Asian Immigrant Advancement in Canada

Barry Edmonston

Abstract

This paper analyses the advancement of Asian immigrants in Canada, using census data from 1986 to 2016. We analyse four Asian immigrant groups - Chinese, Filipinos, South Asians, and all other Asians – in the context of six outcome statuses that are important measures of immigrant advancement. The paper presents a new method for summarising the pace of advancement of immigrants in Canada. Measuring the pace of immigrant advancement requires methodological improvements that deal with potential biases stemming from variations in the composition of immigrants groups by age, age at arrival, and duration of residence since arrival. The new summary period measure of immigrant advancement proposed in this paper provides useful information for comparisons of time periods, age at arrival, and immigrant groups. It offers a more comprehensive picture of the pace of immigrant advancement than other current measures.

Introduction

Consider four broad areas of inquiry for immigration research: 1) why some people decide to leave their country of origin; 2) why emigrants select a destination country for new settlement: 3) immigration policies in destination countries that affect selection of new immigrants; and 4) how immigrants adjust and succeed in their destination countries. This paper deals with the fourth area of research and focusses on the pace of advancement of Asian immigrants after their arrival in Canada. Although there is a wide body of detailed studies about the adjustment of immigrants, we lack adequate specific empirical knowledge about a fundamental question: how are immigrants themselves doing (Smith and Edmonston, 1997)? The answer to this question requires research on the pace of advancement, how it varies for immigrant groups of different ethnicity or country-of-origin, and how advancement rates differ over time. There are basic methodological problems that challenge the measurement of immigrant advancement, including biases that occur due to variations in the composition of immigrant groups by age, age at arrival, and duration of residence since arrival. To take these compositional differences into account, this paper makes use of a measure of immigration advancement originally proposed by Pitkin and Myers (2011). Because we have not found empirical analysis using this measure, we explicate the new

measure and present examples of its use by studying advancement of Asian immigrants in Canada. There are two likely reasons that this new measure has received relatively little attention for empirical analysis earlier. First, it may be difficult for researchers to compute the new measure, which requires several detailed steps. Second, calculations are quite intensive. We have used this new measure to study of the advancement of several groups of Asian immigrants in Canada and to compare temporal changes in the advancement for three periods: 1986 to 1996; 1996 to 2006; and 2006 to 2016. The analysis is based on Canadian census microdata samples for 1986, 1996, 2006, and 2016. We examine the three ethnic groups – Chinese, Filipinos, and South Asians – that constitute the largest Asian immigrant groups in Canada and, in addition, the general group of all other Asian immigrants.

The new measure that we use in the present paper provides an index of expected lifetime advancement based on decennial changes over the past 30 years. We calculate the cohort advancement between two censuses as the difference in observed status attainment, which shows the ten-year advancement between the first and the second census for birth and arrival cohorts. We combine observed changes in attainment for different cohorts into a synthetic estimate of the expected advancement to a specific older age. The observed change in attainment per person is calculated as a hazard rate for the number of persons advancing relative to the risk population (that is, the number who have not attained the status). The total advancement to a specific older age is the cumulative hazard of advancing to that age, which is the expected lifetime attainment for the outcome measure.

The summary period measure of migration advancement used in this paper has several benefits compared to other measures. It distinguishes the initial attainments of immigrants at the time of arrival from subsequent advancements, which is an important aspect of separating immigrant selection effects from immigrant lifetime advancements (Chiswick, 2000). Moreover, it standardises age composition and duration of residence of immigrant groups, which are persistent methodological problems because attainments of immigrants differ markedly by age and duration of residence. Finally, it offers a consistent temporal measure based on the pace of change during ten-year periods – similar to the total fertility rate, a summary period measure for expected lifetime fertility – that is expressed as expected lifetime advancement.

The primary purpose of this paper is to present the new measure of immigrant advancement and to give examples of its use. While other studies have focused on explanations for variations among groups or explanations for variations in socioeconomic achievements, this paper has three more limited research purposes: 1) to consider variations in current age and age at arrival with a new summary measure of lifetime advancement; 2) to compare lifetime attainment measures; and 3) to calculate initial attainment and lifetime advancement rates for four groups of Asian immigrants on six outcome measures. Although the main aim of the paper is to describe a new method for immigration research, the paper also cites selected studies that offer analysis to explain variations in outcomes measures for groups.

Immigration in Canada

Since 1851, immigration flows to Canada have averaged around 120 thousand arrivals per year, with considerable variation from peaks during the 1900s, 1910s, and 1950s to troughs of the 1890s, late 1910s, 1930s, and early 1940s (Figure 1). From 1880 to 1930 there was prolonged large-scale immigration from Europe to Canada when immigration exceeded 10 immigrants per 1,000 population, with comparatively much higher rates in the late 1880s and from 1900 to 1914 (Edmonston, 2016). The five-year period of 1909 to 1913 witnessed the largest volume of immigrants to Canada, in both absolute and relative terms, with the arrival of 1.3 million immigrants, or more than 250 thousand annually. By 1913, more than one-sixth of the Canadian population had arrived in the preceding five years. Immigration levels declined during the World War I and increased in the early 1920s. As economic conditions worsened in Europe in the 1920s, migration to Canada increased after 1918, averaging about 100 thousand immigrants annually in the early 1920s and almost 150 thousand immigrants annually in the late 1920s. In contrast, number of immigrants decreased during the 1890s, World War I, and the 1930 to 1945 period of the Great Depression and the World War II. There were only about 15 thousand immigrants per year on average in the 1930s, and the numbers decreased even further during the World War II, to a low of 7.5 thousand immigrants in 1942.
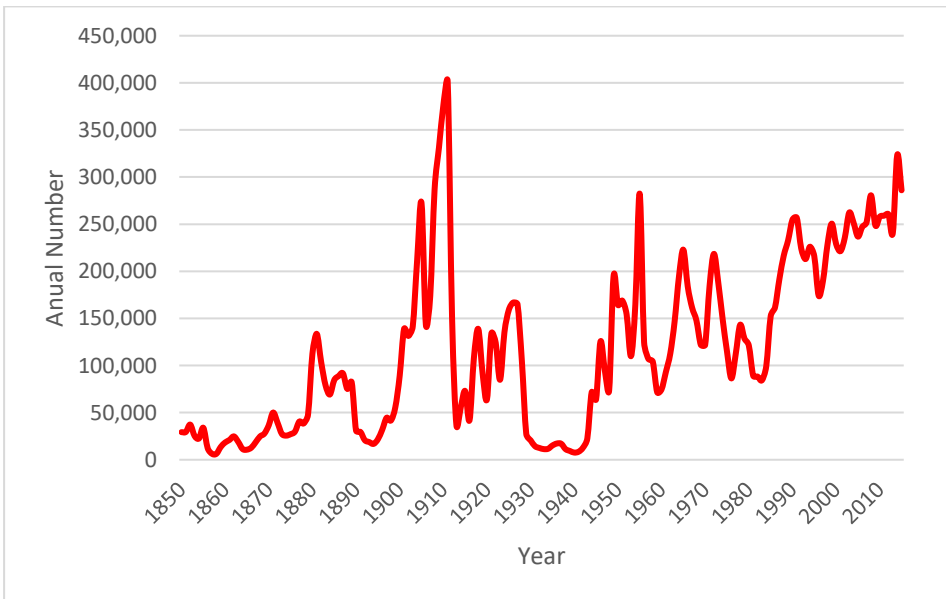

Figure 1: Number of immigrants arriving annually in Canada
Source: From 1852 to 1979: Statistics Canada (2016). From 1980 to 2017: Immigration, Refugees and Citizenship Canada (2017).

