focus on the equation

$$\alpha_k = \lambda + \phi(PIMM)_k + \eta_k, \tag{2}$$

where $\phi$ is the parameter of interest and where $\eta_k$ captures the wage effects of occupation $k$ characteristics other than $PIMM_k$. In other words, (un)desirability of occupation specific characteristics such as job security, working environment etc. has an effect in determining the wage level and $\eta_k$ captures that.

A common assumption in similar previous studies is that the residual occupation effects, $\eta_k$, such as the effects of workplace safety and flexible hours are unrelated to

$PIMM_k$. In this case estimating equation (2) yields unbiased estimates of $\phi$, or in other words, $\phi$ will not be influenced by the omitted characteristics of occupations.

As mentioned above, the question this study is attempting answered can be divided into two separate and equally important parts: (1) if the occupation that a person works in has any influence in determining his or her income, and (2) whether percentage of immigrants working in an occupation (PIMM) has any relevance in determining the wages of that occupation. To that end, estimating equation (1) $[LN(W_i) = X_i\beta + \alpha_k(OCC_k) + V_i]$ gives us the answer to the first part of the puzzle and estimating equation (2) $[\alpha_k = \lambda + \phi(PIMM)_k + \eta_k]$ answers the second part of the question as well as the overall question, which is whether $\phi$ affects income.

To implement this 'two-step' approach, we first estimate equation (1) by ordinary least-squares (OLS). The resulting estimates of the occupation wage effects can be expressed as

$$\hat{\alpha}_k = \alpha_k + \varepsilon_k, \tag{3}$$

where $\varepsilon_k$ is the measurement error in the $\hat{\alpha}_k$. Step 2 estimates the equation

$$\hat{\alpha}_k = \lambda + \phi(PIMM)_k + (\varepsilon_k + \eta_k), \tag{4}$$

using the estimates of the occupation effects in equation (2) as the dependent variable. There are two components in the error term, $\varepsilon_k$ or $\eta_k$, and the appropriate estimation strategy for equation (4) depends on which of the error components dominates the in the composition of the error term. Number of people working in each occupation is not the same suggesting a Weighted Least Squares (WLS) strategy. The appropriate weights are

proportional to an occupation's sample size or the variance of its fixed effect $\alpha_k$. In the composite error term if $\eta_k$ - wage effects of occupation $k$ characteristics other than $PIMM_k$ - is dominant, OLS is appropriate for the second stage and each occupation would be weighted equally. It is our choice for this study to use OLS for the first step (equation 1) and WLS for the second step (equation 2) using each occupation's proportion in the labour force as its weight.

We also estimate the more common approach used in the literature, a 'one-step' method to obtain an estimate of $\phi$ from the equation

$$LN(W_i) = \lambda + X_i\beta + \phi(PIMM)_k + (\eta_k + V_i),$$ (5)

Equation (5) yields unbiased estimates of $\phi$ if $\eta_k$ is orthogonal to $PIMM_k$ and $X_i$. That the immigrantness of occupations (PIMM) is uncorrelated with occupational characteristics, $OCC_k$, allows us to not include the occupational dummy variables in the one-step model. To elaborate, we are assuming that higher income in one occupation due to inflexibility of working hours or unsafe work environment has little to do with the proportion of immigrants working in that particular occupation. One implication of this assumption is that the variable PIMM will not capture the wage effect of (un)desirability of the nature of the occupation such as job safety or flexibility of working hours.

That the standard errors estimated by the one-step model are potentially biased makes the 'two-step' procedure of equation (1) and (2) more preferable. Workers working in the same occupation face similar appealing or repelling characteristics of that particular occupation. Hence, because of $\eta_k$, the composite error term is correlated

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across individuals within occupations. Moulton (1986) has extensively discussed this problem of using grouped data in an individual-level regression.

Relaxing the assumption that residual occupation effects are uncorrelated with the individual characteristics and occupational immigrantness rate, any wage-related occupational characteristics do not bias the estimate of $\beta$ in the two-step procedure. This is because unrestricted occupation fixed effects are included in the first stage. Although, the coefficient of interest that we estimate from the second stage, $\phi$, is subject to a standard omitted variables bias. Variables for job security, risk associated with the occupation, flexibility of working hours, among others, are possible notable exclusions.

The estimates of both $\beta$ and $\phi$ are biased in the one-step procedure. Occupation effects that are not linear in $PIMM_k$ and correlated with $X_i$ cause $\beta$ to be biased.

Some previous studies on gender-based segregation report that one-step and two-step estimation strategies can lead to different results.[4] Considering the instances in which they estimate the same object is, therefore, useful. If $\eta_k$ is truly a random effect, the two procedures should lead to similar estimates, all else being equal. If the uncorrelated (orthogonality) condition does not hold, each procedure produces a biased estimate of $\phi$. However, under the following circumstances the bias should be the same: (1) If there are no other control variables in the regression (i.e., no $X_i$), or (2) if $\beta$ in both the procedures are same. As noted above, the estimate of $\beta$ from the two-step procedure is unbiased, while the estimate of $\beta$ from the one-step procedure is not. For the bias in the estimated $\phi$ to be different in the two procedures, however, this

[4] For Example, Macpherson and Hirsch (1995, page 450) report that the gender composition coefficient for males (using their expanded specification) is -0.0986 from a one-step procedure, and -0.1305 from a two-step procedure.

difference is not sufficient. The individual characteristics, $X_i$, also has to be correlated with the immigrantness rate, $PIMM_k$, for the bias in the estimated $\phi$ to be different in the two procedures. If, on the other hand, they are uncorrelated, the two procedures should have a similar bias.

To have a more clear perspective on this bias issue, it is helpful to think about the possible components of the residual occupation effects, $\eta_k$. Omitted job characteristics may be the solitary basis of compensating wage differentials across occupations. The evidence in Macpherson and Hirsch (1995) suggests that when these characteristics are omitted there is a significant bias in estimates of the effect of gender composition on wages. Another component of the residual occupation effects can be the average characteristics of co-workers in an occupation, which can be motivated by human capital externalities (see, e.g., Acemoglu and Angrist 2000; Moretti 1999).[5] This example is interesting because it is type of omitted variable that would lead the one-step and two-step estimates of $\phi$ to differ. Observable components of these human capital externalities are simply the average $X_i$ by occupation, denoted $\overline{X_k}$.

Let us assume that the bias in $\phi$ is due to the correlation of $PIMM_k$ with the omitted variable $\overline{X_k}$. $\overline{X_k}$ is correlated with $X_i$ by construction, which implies that $PIMM_k$ is also correlated with $X_i$. In this case the bias in the estimate of $\beta$ compounds the standard omitted variable bias in the one-step estimate of $\phi$. In the two-

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[5] Individuals' wages increasing in the average education in their occupation is an example of such an externality effect.

step procedure there is only the standard omitted variables bias in $\overset{\wedge}{\phi}$ and the estimate of

$\beta$ is unbiased.


## *4. B. Industrial Categories*

Now we repeat the above mentioned process dividing individuals into 16 industrial categories. Thus, the revised equations (1 to 5) become:

$$LN(W_i) = X_i\beta + \alpha_k(IND_k) + V_i, \tag{1a}$$

where the $X_i$ are characteristics that vary by individuals, $IND_k$ are industrial category dummy variables that take the value 1 if the individual is in industry $k$ ($k = 1$ to 16) and 0 otherwise, $V_i$ is an individual specific error term. The industrial category wage effects, $\alpha_k$, captures the impact of the various characteristics of industry $k$ on individual wages, controlling for the individual characteristics $X_i$. The interest here is one characteristic in particular: the percentage of employment in industry $k$ that is immigrants, denoted $PIMM_k$. Therefore, we focus on the equation

$$\alpha_k = \lambda + \phi(PIMM)_k + \eta_k, \tag{2a}$$

where $\phi$ is the parameter of interest and $\eta_k$ captures the wage effects of industry $k$ characteristics other than $PIMM_k$.

$$\overset{\wedge}{\alpha}_k = \alpha_k + \varepsilon_k, \tag{3a}$$

where $\varepsilon_k$ is the measurement error in the $\overset{\wedge}{\alpha}_k$. Next, we estimate the equation

$$\overset{\wedge}{\alpha}_k = \lambda + \phi(PIMM)_k + (\varepsilon_k + \eta_k), \tag{4a}$$

using the estimates of the industry effects in equation (2a) as the dependent variable. For the second step (equation 2a) we use proportion of each industry's sample size as weight.

It is more common in the literature to obtain an estimate of $\phi$ using a 'one-step' method. The two-step method can be sidestepped by estimating

$$LN(W_i) = \lambda + X_i\beta + \phi(PIMM)_k + (\eta_k + V_i), \tag{5a}$$

## CHAPTER SUMMARY

Our main objective is to investigate the effect of an increase in occupational as well as in industrial PIMM on income of immigrants and Canadians. Now that we outlined the methodology used in this study, in the following section we will discuss the estimates of the coefficients that interest us.

# CHAPTER 5

# <u>Results</u>

In this section we present comprehensive estimates of our one-step and two-step procedures of the relationship between wages and the immigrantness of occupations and industries in Canada (PIMM). It is our belief that there is little reason for the $\beta$ coefficients to be identical for men and women. Or in other words, individual and job characteristics affect men and women differently. As a result, presenting the estimates separately for men and women enables us to compare the effect on Canadian men against that on immigrant men and Canadian women against their immigrant counterparts. When we categorise immigrants according to various criterion (e.g. age of immigration), we compare those immigrants against the rest of the labour force.

## *5. A. Occupational Categories*

### **5. A. 1 (a). Earning Function: Two Step Procedure**

Table 11 presents the estimates of the first-step (equation 1) of the two-step approach for males and females – Canadians and immigrants separately – when we classify the labour force into 25 occupational categories. We use dummy variables for education attainment. College graduates are our base group (almost one third of the individuals in our sample are college graduates) and the other three groups are high school dropouts, high school graduates, and people with more than high school but less

than 16 years of schooling. Dummy variables are also used for (1) marital status, with people reporting living with a spouse at the time of questioning regarded as married and all others as singles, (2) having dependent children, (3) visible minority status, (4) efficiency in official language(s), (5) living in metropolitan areas (CMAs), and (6) province of residence, where we use Ontario as the base province (a little less than half of the sample population live there). It is important mentioning that we do not consider people living in Yukon and the North-West Territories in our dataset.