After the World War II, immigration in Canada increased steadily as the country enjoyed a high degree of political freedom and economic prosperity, compared with Europe and many other parts of the world. Availability of employment in the expanding manufacturing, resource, and construction sectors of the Canadian economy gave ample opportunities for a new wave of immigrants. The 1967 changes in immigration law, especially the elimination of national preference policies that had favoured immigration from European countries, prompted further increase in immigration as Canada began to receive new immigrants from Asia and Latin America. After 1967, equal preference was given to applications from any country. In recent years, annual immigration numbers have varied between 250-300 thousand with an annual average of 270 thousand.
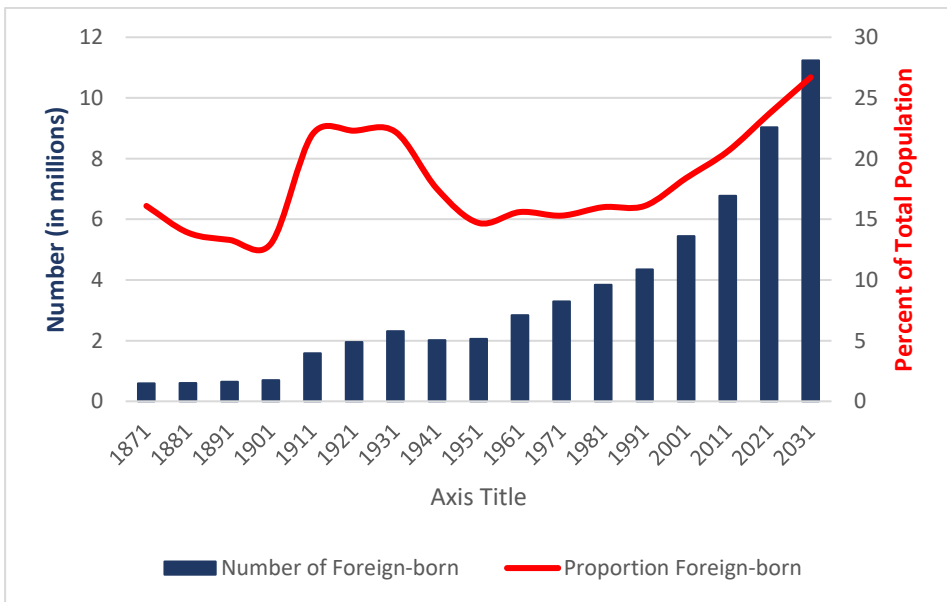

Figure 2: Number and Proportion of Foreign-born Population in Canada, 1871 to 2031
Remarks: For 1871 to 2016, enumerated population. For 2021 and 2031, projected population.
Source: Statistics Canada, Census of Population, 1871 to 2006, 2016; National Household Survey, 2011; Immigration and Diversity: Population Projections for Canada and its Regions, 2011 to 2036 (reference scenario).

In addition to immigration statistics, it is useful to examine data on the foreign-born population in Canada because some immigrants decide to leave Canada, others may move back and forth between their country of origin and Canada, and some may have died. Periodic population censuses provide a direct measure of the effect of immigration on the population growth in Canada by counting the number of foreign-born people living in the country at a specific point in time (Figure 2). The 1871 Census enumerated approximately half a million foreign-born people, representing 16 percent

of the Canadian population. The foreign-born population continued to rise at the end of the 1800s, but at a slower pace than the population born in Canada. The 1901 Census recorded the lowest proportion of foreign-born population (13 per cent). After the considerable rise in immigration at the beginning of the 1900s, the 1931 Census counted nearly 2.3 million of foreign-born people, representing 22 per cent of the population of Canada. This influx of immigrants was followed by a significant drop to approximately 2.0 million in 1941 as a result of the Great Depression and World War II and also due to high out-migration from Canada. By contrast, since the 1950s, the foreign-born population in Canada has been steadily increasing. The 2016 population census enumerated the foreign-born population of 7,540,830 or 22 per cent of the total population enumerated. This was the largest proportion since the 1931 population census. By 2031, the foreign-born population in Canada is projected to increase to 11.4 million, or 27 per cent of the total population of the country.

The birthplace of newly arrived immigrants has also shifted in recent decades. The proportion of immigrants from Europe and the United States has decreased from 27 per cent in 1991 to 16 per cent in 2016. Immigrants born in the United Kingdom comprise about one-fourth of recent immigrants from Europe and the United States. The proportion of recently arrived immigrants from South Asia has steadily increased from 9 per cent in 1991 to 17 per cent in 2016. Immigrants from Asia make up the largest share of the recently arrived immigrants, with South Asians comprising 20 per cent of the recent Asian immigrants and 38 per cent of all Asian immigrants in Canada in 2016. Immigrants from the Philippines are the second largest group of recent Asian immigrants comprising 15 per cent of recent arrivals and 16 per cent of all Asian immigrants. Chinese immigrants comprise of 11 per cent of all recently arrived immigrants in 2016 and are the second largest group of Asian immigrants in Canada, comprising 34 per cent of Asian residents. Smaller proportions of Asian immigrants have arrived in recent years from Korea, Vietnam, Japan, and other countries.

Chinese Immigrants. Chinese immigrants have been arriving in Canada since the late 1870s. Until recent decades, the largest number of arrivals occurred from about 1870 to 1920, when Chinese labourers arrived for building most of British Columbia's portion of the trans-Canada railway. Independent Chinese immigration in Canada resumed after Canada eliminated ethnic-origin and the "place of origin" rules from its immigration policy in 1967. From 1947 to the early 1970s, Chinese immigrants to Canada came mostly from Hong Kong, Taiwan, and Southeast Asia. There was an increase in Chinese immigration from Hong Kong from 1991 to 1996, with about 30 thousand Hong Kong residents migrating annually to Canada, comprising over one-half of all Hong Kong emigrants and about 20 per cent of the total number of immigrants to Canada. The great majority of these people settled in the Toronto and Vancouver areas, where there were well-established Chinese communities.