**Table 11: Estimated Effects of Wage Determining Factors from Two-Step Procedure (Occupation)**

| 1ST STEP OLS | MALE | | FEMALE | |
|---|---|---|---|---|
| OCCUPATION | CANADIANS | IMMIGRANTS | CANADIANS | IMMIGRANTS |
| Age | 0.066 | 0.048 | 0.065 | 0.047 |
| Age Square | -0.001 | 0.000 | -0.001 | 0.000 |
| EDUCATION | BASE GROUP: COLLEGE GRADUATES | | | |
| Some Schooling | -23.02 | -21.79 | -25.75 | -21.19 |
| High School Graduates | -17.56 | -19.40 | -19.88 | -16.88 |
| Some College | -13.44 | -12.63 | -15.80 | -12.22 |
| MARITAL STATUS | BASE GROUP: LEGALLY NOT MARRIED | | | |
| Legally Married | 9.61 | 5.70 | -0.17 [6] | -2.17 |
| CHILDREN | BASE GROUP: NO DEPENDENT CHILD | | | |
| Have Dependent Child(ren) | 6.60 | 4.57 | -4.62 | -2.04 |
| CITYDWELLERS | BASE GROUP: NOT METROPOLITAN CITY RESIDENTS | | | |
| City Residents | 7.98 | 1.92 | 11.79 | 10.68 |
| MINORITY STATUS | BASE GROUP: NOT VISIBLE MINORITIES | | | |
| Visible Minorities | -5.31 | -17.22 | -0.94 | -7.79 |
| FIRST LANGUAGE | BASE GROUP: NOT ENGLISH and/or FRENCH | | | |
| English and/or French | 5.34 | 11.55 | 0.65 | 8.08 |
| PROVINCE | BASE GROUP: ONTARIO | | | |
| Alberta | -4.84 | -6.12 | -9.94 | -10.92 |
| BC | 3.80 | -2.81 | 0.36 | -1.43 |
| Manitoba | -14.15 | -15.91 | -14.22 | -18.62 |
| New Brunswick | -13.04 | -0.18 | -13.77 | -20.01 |
| New Foundland | -13.09 | -5.02 | -13.35 | 2.39 |
| Nova Scotia | -17.33 | -15.84 | -17.84 | -19.38 |
| PEI | -19.43 | -24.02 | -15.69 | -30.21 |
| Quebec | -10.96 | -14.23 | -11.78 | -13.96 |
| Saskatchewan | -14.07 | -6.33 | -15.95 | -15.68 |

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[6] The grey-shaded coefficients are statistically not significant at the 95% confidence level.

In all the Tables where we report estimated effects of the wage determining factors, we report $\exp^{\phi} - 1$ to show the percentage points change in most coefficients. Only exceptions are 'age' and 'age square' variables, for which we report the $\beta$ coefficient itself.

College graduates earn 13% more than college dropouts for Canadian males. This figure soars up to 18% when compared to high school graduates and 23% to high school dropouts. The percentage increases are similar for Canadian females and immigrant males and females. Married males of both groups earn more than single men. It probably is linked with being more sTable, responsible, and inclined to work hard to support family. Canadian males who are married earn 10% more than who are not. Male Immigrants who are married earn 6% more than their non-married counterparts. Interestingly enough, married females of both groups earn less than single women, although not by much.

Proficiency of immigrant males in official languages, English and/or French, assists them earning 12% more than those immigrant males who are not as efficient. This supplement is 8% for immigrant females. Canadian men living in metropolitan areas earn 8% more than those who live in non-metropolitan areas, but immigrant men earn only 2% more when made the same comparison. Canadians, both male and female, make more money in Ontario than in all other provinces, with the exception of British Columbia. Where Canadians living in BC earn more, immigrants actually are penalised for living in the West coast. Living in Newfoundland, on the other hand, is beneficial for immigrant females who earn 2% more living in the East coast compared to Canadian females' penalty of 13%.

## 5. A. 1 (b). Earning Function: One Step Procedure

Table 12 presents the estimated $\beta$ coefficients of the one-step method (equation 5) using OLS, subcategorising Canadians and immigrants into males and females. The one-step estimates (actual percentage points) are markedly different, although the relative numbers are similar.

**Table 12: Estimated Effects of Wage Determining Factors from One-Step Procedure (Occupation)**

| ONE STEP OLS | MALE | | FEMALE | |
|---|---|---|---|---|
| OCCUPATION | CANADIANS | IMMIGRANTS | CANADIANS | IMMIGRANTS |
| Age | 0.071 | 0.055 | 0.076 | 0.052 |
| Age Square | -0.001 | -0.001 | -0.001 | -0.001 |
| **EDUCATION** | BASE GROUP: COLLEGE GRADUATES | | | |
| Some Schooling | -31.88 | -33.67 | -39.36 | -34.72 |
| High School Graduates | -25.08 | -29.76 | -32.87 | -29.49 |
| Some College | -18.71 | -20.57 | -25.53 | -21.86 |
| **MARITAL STATUS** | BASE GROUP: LEGALLY NOT MARRIED | | | |
| Legally Married | 11.79 | 7.23 | 0.88 | -1.66[7] |
| **CHILDREN** | BASE GROUP: NO DEPENDENT CHILD | | | |
| Have Dependent Child(ren) | 7.79 | 4.94 | -4.45 | -1.68 |
| **CITYDWELLERS** | BASE GROUP: NOT METROPOLITAN CITY RESIDENTS | | | |
| City Residents | 8.88 | 2.85 | 12.79 | 10.80 |
| **MINORITY STATUS** | BASE GROUP: NOT VISIBLE MINORITIES | | | |
| Visible Minorities | -5.73 | -18.90 | -1.66 | -9.70 |
| **FIRST LANGUAGE** | BASE GROUP: NOT ENGLISH and/or FRENCH | | | |
| English and/or French | 5.31 | 14.22 | 0.85 | 10.00 |
| **PROVINCE** | BASE GROUP: ONTARIO | | | |
| Alberta | -5.45 | -6.80 | -12.04 | -12.22 |
| BC | 3.11 | -3.49 | -1.58 | -2.72 |
| Manitoba | -15.07 | -16.99 | -15.27 | -18.93 |
| New Brunswick | -13.54 | 0.44 | -14.92 | -21.60 |
| New Foundland | -13.50 | -3.13 | -15.56 | 8.43 |
| Nova Scotia | -18.43 | -14.08 | -19.42 | -20.23 |
| PEI | -21.40 | -21.85 | -17.85 | -27.13 |
| Quebec | -11.50 | -14.86 | -12.56 | -12.81 |
| Saskatchewan | -15.56 | -7.23 | -18.18 | -16.12 |