In recent decades, mainland China has overtaken Hong Kong as the largest source of Chinese immigrants. A great number of immigrants in the past have been Cantonese speakers and a disproportionate representation of Cantonese compared to

other Chinese-speakers is prevalent in many Chinese communities in Canada. According to the 2016 population census, 1.4 million Chinese reside in Canada. Chinese are Canada's largest Asian ethnic group. Chinese immigrants have provided the third largest number of Canadian immigrants since 2010, averaging 30,600 immigrants per year, or 11.3 per cent of all immigrants to Canada (Immigration, Refugees, and Citizenship Canada, 2017).

South Asian Immigrants. South Asian troops from Hong Kong and the Malay States visited British Columba in 1897 on their return from London after celebrations of Queen Victoria's Diamond Jubilee in London. It is believed that they told stories to others at home about conditions in British Columbia that may have stimulated South Asian migration to Canada. By 1904, arrivals of South Asians to Vancouver began, with the first few hundred South Asian immigrants arriving from Hong Kong and other British Far Eastern settlements. From 1904 to 1908 – before Canada's immigration ban on South Asian immigration in 1908 – about 5 thousand South Asians settled in British Columbia. The majority of them were Sikh. In 1908, the federal government enacted immigration regulations that specified that immigrants had to travel to Canada with continuous-passage arrangements from their country of origin, which was not possible between India and Canada. This travel restriction ended, in practice, the immigration of South Asians to Canada in 1908. After a long period of ban on South Asian immigration to Canada after 1908, the federal government removed, partially, the continuous-passage regulation in 1951, because of the independence of India and the government perception that there should not be a total ban on South Asian immigration. The government instituted a quota system for South Asian immigration in 1951, with a modest quota of a few hundred each year. Subsequently, the Immigration Act of 1967 removed most of the racial and national restrictions from the federal immigration regulations and established a new point system for determining the eligibility for immigration. As racial and national restrictions were removed, South Asian immigration to Canada increased again and, at the same time, became much more culturally diverse. A large proportion of immigrants during the 1950s were Sikh relatives of earlier South Asian settlers, while the 1960s also saw sharp increase in immigration from other parts of India and from Pakistan. By the early 1970s, two-third of South Asian immigrant men were professionals — teachers, doctors, university professors and scientists. Canadian preference for highly skilled immigrants during the 1960s broadened the ethnic range of South Asian immigrants and decreased the proportion of Sikhs.

South Asian countries – mainly India, Pakistan, Bangladesh, and Sri Lanka – have supplied an annual average of more than 54 thousand immigrants in Canada since 2010, or around 20.1 per cent of all annual average Canadian immigrants. The migrants from the South Asian countries are the largest group of recent immigrants in Canada. In 2016, there were 1,097,000 South Asians living in Canada which is the second largest group of Asian immigrants next to China (Immigration, Refugees, and Citizenship Canada, 2017).

Filipino Immigrants. During the 1960s, Canada began to receive workers from the Philippines who were nurses or doctors, technicians, and office workers. In the late 1960s, more Filipinos came to work in the garment industry of Canada. During the 1970s, a greater proportion of Filipinos came to work in clerical, sales, and manufacturing fields. By the late 1970s, an increasing proportion of Filipinos arrived in Canada to join their relatives under the family reunification programme. Economic and political difficulties (especially following the declaration of martial law in 1972) initiated increased emigration starting in the 1970s. During the 1980s, Canada saw an influx of Filipino contract workers, many of them found work as live-in caregivers. Many of these contract workers later became landed immigrants under the conditions of Canada's Live-In Caregiver Programme. From 1990 onward, there has been a steady flow of Filipinos entering Canada as families and independents instead of being sponsored by family or being recruited as contract workers. By 1995, more than 220 thousand Filipinos had entered Canada as landed immigrants seeking better economic opportunities for their families. The majority were young adult women, relatively well educated and proficient in English. Their intended occupations were in health, manufacturing, sales, teaching and service categories. Since the 1990s, Filipinos have consistently ranked first in the "independent immigrants" category, a group based on skills and ability to contribute quickly to Canadian society and economy. According to 2016 population census, there were 652 thousand Filipinos living in Canada, and the number has been increasing rapidly in recent years. Since 2010, the Philippines has been the second largest source of immigrants to Canada (Immigration, Refugees, and Citizenship Canada, 2017).

Other Asian Immigrants. Other Asian immigrants constitutes a diverse group of immigrants from East and Southeast Asia. The main other Asian immigrants are Korean, Vietnamese, Japanese, and Thai. Koreans make up one of the largest Asian ethnic groups in Canada. Almost all Korean immigration to Canada is from the Republic of Korea (South Korea). There are less than 10 arrivals each year from People's Democratic Republic of Korea (North Korea). It was only after 1967 that the number of Koreans arriving in Canada annually numbered in the hundreds and, after 1970, in thousands. Most Korean-Canadians, including immigrants and their children, are skilled workers or professionals – doctors, professors, or engineers – or are engaged in retail businesses such as food stores, gasoline stations, restaurants, printing shops, and real-estate and insurance agencies. Most Koreans have settled in urban centres, particularly in Toronto, Vancouver, Edmonton, and Calgary. More recently, some are moving to smaller centres as economic opportunities change. Canada also receives many Korean tourists and university students. According to the 2016 population census, the population of Korean origin in Canada was 241 thousand. The population of Korean origin is concentrated in Ontario (49 per cent) and British Columbia (35 per cent), with the majority living in Toronto and Vancouver. An annual average arrival of Koreans in Canada since 2010 has been around 4,600 per year or around 1.7 per cent of all immigrants to Canadian according to official sources (Immigration, Refugees, and Citizenship Canada, 2017).

On the other hand, settlement of Vietnamese in Canada is relatively recent. It resulted from two waves of immigration in the aftermath of the Vietnam War. The first wave consisted mostly of middle-class Vietnamese who arrived in Canada after the fall of Saigon in 1975. Most of these immigrants spoke French. The second wave of immigration consisted of refugees from the former South Vietnam, seeking to escape the harsh living conditions and deteriorating human-rights situation following the reunification of North and South Vietnam after 1975. These refugees were widely referred to in the media as the "boat people." Moved by the desperate plight of the hundreds of thousands who took to high seas in makeshift boats to flee Vietnam, the Government of Canada accepted 50,000 refugees from Indochina (Vietnam, Cambodia, and Laos), and later raised the figure to 60,000. According to 2016 population census, there were 241 thousand persons of Vietnamese origin in Canada. Vietnamese-Canadians live primarily in the metropolitan areas of Toronto, Montréal, Vancouver, and Calgary and the majority are first-generation Canadians (born in Vietnam or other countries of Asia). An annual average of 2,200 Vietnamese arrived in Canada per year since 2010, or 0.8 percent of all Canadian immigrants (Immigration, Refugees, and Citizenship Canada, 2017).

The recent wave of Japanese immigration to Canada began in 1967, when immigration laws were amended, and a point system of deciding the eligibility for immigration was instituted in Canada. Many Japanese that have migrated to Canada work in business and service sectors and are skilled traders. According to the 2016 population census of Canada, there were 121 thousand Japanese-Canadians. Almost one third of the Japanese immigrants in Canada are first generation immigrants; around one-third are second generation while another one-third are third or greater generation immigrants. An average of 1,100 Japanese arrived in Canada every year since 2010, or 0.4 per cent of all Canadian immigrants (Immigration, Refugees, and Citizenship Canada, 2017).

Immigration from Thailand to Canada has continued at a slow pace since the 1950s, with a brief period of increase after the 1997 financial crisis in Thailand, which resulted in more Thais looking for work and educational opportunities overseas. In contrast to the 1960s, when only about 100 immigrants from Thailand arrived annually, Canada now receives about 500 Thai immigrants every year on average, or around 0.2 per cent of all Canadian immigrants (Immigration, Refugees, and Citizenship Canada, 2017). The majority of Thai-Canadians are well-educated professionals who have migrated to Canada for the purpose of either education or business, or marriage. Educational links between Thailand and Canada are strong, and many young Thais travel to Canada for post-secondary education and return back to Thailand after completing their studies. Those immigrants who stay permanently in Canada, generally work in professional fields such as banking, medicine, engineering, and business. Some Thai immigrants also work in the restaurant industry because Thai cuisine has become popular in Canada, particularly in the urban areas. According to the 2016 population census of Canada, more than 19 thousand people in Canada were reported to be Thai origin (Immigration, Refugees, and Citizenship Canada, 2017).

Table 1: Socioeconomic status of Asian Immigrants in Canada, 2016.

Group	Percent with University Degree or More	Mean Individual Income	Percent Professional or Managerial Occupation
Canadian-born adults	15.4	$51,100	26.6
Foreign-born Adults	30.0	$44,300	29.6
Chinese	37.4	$40,300	37.5
Filipino	32.5	$37,900	11.8
South Asian	35.9	$40,000	28.3
All Other Asian	31.4	$34,000	27.2

Source: Author's analysis based on 2016 population census data.

Table 2: Asian immigrants arriving in Canada, by age at arrival, 2006-2016.

Age at arrival (years)	Asian Immigrants					All Immigrants
	Chinese	Filipino	South Asian	Other Asian	All	
0-4	7.3	4.8	8.8	6.9	7.1	8.2
5-9	4.8	8.1	6.9	6.8	6.7	7.9
10-14	5.9	10.2	5.5	8.2	7.2	7.1
15-19	7.0	8.0	4.7	8.3	6.6	6.4
20-24	7.7	5.1	10.9	6.9	8.1	8.2
25-29	16.6	9.7	18.7	11.7	14.9	14.7
30-34	11.2	14.8	15.0	14.3	13.9	14.8
35-39	9.7	13.5	8.8	11.0	10.6	11.2
40-44	10.4	9.4	4.7	9.1	7.9	7.6
45-49	6.5	6.7	3.4	5.1	5.3	4.9
50-54	3.2	3.0	3.4	2.7	3.2	2.8
55-59	2.4	1.4	3.6	2.2	2.5	2.1
60-64	2.8	2.9	3.0	2.6	2.9	1.8
65-69	2.5	1.5	1.5	2.3	1.8	1.3
70-74	2.1	1.0	1.0	2.0	1.4	1.0
All Ages	100.0	100.0	100.0	100.0	100.0	100.0
Median	31.1	30.9	28.5	27.7	29.8	29.2

Source: Author's analysis based on 2016 population census data.

Asian immigrants differ from other Canadian residents in terms of socioeconomic status. Table 2 shows educational attainment, individual income, and occupation of Canadian-born adults compared to foreign-born adults - Chinese, Filipino, South Asian, and other Asian. Compared to Canadian-born adults, Asian immigrants have almost twice as many adults with a university degree or more and are more likely to be employed in a professional or managerial occupation. On the other hand, Asian immigrants report slightly lower individual incomes than native Canadians. The reason is that Canada's point-based preference system for immigration is biased towards better

educated adults as far as immigration to Canada is concerned. The educational advantages of Asian immigrants, however, are not reflected in their individual income. Asian immigrants report slightly lower individual income than all immigrants in Canada. The income of Asian immigrants is also lower than the income of native Canadian. Picot and others (2007) have analysed reasons for relatively lower individual income of Asian immigrants in Canada. Looking at the proportion of adults with professional or managerial occupations, only Chinese immigrants in Canada report higher levels of individual income as compared to all foreign-born and Canada-born adults. Filipino immigrants in Canada report relatively lower proportion of adults with professional or managerial occupations. However, Asian immigrants are relatively well-educated and reasonably represented in professional and managerial occupations but have lower individual income than other foreign-born or Canada-born adults.

Methods

The paper focusses on the pace of advancement, how it varies for different immigrant groups, and how rates of advancement differ over time. There are four basic methodological problems that challenge the measurement of immigrant advancement, including biases that occur due to variations in: 1) initial level of attainment at the time of arrival; 2) composition of immigrant cohorts observed at different times; 3) composition of immigrant groups by age; and 4) composition of immigrant groups by age at arrival. We next describe each of these four biases.

One of the most common problems in comparing immigrant advancement is that the status attainments observed after arrival are heavily influenced by the initial level of attainment. Immigrants arrive with different skills and social capital. Immigrants who arrive as refugees are often poorly educated and have minimal occupational skills. Immigrants who arrive based on occupational skills frequently have professional degrees and several years employment experience. If immigrants are asked about their education, occupation, or income several years after arrival, refugees and skilled immigrants will differ greatly because of their initial attainment, and not primarily because of their advancement after arrival.

Consider four groups of immigrants: Group A: high initial attainment and high advancement after arrival; Group B: high initial attainment and low advancement after arrival; Group C: low initial attainment and high advancement after arrival; and Group D: low initial attainment and low advancement after arrival. If these four groups are observed several decades after arrival, group A would have very high observed attainment, groups B and C might have similar attainment, and group D would have low attainment. For Group A, we may infer substantial advancement and for Group D, we may suspect little advancement. For groups B and C, we may not be able to infer whether either or both have experienced similar advancement after arrival without evidence about their initial attainment. To make comparison about expected lifetime achievement of immigrants as the outcome variable, a summary period measure is

needs to compare initial attainment and subsequent advancement over the lifetime of the immigrants.