For example, in the two-step method married Canadian men earn 10% more than unmarried Canadian males and immigrant males that are married make 6% more than

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[7] The grey-shaded coefficients are statistically not significant at the 95% confidence level.

single men. On the other hand, in the one-step method married Canadian men earn 12% more than unmarried Canadian males and immigrant males that are married make 7% more than their single counterparts. Comparing other variables also illustrates that even though the actual numbers in two procedures are different, they both paint a similar picture when we divide the labour force based on occupations.

One noTable difference in the one-step estimate is that Canadian females also earn less in British Columbia than in Ontario.

## 5. A. 2 (a). Wage Penalties: Immigrants as a Homogeneous Group

A small value of $\hat{\phi}$ suggests that the wage penalty/reward in immigrant occupations is very modest. A larger value suggests a larger penalty/compensation. Statistical significance of the estimates is important in this context. Insignificant estimates will indicate that there is not enough evidence to suggest that immigrant occupations are penalised or rewarded.

**Table 13: Estimated Effects of Immigrant Composition on Occupational Income**

| OCCUPATION | | |
|---|---|---|
| PIMM | CANADIANS | IMMIGRANTS |
| STEP 1. OLS + STEP 2. WLS | -0.29 (0.006) | -0.84 (0.053) |
| 1 STEP PROCEDURE (OLS) | -0.26 ***[8] (0.189) | -0.68 *** (0.210) |

| OCCUPATION | MALE | | FEMALE | |
|---|---|---|---|---|
| PIMM | CANADIANS | IMMIGRANTS | CANADIANS | IMMIGRANTS |
| STEP 1. OLS + STEP 2. WLS | -0.33 (0.013) | -0.80 (0.060) | -0.53 (0.023) | -1.36 * (0.113) |
| 1 STEP PROCEDURE (OLS) | 0.05 (0.204) | -0.39 *** (0.222) | -1.37 *** (0.266) | -1.63 *** (0.250) |

Numbers inside the brackets are the $R^2$ values of the respective regressions.

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[8] *=90% significant, **=95% significant, ***=99% significant

For immigrant males there is a fairly wide difference in estimates between the two procedures. Both two-step and one-step estimate suggests a wage penalty for immigrant males in immigrant occupations. The former estimate indicates twice as higher a penalty (0.8%) for immigrant males than the one-step estimate does, but it is statistically insignificant. The one-step method suggests a penalty of 0.39%, while the statistical significance of it is hard to evaluate, since the standard error estimate is potentially biased. The estimates for Canadian males are uniformly much smaller than their immigrant counterparts. In fact the one-step procedure suggests some potential benefits (0.05%), although without any degree of significance. Both procedures suggest a significantly large penalty (1.36% and 1.63%) for immigrant females in immigrant occupations and both of them are statistically significant, although the level of significance varies. Potential penalty (0.53% and 1.37%) as suggested by both the methods are smaller for Canadian females in immigrant occupations when compared with the penalty for immigrant females.

We can use an example to elaborate on this. Given an average PIMM of 19.537 percent (0.19537) for Canadian males, the two-stage estimates of -0.33 for Canadian men imply an elasticity of ($\{0.19537\} \times \{-0.33\} =$) -0.0644. The same elasticity for the one-step estimate is ($0.19537 \times 0.05 =$) 0.0097.

### 5. A. 2 (b). Wage Penalties: Non-White Immigrants

So far we have presented results considering all immigrants are homogeneous. Now we distinguish among immigrants according to a wide array of criterion and present estimates of the PIMM coefficient for immigrants and Canadians by different groupings to provide a full spectrum of results. First, immigrants that were born outside

Canada, United States or Europe are grouped together against the rest of the population (including immigrants from Europe and United States). We look at the males of both these groups to deduce the effect of increase of these immigrants in the labour force in Table 14.

**Table 14: Effect of Composition of Non-White Immigrants (Occupation)**

| OCCUPATION | MALE | |
|---|---|---|
| PIMM | NON-WHITE IMMIGRANTS | OTHERS |
| 1. OLS, 2. WLS | -1.59 * (0.116) | -1.19 (0.089) |
| 1 STEP OLS | -1.24 *** (0.196) | -0.78 *** (0.200) |

These percentage points are quite high compared to the results we got when all immigrants were considered homogenous. Both two-step and one-step estimates suggest that wage penalty for non-white immigrant males in immigrant occupations is higher than the penalty paid by other men in the labour force.

## 5. A. 2 (c). Wage Penalties: By Year of Immigration

Next, we categorise immigrants who entered Canada after 1980 against rest of the labour force (including immigrants who came prior to 1980) and do the same for immigrants who arrived after 1990. Males are our representative group here enabling us to compare the effect of such immigrants joining the labour force.