A second problem of bias relates to the variations in the composition of immigrant cohorts observed at different times. The error of using cross-sectional data for a single period to infer lifetime advancement has long been recognised by immigration researchers (Borjas, 1985). The problem is that cross-sectional observations by age cannot be linked together as if they represent a longitudinal path of attainment. In cross-sectional observations, older immigrants may have had different attainments when they were young than younger immigrants. To observe changes in immigrant cohorts – a group of immigrants who arrived in the same time period – it is necessary to have observations at least two points in time.

Comparison of immigrant groups are affected by the age composition of the groups which is third type of bias. Differences in the age composition of immigrant groups are obvious and most multivariate analyses include immigrant age in order to take age differences into account. For a summary measure, it is equally important to adjust for age differences. The summary period measure used in this analysis is constructed in such a manner that differences in age composition do not influence the summary period measure.

Fourth, comparison of immigrants is also influenced by the variation in the age composition at the time of arrival. This leads to different durations of residence for immigrants of the same age (Lee and Edmonston, 2011). The duration effect on status attainment means that immigrant groups with longer residence have more time to advance than immigrant groups that have arrived only recently. The summary measure used in this analysis is based on standardised age composition at arrival so that it is not influenced by differences in the age composition at arrival.

Appendix A presents formal definitions and derivations of the summary period measure of lifetime advancement used in the present analysis. The measure proposed is similar to the total fertility rate, a summary period measure commonly used in demography. Appendix B describes the data and calculation of the summary period measure in detail, illustrating the calculation of summary period measure for Chinese immigrants arriving in Canada between 2006 and 2016. The key steps are as follows:

- Tabulate number of Chinese immigrants by age and age at arrival who are and who are not Canadian citizens for two successive censuses. Next, calculate the proportion who have or do not have Canadian citizenship for each census by age and age at arrival.
- For the time period between the two censuses, calculate the hazard rate of attaining Canadian citizenship for each age and age at arrival. The hazard rate is defined as the proportion of immigrants – by age and age at arrival – attaining Canadian citizenship during the period between the two censuses. The hazard rate is calculated by dividing the number who attained Canadian

      citizenship during the period by the number who were not Canadian citizens in the beginning census.

- Based on the hazard rates, calculate the expected lifetime advancement for each age at arrival group. This is done by calculating the proportion of Canadian citizens observed in the first census for each age at arrival group. For immigrants arriving at age 25 to 29 years, for example, they would be 30-34 years old when observed in the first census. For this reason, a small proportion of some immigrants might already have Canadian citizenship when observed in the first census, even though new immigrants would not have Canadian citizenship at the time of initial arrival. We refer to data for the first year of observation in the census as "initial attainment". Based on the hazard rates for each age group for the age of arrival group, we calculate the advancement of attaining Canadian citizenship until an older age, which is taken to be age 75 years. The proportion attaining Canadian citizenship – for each age at arrival group – is termed "lifetime attainment". The difference between initial attainment and lifetime attainment is referred to as "lifetime advancement".

- To calculate an overall period measure, we standardise the measure using a standard age at arrival distribution. The standardisation is done by weighting the age at arrival distribution for each immigrant group for each period by the age at arrival distribution of all Asian immigrants arriving in Canada during 2006 to 2016. This means that differences in the lifetime advancement for different immigrant groups or different time periods are **not** the result in differences in the observed age or age at arrival distributions.

      The standardised summary measure for immigrants complements such other methods as longitudinal studies of immigrant's achievements over time or multivariate analysis of immigrants from successive censuses or surveys. The summary period measure used in this analysis describes the experiences of a particular population over a specific period of time. It has three important advantages. First, it considers variation in age, age at arrival, and duration of residence which can distort comparison of immigrant status achievement. Second, it is calculated for specific time periods which reflect the changing social and economic conditions that immigrants experience. Third, it distinguishes separate effects of initial status attainments from subsequent advancements.

      As illustrated in the analysis below, the expected lifetime achievement may vary for different time periods because the measure summarises achievements for different birth and arrival cohorts for a particular period. The social and economic conditions for immigrants may vary for different time periods, and advancement during a given period will affect the expected lifetime advancement.

      There are some limitations to the summary period measure used in this analysis. First, the measure is influenced by the distribution of age at arrival. If comparison is made for periods with greatly different age at arrival distributions, it is useful to standardise the comparison with a representative distribution. For this reason, in the

analysis below, comparisons are standardised for each immigrant group for each period on the age at arrival distribution for all Asian immigrants arriving during 2006-2016.

A second limitation is that the measure considers only possible positive advances in achievement. The measure is not affected by negative or reversible changes, such as decline in homeownership or income for a birth or arrival cohort from one census to the next. If negative or reversible changes need to be considered, the lifetime measure would need to be altered.

Third, the period summary measure is designed for studying initial immigrants and considers the age at arrival and duration of residence since arrival. Analysis of second-generation immigrants - sons, and daughters of immigrants, is a topic of considerable interest. The second-generation, however, has important differences from their parents. They are Canadian citizens at birth and proficient in English, French, or both. The measure proposed here can be calculated for second-generation immigrants by treating them as a single cohort arriving at birth, all with the same category of duration of residence. It is not clear, however, that this would be a useful summary measure for research on second-generation immigrant or for possible comparison to expected lifetime achievements of immigrants.

Data

We consider three broad topics for the measurement of immigrant advancement: acquisition of human capital, socioeconomic achievement, and social integration. We consider six outcome measures. For the acquisition of human capital, we include (1) knowledge of Canada's two official language, English, French, or both and (2) completion of a university degree. For socioeconomic achievements, we include (3) professional or managerial occupation, (4) above median family income; and (5) home ownership. For social integration, we include (6) Canadian citizenship.

Table 3: Details of microdata files of different population census used in the analysis.

Census Year	Total Population	Sampling Fraction	Sample Size
1986	26,100,587	2.0	500,434
1996	28,846,761	2.7	792,448
2006	31,612,897	2.7	844,476
2016	35,151,728	2.7	930,421

We analyse census microdata files of four recent Canadian censuses which are samples of individuals (Table 3). The Canadian census microdata excludes some residents, including persons living in institutional collective dwellings such as nursing homes and prisons; and persons living in non-institutional collective dwellings such as student dormitories, hotels and motels, and work camps.