**Table 15: Effect of Composition of Year of Immigration (Occupation)**

| OCCUPATION | MALE | | MALE | |
|---|---|---|---|---|
| PIMM | MIGRATED AFTER 1980 | OTHERS | MIGRATED AFTER 1990 | OTHERS |
| 1. OLS, 2. WLS | -2.18 ** (0.196) | -1.59 * (0.114) | -4.02 * (0.165) | -4.69 ** (0.184) |
| 1 STEP OLS | -1.36 *** (0.217) | -0.83 *** (0.203) | -4.61 *** (0.205) | -3.63 *** (0.209) |

All the estimates are significant at varying degrees. It is easy to observe that the later the immigrants come, the higher the penalty they pay. Or in other words, immigrants take a long time to have their income converged with that of Canadians. The large percentage points in Table 15 suggest that 15, which most researchers found to be the number of years required to have the immigrants' income converge with Canadians', may not be long enough for the recent cohorts.

## 5. A. 2 (d). Wage Penalties: By Age at Immigration

The next sets of results give indication to if there is any effect of immigrants coming in earlier or latter days of their lives. We assemble immigrants who migrated to Canada after age 12 against the rest. Similar technique is employed to categorise immigrants who migrated after 19, 24, 29, and 39.

**Table 16: Effect of Composition of Age of Immigration (Occupation)**

| OCCUPATION | IMMIGRANT MALES MIGRATED | | | | |
|---|---|---|---|---|---|
| PIMM | AFTER AGE 12 | AFTER AGE 19 | AFTER AGE 24 | AFTER AGE 29 | AFTER AGE 39 |
| 1. OLS, 2. WLS | -1.00 (0.099) | -1.09 (0.087) | -1.78 (0.109) | -3.92 ** (0.214) | -16.05 *** (0.331) |
| 1 STEP OLS | -0.58 *** (0.225) | -0.64 *** (0.243) | -0.98 *** (0.249) | -2.20 *** (0.245) | -14.80 *** (0.249) |
| OCCUPATION | OTHER MALES | | | | |
| PIMM | AFTER AGE 12 | AFTER AGE 19 | AFTER AGE 24 | AFTER AGE 29 | AFTER AGE 39 |
| 1. OLS, 2. WLS | -0.60 (0.039) | -0.60 (0.031) | -0.80 (0.029) | -1.69 (0.059) | -10.33 ** (0.214) |
| 1 STEP OLS | -0.15 *** (0.206) | -0.16 *** (0.205) | -0.26 *** (0.207) | -0.81 *** (0.209) | -7.27 *** (0.213) |

It is quite obvious from the above results that the earlier (younger) the immigrants come to Canada, the better they perform in the labour market. People who migrate at 40 years of age or older pay a very large penalty compared to people who

migrate after age 12. As discussed earlier, the difference between the one-step and two-step estimates suggests that the assumption that the residual occupation effects, $\eta_k$, are random may be inappropriate.

## *5. B. Industrial Categories*

## 5. B. 1 (a). Earning Function: Two Step Procedure

**Table 17: Estimated Effects of Wage Determining Factors from Two-Step Procedure (Industry)**

| 1ST STEP OLS | MALE | | FEMALE | |
|---|---|---|---|---|
| **INDUSTRY** | **CANADIANS** | **IMMIGRANTS** | **CANADIANS** | **IMMIGRANTS** |
| Age | 0.062 | 0.050 | 0.066 | 0.045 |
| Age Square | -0.001 | 0.000 | -0.001 | 0.000 |
| **EDUCATION** | **BASE GROUP: COLLEGE GRADUATES** | | | |
| Some Schooling | -31.26 | -30.23 | -34.92 | -31.90 |
| High School Graduates | -24.64 | -26.23 | -28.88 | -25.63 |
| Some College | -18.70 | -18.13 | -22.49 | -18.75 |
| **MARITAL STATUS** | **BASE GROUP: LEGALLY NOT MARRIED** | | | |
| Legally Married | 10.68 | 6.28 | 0.91 | -1.31[9] |
| **CHILDREN** | **BASE GROUP: NO DEPENDENT CHILD** | | | |
| Have Dependent Child(ren) | 7.27 | 5.00 | -4.71 | -2.23 |
| **CITYDWELLERS** | **BASE GROUP: NOT METROPOLITAN CITY RESIDENTS** | | | |
| City Residents | 8.74 | 2.80 | 11.55 | 9.56 |
| **MINORITY STATUS** | **BASE GROUP: NOT VISIBLE MINORITIES** | | | |
| Visible Minorities | -5.02 | -18.23 | -2.52 | -9.58 |
| **FIRST LANGUAGE** | **BASE GROUP: NOT ENGLISH and/or FRENCH** | | | |
| English and/or French | 4.32 | 12.44 | 1.17 | 9.31 |
| **PROVINCE** | **BASE GROUP: ONTARIO** | | | |
| Alberta | -5.19 | -6.64 | -11.18 | -11.64 |
| BC | 3.97 | -1.63 | -0.04 | -1.40 |
| Manitoba | -13.93 | -17.82 | -15.32 | -19.44 |
| New Brunswick | -13.39 | -0.01 | -14.94 | -19.49 |
| New Foundland | -12.82 | -0.25 | -14.86 | 5.52 |
| Nova Scotia | -18.06 | -13.15 | -18.89 | -19.71 |
| PEI | -16.71 | -18.23 | -18.07 | -24.36 |
| Quebec | -10.60 | -13.70 | -12.08 | -12.81 |
| Saskatchewan | -13.39 | -4.91 | -17.14 | -15.20 |

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[9] The grey-shaded coefficients are statistically not significant at the 95% confidence level.

Table 17 above presents the $\beta$ coefficients (equation 1a) of the two-step approach for males and females – both Canadians and immigrants – separating the labour force into 16 industrial categories.