The analysis is limited to foreign-born residents only who identify themselves as Chinese, Filipino, South Asian, or other Asian ethnic origins. For each of the four groups, we tabulate the number below and above the threshold level (described below) by age and duration of residence for the six outcome measures. Foreign-born residents were asked about the year in which they first obtained landed or permanent resident status. We use year of immigration to calculate the duration of residence. We calculate age at immigration, based on the person's year of birth and year of immigrant arrival.

We examine six outcome measures for the advancement of immigrant groups. The outcome measures are:

- Knowledge of official languages means whether the person can converse in English, French, or both. We code the outcome variable as either above the status threshold (the person can converse in English, French, or both) or below the threshold (the person cannot converse in either English or French).
- University degree means whether a person aged at least 15 years has completed a university (bachelor's) degree. Persons aged less than 15 years are assumed to have not completed a university degree.
- Professional or managerial occupation means a person at least 15 years of age is employed in a professional or managerial occupation. Persons below 15 years of age are assumed to be not employed in a professional or managerial occupation. Like most national statistical agencies, Statistics Canada periodically revises its occupational classifications. We code professional or managerial occupations to be as similar as possible over time, but there may be some lack of correspondence between censuses.
- Median individual income means all income received by an individual at least 15 years of age before taxes and deductions. Persons below 15 years of age are assumed to be below the median income level. We code individuals as either above or below the median income thresholds for each census year. The median individual income threshold in the current Canadian dollars is $10, 972 in 1986, $16,672 in 1996, $24,000 in 2006, and $34,000 in 2016.
- House ownership means the person owns a private dwelling if a member of the household to which the person belongs owns a dwelling even if it is not fully paid for. It does not make sense, however, to assume that all household members, including children, are homeowners if one household member (or an adult couple) is the owner. We classify a person as owning a house if the lives in a household that owns a house, and the person forms either an adult couple or is a lone parent or living alone. Otherwise, we classify the person as not owning a house. This operational definition means that all children in a household, regardless of their age, are classified as not owning a house.
- Canadian citizenship means that the person has acquired Canadian citizenship by naturalisation. Canadian citizens can have more than one citizenship, and we code immigrants (persons who were not Canadian citizens at birth) as either having or not having Canadian citizenship by naturalisation.

The Canadian census asks respondents about their ethnic origin, which refers to the ethnic or cultural origin of person's ancestors (Lee, 2011). We limit attention to persons who report a single ethnic origin. Chinese includes persons who report Chinese as their only ethnic origin. Filipino includes persons who report Filipino as their only ethnic origin. South Asian includes persons who report one of several possible single ethnic origins, including Bangladeshi, East Indian, Gujarati, Pakistani, Punjabi, Sri Lankan, Tamil, or South Asian. We include all other single origin Asian immigrants in the analysis as a comparison group.

Canada ethnic origin data are not based on birthplace. Indeed, there is considerable variation in birthplace for Asian ethnic groups. Respondents identifying themselves as Chinese in the 2016 census report their birthplace as: mainland China (68 per cent), Hong Kong (18 per cent), Taiwan (4 per cent), Southeast Asia (3 per cent), and other places (7 per cent). Filipinos are predominantly born in the Philippines (99 per cent), with only a small number born in other places. South Asians include immigrants born in many places, including India (56 per cent), Pakistan (15 per cent) Sri Lanka (10 per cent) Bangladesh (5 per cent), Eastern Africa (3 per cent), South America (3 per cent), Middle East (2 per cent), Oceania (2 per cent), Caribbean (1 per cent), United Kingdom (1 per cent), and other places (2 per cent). Finally, all other Asian immigrants are diverse in their ethnicity and country of origin with more than 90 per cent of recent arrivals from six countries (Immigration, Refugees and Citizenship Canada, 2017), including Korea (36 per cent of all other Asian Immigrants), Vietnam (32 per cent), Japan (13 per cent), Thailand (5 per cent), Indonesia (2 per cent), and Cambodia (2 per cent). Some immigrants from these countries identify themselves as Chinese, Filipino, or South Asian. They are reported in their ethnic origin categories and not as "other Asian immigrants."

Since the 1981 population census, respondents have been allowed to report more than one ethnic origin. Over time, with ethnic intermarriages, an increasing proportion of Canadians have reported multiple ethnic origins. It is difficult to interpret data for immigrants with multiple ethnic origins. We, therefore, restrict attention to single ethnic origins. This is, however, not an important restriction as most Asian immigrants report single ethnic origin. In 2016, the proportion of Asian immigrants reporting multiple origins was 2 per cent for Chinese, 3 per cent for South Asians, 4 per cent for Filipinos, and 4 per cent for Vietnamese.

There are three types of outcome variables used in the present analysis (Table 4). The first outcome variable type involves individual-level characteristics of immigrants. These characteristics are related to the early years of life. For example, an individual can report (or have reported by someone else) Canadian citizenship from the moment of birth. If a young child arrives in Canada at one year of age, for example, he may be reported in the initial census as lacking Canadian citizenship until, after several years, he possibly acquires Canadian citizenship. The second outcome variable type involve those individual characteristics which are not usually reported in the population census until early adult years. Most population census do not ask young persons about

their educational attainment or occupation because they are enrolled in school and have not entered the labour force. In Canadian population census, data on educational attainment and occupation are not collected for persons below 15 years of age. For the present analysis, we impute status attainment for persons below 15 years of age as follows: 1) tabulate the study population by age and age at arrival in Canada and report all persons as below status attainment; and 2) impute the proportion of persons with above status attainment as zero. After reaching age 15 years, birth cohorts advance from an age group (10-14 years) with all persons below status to an age group (15-19 years) with status attainment based on the reported census data.

Table 4: Outcome variables used in the analysis.

Outcome variable type	Example	Variable coding	
		Aged 0 to 14 Years	Aged 15 or More Years
1. Individual level with information at birth	Citizenship	As reported for the individual	As reported for the individual
2. Individual level with no information for children or youth	Occupation	Impute below-attainment status for all individuals	As reported for the individual
3. Family-level	House ownership	Impute below-attainment status for all individuals	As reported for family if respondent is family head, partner, or living alone

Source: Author

The third outcome variable type is more complicated because some variables are based on family characteristics. One common family-based measure is house ownership. Because house ownership is measured at the family-level, all persons of the family share the same value of this measure. Having the same family-level characteristics, however, poses a problem for interpreting individual advancement over the lifetime. A lifetime variable based on family-level data, for example, may record owning a house as an infant, not owning a house as a young adult, owning a house as an older adult, and finally not owning a house as an elderly adult living with offspring. For a summary period measure of individual advancement over the lifetime, it is, therefore, necessary to recode family-level measures. For the present analysis, we recode family-based measures to below attainment for all children and youth aged 0 to 14 years. After age 15 years, we code family-based measures as observed if the respondent is the family head or partner. In other words, we adopt a coding procedure for family-based data that presumes that individuals have the family attainment characteristics only if they are the family's primary maintainer or partner of primary maintainer.

The period summary measure of expected attainment (see equation 5 in Appendix A) is weighted by the number of immigrants that arrive at each age. To consider differences in the age composition at arrival for different immigrant groups and different time periods, we standardise comparison by using the same age composition at arrival for all calculations of expected lifetime attainment.
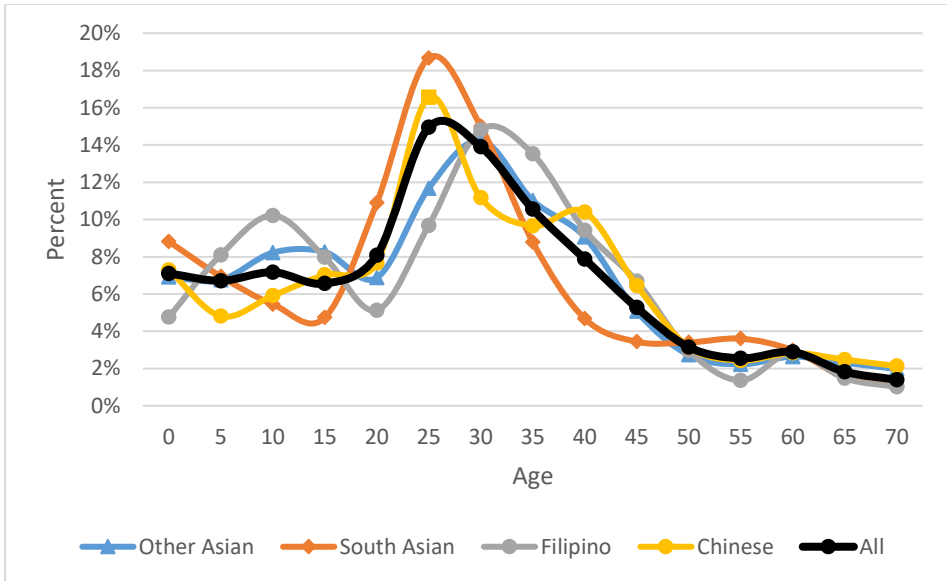

Figure 3: Age at Arrival in Canada for Asian Immigrant Groups, 2006-2016.
Source: Author

Figure 3 illustrates the age composition at arrival for four Asian immigrant groups as well as all Asian immigrants. Chinese immigrants arrive at slightly older ages and display a bimodal distribution, with peak arrivals at about age 25 years and age 40 years. Filipinos, on the other hand, have the second oldest age at arrival, with a higher proportion of adults arriving with teen-age children. South Asians have the third oldest age at arrival, with a noticeable peak for adults in their late 20s and a higher proportion arriving with relatively young children. Other Asian immigrants have the youngest age at arrival with a higher proportion of adults arriving with children and youth. The black line in Figure 3 shows the age composition for all Asian immigrants at arrival which is used for standardising the summary period outcome measures.

Results

Age at arrival effects. Figure 4 displays the lifetime advancement by age at arrival. There is striking contrast between the results for South Asians who arrived at 0-19 years of age and those who arrived at age at least 50 years. South Asian immigrants

who arrived before 20 years of age have relatively high rates of initial attainment of knowing one or both official languages, with 74 per cent reporting that they knew English, French, or both at their first census, compared to 54 per cent for immigrants arriving at age 50 years or older. Initial attainment levels are based on attainment rates reported in the first census after arrival. For immigrants arriving in the five years prior to the census, they are about 2.5 years prior to first census. For immigrants arriving 5-10 years prior to the census, they are about 7.5 years prior to the first census.
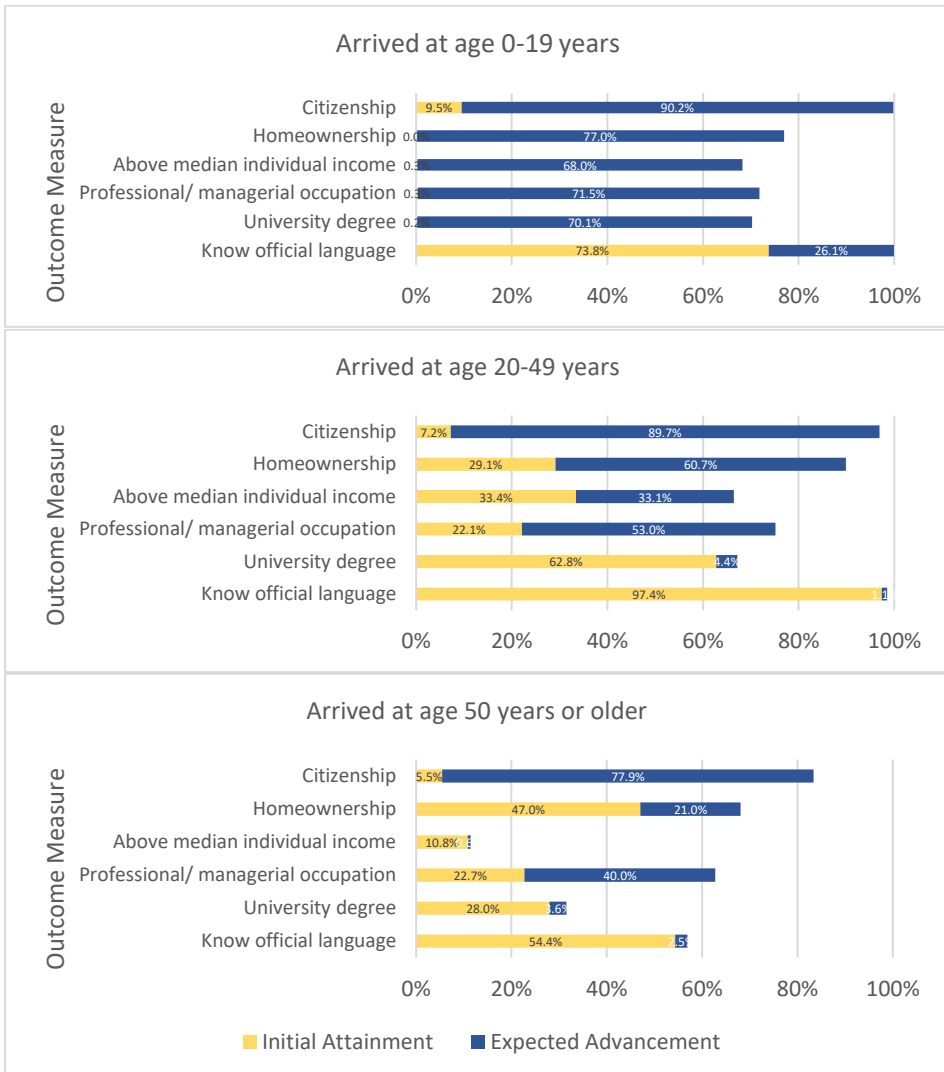