As mentioned earlier, equation (1) and equation (1a) are virtually the same excepting labour force in equation (1) is categorised according to occupations and according to industries in equation (1a). Recall that dummy variables are used for (1) education attainment, (2) marital status, (3) having dependent children, (4) visible minority status, (5) efficiency in official language(s), (6) living in metropolitan areas (CMAs), and (7) province of residence. Canadian males who are college graduates earn 18% more than college dropouts, 24% more than high school graduates and 31 % more than high school dropouts. These rates are similar for Canadian females and immigrant males and females. Married males of both groups earn more than single individuals. Canadian males who are married earn 10% more than who are not. Male Immigrants who are married earn 6% more than their non-married counterparts. Married Canadian females earn slightly more than non-married Canadian females but, interestingly enough, married immigrant females earn slightly less than those who are single.

Proficiency in official languages, one or both, assist immigrant males in earning 12% more than those immigrant males who are not as efficient. This increase is 8% for immigrant females. Compensating salary differential for living in metropolitan areas is 8% more Canadian men, but only 2% more for immigrant men. Of all Canadian males those living in B.C. earn the most, where Ontario provides highest income for immigrant men. Immigrant females earn 5% more in Newfoundland than in Ontario, compared to Canadian females' penalty of 14%.

## 5. B. 1 (b). Earning Function: One Step Procedure

Table 18 below presents the estimates of the one-step method (equation 5a) using OLS, subcategorising Canadians and immigrants into males and females. Both procedures, however, provide similar estimates (percentage points) of the $\beta$ coefficients.

**Table 18: Estimated Effects of Wage Determining Factors from One-Step Procedure (Industry)**

| ONE STEP OLS | MALE | | FEMALE | |
|---|---|---|---|---|
| **INDUSTRY** | **CANADIANS** | **IMMIGRANTS** | **CANADIANS** | **IMMIGRANTS** |
| Age | 0.070 | 0.054 | 0.073 | 0.051 |
| Age Square | -0.001 | -0.001 | -0.001 | -0.001 |
| **EDUCATION** | **BASE GROUP: COLLEGE GRADUATES** | | | |
| Some Schooling | -31.53 | -33.04 | -39.01 | -35.81 |
| High School Graduates | -24.84 | -29.15 | -31.95 | -28.93 |
| Some College | -18.45 | -20.07 | -24.96 | -21.66 |
| **MARITAL STATUS** | **BASE GROUP: LEGALLY NOT MARRIED** | | | |
| Legally Married | 11.67 | 7.13 | 0.96 | -1.37 |
| **CHILDREN** | **BASE GROUP: NO DEPENDENT CHILD** | | | |
| Have Dependent Child(ren) | 7.67 | 4.91 | -4.59 | -1.83 |
| **CITYDWELLERS** | **BASE GROUP: NOT METROPOLITAN CITY RESIDENTS** | | | |
| City Residents | 9.05 | 3.28 | 13.20 | 11.36 |
| **MINORITY STATUS** | **BASE GROUP: NOT VISIBLE MINORITIES** | | | |
| Visible Minorities | -5.64 | -18.66 | -1.83 | -10.29 |
| **FIRST LANGUAGE** | **BASE GROUP: NOT ENGLISH and/or FRENCH** | | | |
| English and/or French | 5.28 | 13.81 | 0.96 | 11.01 |
| **PROVINCE** | **BASE GROUP: ONTARIO** | | | |
| Alberta | -6.24 | -7.50 | -12.71 | -13.06 |
| BC | 2.72 | -3.74 | -1.96 | -2.58 |
| Manitoba | -15.63 | -17.62 | -16.32 | -20.35 |
| New Brunswick | -14.05 | -0.34 | -15.83 | -22.44 |
| New Foundland | -14.27 | -3.49 | -16.45 | 7.17 |
| Nova Scotia | -19.04 | -15.24 | -20.30 | -19.81 |
| PEI | -21.94 | -20.92 | -19.68 | -28.22 |
| Quebec | -11.56 | -14.73 | -12.76 | -12.89 |
| Saskatchewan | -16.39 | -7.54 | -19.15 | -17.53 |

For example, in the one-step method married Canadian men earn 11% more than unmarried Canadian males and immigrant males that are married make 7% more than

their single counterparts. In the two-step method these numbers are 10% and 6% respectively. Comparing other variables also illustrates that even though the actual numbers in one-step and two-step procedures are different, they both paint a similar picture when the labour force is categorised according to the industries they work in.

## 5. B. 2 (a). Wage Penalties: Immigrants as a Homogeneous Group

Our main objective is to look for whether there is enough evidence to suggest that immigrant industries are categorically penalised or rewarded.

**Table 19: Estimated Effects of Immigrant Composition on Industrial Income**

| INDUSTRY | | |
|---|---|---|
| PIMM | CANADIANS | IMMIGRANTS |
| STEP 1. OLS + STEP 2. WLS | -0.91 (0.081) | -1.13 (0.161) |
| 1 STEP PROCEDURE (OLS) | -0.90 *** (0.196) | -1.04 *** (0.215) |

| INDUSTRY | MALE | | FEMALE | |
|---|---|---|---|---|
| PIMM | CANADIANS | IMMIGRANTS | CANADIANS | IMMIGRANTS |
| STEP 1. OLS + STEP 2. WLS | -0.68 (0.065) | -1.05 (0.160) | -1.28 * (0.211) | -1.81 *** (0.431) |
| 1 STEP PROCEDURE (OLS) | -0.44 *** (0.206) | -0.84 *** (0.226) | -1.58 *** (0.275) | -1.72 *** (0.251) |

Again, a small value of $\hat{\phi}$ suggests that the wage penalty/reward in immigrant industries is very modest and a larger value suggests a larger penalty/compensation. Statistical significance of the estimates is important in this context.

For immigrant males there is a fairly wide difference in estimates between the two procedures. Both two-step and one-step estimates suggest a wage penalty for immigrant males in immigrant jobs. The two-step estimate indicates a penalty of 1.05% for immigrant males, but it is statistically insignificant. The one-step estimate suggests a penalty of 0.84%, while the statistical significance of it is hard to evaluate since the

standard error estimate is potentially biased. The penalty that the Canadian males pay (0.68% or 0.44%) is uniformly much smaller than that of immigrant men and the two-step estimate is statistically insignificant. Both procedures suggest a significantly large penalty (1.81% or 1.72%) for immigrant females in immigrant jobs and both of them are statistically significant. For Canadian females potential penalty as suggested by both the methods (1.28% or 1.58%) is smaller compared to that of immigrant females.

We can use an example to elaborate on this. Given an average PIMM of 19.294 percent (0.19294) for Canadian males, the two-stage estimates of -0.68 for Canadian men imply an elasticity of ($\{0.19294\} \times \{-0.68\} =$) -0.1311. The same elasticity for the one-step estimate is ($\{0.19294\} \times \{-0.44\} =$) -0.0848.

### 5. B. 2 (b). Wage Penalties: Non-White Immigrants

So far we have presented results considering all immigrants are homogeneous. Now we distinguish among immigrants according to a wide array of criterion and present estimates of $\hat{\phi}$ for immigrants and Canadians by different groupings to provide a full spectrum of results. First, immigrants that were born outside Canada, United States or Europe are grouped together against the rest of the population (including immigrants from Europe and United States). We focus on the males of both these groups as a reference point to evaluate the effect of these non-white immigrants in Table 20.

**Table 20: Effect of Composition of Non-White Immigrants (Industry)**

| INDUSTRY | MALE | |
|---|---|---|
| PIMM | NON-WHITE IMMIGRANTS | OTHERS |
| STEP 1. OLS + STEP 2. WLS | -2.35 ** (0.302) | -1.81 (0.156) |
| 1 STEP PROCEDURE (OLS) | -2.01 *** (0.204) | -1.37 *** (0.203) |

These results are quite high compared to the results we got when all immigrants were considered homogenous. Both two-step and one-step estimates suggest statistically significant wage penalty for non-white immigrant males in immigrant jobs that is higher than the penalty paid by other men in the labour force.

## 5. B. 2 (c). Wage Penalties: By Year of Immigration

Next, we categorise immigrants who entered Canada after 1980 against the rest of the labour force (including immigrants who came prior to 1980) and do the same for immigrants who arrived after 1990. Males are our representative group here as well, enabling us to compare the effect of earlier and subsequent cohorts of immigrants.

**Table 21: Effect of Composition of Year of Immigration (Industry)**

| INDUSTRY | MALE | | MALE | |
|---|---|---|---|---|
| PIMM | MIGRATED AFTER 1980 | OTHERS | MIGRATED AFTER 1990 | OTHERS |
| 1. OLS + 2. WLS | -2.25 ** (0.312) | -1.62 (0.134) | -5.88 *** (0.454) | -5.09 * (0.220) |
| 1 STEP OLS | -1.79 *** (0.219) | -1.24 *** (0.206) | -5.36 *** (0.207) | -4.42 *** (0.213) |

All the one-step estimates are at least 99% significant and all but one of the two-step estimates are significant themselves, although to a varying degree.

It is easy to observe that the later the immigrants come, the higher the penalty they pay. Or in other words, immigrants take a long time to have their income converged with that of Canadians. The penalty for males of the rest of the labour force is uniformly smaller than their immigrant counterparts at every comparable age. Expectedly, these estimates are much higher than when all immigrants were considered homogeneous.

## 5. B. 2 (d). Wage Penalties: By Age at Immigration

The next sets of results give indication to if there is any effect of the age at which immigrants enter Canada. We assemble immigrants who migrated to Canada after age 12 against the rest. We focus on the males of both these groups as a reference point to evaluate the effect of age of immigration in Table 22. Similar technique is employed to categorise immigrants who migrated after the age of 19, 24, 29, and 39.

**Table 22: Effect of Composition of Age of Immigration (Industry)**

| INDUSTRY | IMMIGRANT MALES MIGRATED | | | | |
|---|---|---|---|---|---|
| PIMM | AFTER AGE 12 | AFTER AGE 19 | AFTER AGE 24 | AFTER AGE 29 | AFTER AGE 39 |
| 1. OLS + 2. WLS | -1.16 (0.177) | -1.30 (0.163) | -1.90 (0.157) | -3.20 (0.152) | -17.93 *** (0.489) |
| 1 STEP OLS | -0.91 *** (0.228) | -0.97 *** (0.245) | -1.37 *** (0.251) | -2.25 *** (0.244) | -17.50 *** (0.250) |
| INDUSTRY | OTHER MALES | | | | |
| PIMM | AFTER AGE 12 | AFTER AGE 19 | AFTER AGE 24 | AFTER AGE 29 | AFTER AGE 39 |
| 1. OLS + 2. WLS | -0.74 (0.071) | -0.91 (0.075) | -1.26 (0.078) | -2.28 (0.100) | -13.00 ** (0.320) |
| 1 STEP OLS | -0.46 *** (0.208) | -0.55 *** (0.207) | -0.78 *** (0.209) | -1.54 *** (0.211) | -12.03 *** (0.223) |

It is quite obvious from the above results that the earlier (younger) the immigrants come to Canada, the better they perform in the labour market. People who migrated when 40 years of age or older pay a very large and statistically significant penalty (17.93% or 17.50%), whereas people who migrated between age 12 and age 39 counterbalance this penalty to almost next to nothing (1.16% or 0.91%).

# CHAPTER 6

# <u>Conclusion</u>

Analysis of the effect of immigrant composition on income in Canada has uncovered some remarkable particulars. Estimates of the relationship between income and immigrant composition can be sensitive to the choice of estimation strategy and the inclusion of any additional control variables. Although there is some heterogeneity across subgroups, most estimates for Canadians are quite modest and typically statistically insignificant. The estimates for immigrants, however, are uniformly negative, revealing a more substantial penalty for work in immigrant jobs.

Analysis at finer levels of aggregation reveals some heterogeneity in the penalty across groups. In narrower specifications, immigrants who originated from places other than Europe and the United States face significant penalties to working in immigrant jobs relative to co-workers in Canadian jobs. Larger negative penalties are also found for immigrants who have not been in Canada for a very significant period of time. Immigrants who enter Canada at an older age face massive penalties to working in immigrant jobs. Immigration at an earlier age reduces this penalty considerably and childhood immigration almost dissolves any penalty to be had. The corresponding penalties for Canadians are more uniform across the different subgroup specifications and decomposition of the data.

There is no pay equity legislation in place for the betterment of immigrants in Canada and this study can shade some lights as to whether there is a need for one. Pay equity programs for women have been introduced to the public sectors of most provinces, the private sector of Ontario, and more recently the private sector of Quebec. Pay equity programs for immigrants, if that was ever to be put in place, can gain some perspective from the female pay equity legislation on the 'target' for these initiatives, as well as any further extensions of comparable worth.

The aggregate relationship of income with immigrant composition could typically be a rallying point for advocates of pay equity legislation. Our results suggest that for immigrants this aggregate relationship is fairly small, unless they are subcategorised into specific groups (e.g. non-white immigrants, immigration after 1990). A simulation of the contribution of occupational and industrial immigrant segregation to the aggregate immigrant wage differential is correspondingly quite modest. This raises the question whether a universal pay equity program would provide widespread benefits to immigrants.

There are at least two important caveats to these conclusions. First, our results do not preclude the existence of low-paid immigrant occupations or industries, such as chefs and cooks, supervisors, and other occupations in food and beverage service and childcare and home support workers; accommodation, food and beverage services industry. However, there are some immigrants who are likewise low paid in mixed and Canadian occupations and industries: Retail trade supervisors, salespersons, sales clerks and cashiers; retail trade industry (mixed), and occupations unique to primary industries, agriculture industry (Canadian). More important, some immigrants hold immigrant jobs that are relatively highly paid, such as Supervisors, machine operators and assemblers in

manufacturing; jobs in the manufacturing industry. As a result, the immigrant composition of employment does not have strong consequence for the low pay of immigrants at the aggregate level. That is, immigrants are not low paid because and only when they work in immigrant jobs. Immigrants working in immigrant jobs are not at a larger disadvantage relative to their Canadian counterparts than immigrants working in mixed and Canadian jobs. If there is a 'systematic' discrimination in the labour market, it is against all immigrants, not just against immigrants in immigrant jobs.

Second, we do find significant penalties to immigrant work for Canadians, and more so when immigrants are categorised with a rigid classification. Therefore, the potential impact of selective pay equity programs may be greater for these individuals. As is true in many previous studies of comparable worth programs, these predictions are simulations and speculation based on inference from 'pre-legislation' labour market. Further study into the reasons why many immigrant jobs in Canada do not attract a sizeable income penalty remain important topics for future research.

# Appendix

**Immigrant Occupations**
1. Chefs and cooks, supervisors, and other occupations in food and beverage service
2. Childcare and home support workers
3. Service supervisors, occupations in travel and accommodation, attendants in recreation and sport and sales and service occupations
4. Supervisors, machine operators and assemblers in manufacturing
5. Labourers in processing, manufacturing and utilities

**Mixed Occupations**
1. Senior management occupations
2. Other management occupations
3. Professional occupations in business and Finance
4. Financial, secretarial and administrative occupations
5. Clerical occupations and clerical supervisors
6. Occupations in natural and applied sciences
7. Professional occupations in health, registered nurses and supervisors
8. Technical, assisting and related occupations in health
9. Occupations in social science, government services and religion
10. Teachers and professors
11. Occupations in art, culture, recreation and sport
12. Wholesale, technical, insurance, real estate sales specialists, and retail, wholesale and grain buyers
13. Retail trade supervisors, salespersons, sales clerks and cashiers
14. Contractors and supervisors in trades and transportation
15. Construction trades
16. Other trades occupations
17. Trades helpers, construction, and transportation labourers and related occupations

**Canadian Occupations**
1. Occupations in protective services
2. Transport and equipment operators
3. Occupations unique to primary industries

**Immigrant Industries**
1. Manufacturing
2. Accommodation, food and beverage services

**Mixed Industries**
1. Construction
2. Transportation and storage
3. Wholesale trade
4. Retail trade
5. Finance, insurance and real estate
6. Business services
7. Educational services
8. Health and social services
9. Other services

**Canadian Industries**
1. Agriculture
2. Other primary industries
3. Communication and other utilities
4. Government services: Federal
5. Government services: Other

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