Figure 4: Lifetime attainments and age at arrival.
Source: Author

Immigrants arriving at age less than 20 years generally do not have a university degree; they are not in the labour force and do not have income. They also do not own a house. Therefore, the expected lifetime initial attainment for these immigrants is mainly dependent upon lifetime advancement. This contrasts to immigrants who arrive at age 50 years or older. They have higher initial attainment on education, occupation, income, and house ownership. Based on higher rates of lifetime advancement, South Asian immigrants who arrived in their youth have higher expected lifetime attainment rates for every outcome measure, compared to immigrants who arrived at age 50 years or older. Although South Asian immigrants arriving at age 50 or older experience some advancement for citizenship and professional/managerial occupation, yet they make little advancement in house ownership, individual income, university degree, or knowledge of official language after arrival in Canada.

South Asian immigrants who arrived at age 20-49 years have higher initial attainment levels but lower rates of advancement, compared to immigrants arriving at younger ages. Overall, South Asian immigrants arriving at younger ages have modestly higher rates of expected lifetime attainment of citizenship but lower rates of expected lifetime attainment in terms of house ownership, compared to immigrants arriving at 20-49 years of age. However, the two groups are similar for other outcome measures.

Time Period Effects. Figure 5 shows the expected advancement for Chinese immigrants for three time periods, 1986-1996, 1996-2006, and 2006-2016 in terms of knowledge of official languages, university degree, and above median income. Almost 87 per cent Chinese immigrants in 1986-1996 arrived in Canada with the knowledge of either English or French or both compared to 74 per cent in the recent period. This difference is mainly a result of the place of origin of Chinese immigrants. Immigrants who arrived before the 1990s included a higher proportion from Hong Kong, where familiarity with English is more common. In all time periods, about 9 to 11 per cent Chinese immigrants advanced their lifetime knowledge of official languages. Most of the difference in expected lifetime attainment of official languages for the three time periods results from the knowledge that they reported upon their arrival in Canada.

There has been a substantial increase in the lifetime attainment of achieving a university degree for Chinese immigrants over time, with a gain from 41 per cent in 1986-1996 to 62 per cent in 1996-2006 and 68 per cent in 2006-2016. This gain occurred due to the increase in initial attainment as well as expected lifetime advancement. In 1986-1996, 25 per cent of Chinese immigrants had an initial attainment of a university degree, which increased to 34 per cent in 1996-2006 and 35 per cent in 2006-2106. The expected lifetime advancement to a university degree also increased, from a lifetime advancement of 16 per cent in 1986-1996 to 28 per cent in 1996-2006 and 2006-2016. This means that Chinese immigrants have arrived with better education. One reason is Canada's immigration point system which gives preference for educated immigrants. At the same time, the population census data suggest that Chinese immigrants in Canada appear to have increasingly pursued a university education after arrival.
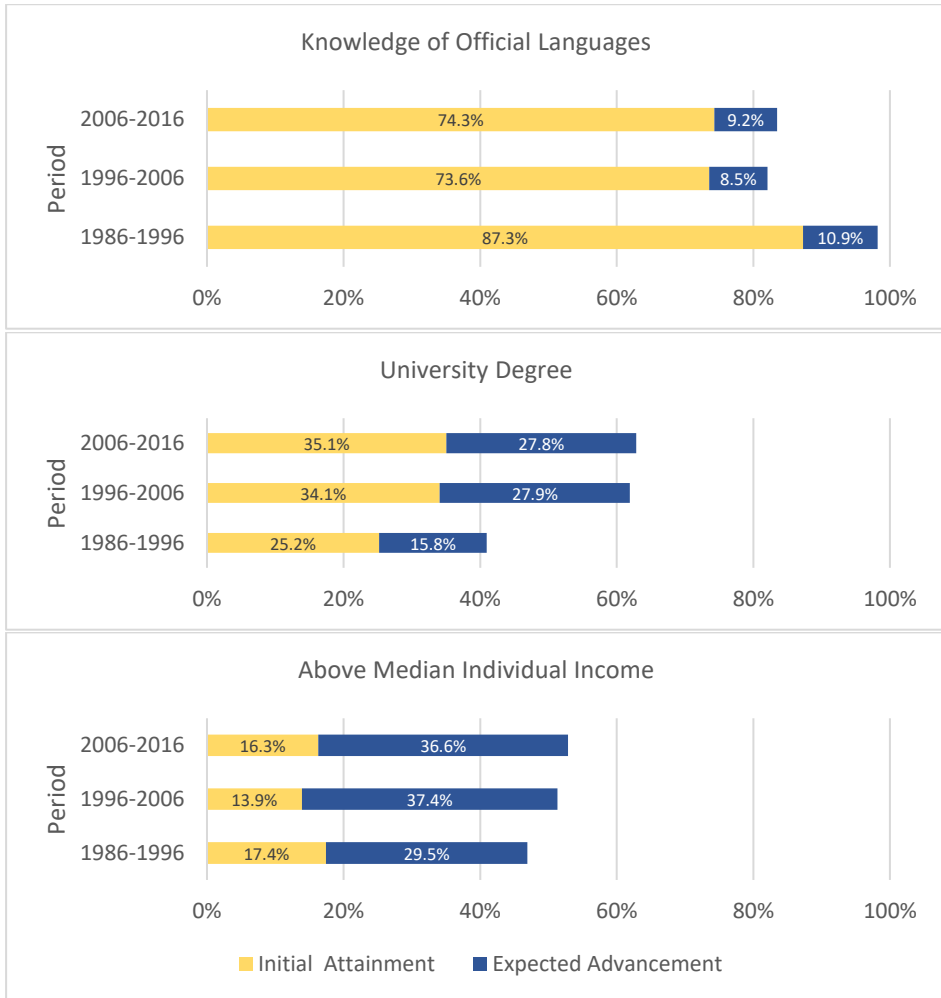
163

Figure 5: Period changes for expected advancement for Chinese immigrants 1986-2016
Source: Author

Chinese immigrants in recent time periods have also experienced improvement in attaining above median individual income. About 17 per cent Chinese immigrants in 1986-1996 reported an initial attainment of above median individual income, compared to 14 per cent in 1996-2006 and 16 per cent in 2006-2016. The main difference is that the two recent time periods have witnessed gains in the proportion of Chinese immigrants advancing to above median individual income, with an increase of 30 per cent in 1986-1996 and 37 per cent in both 1996-2006 and 2006-2016. As a result, more than one-half of Chinese immigrants in recent time periods have expected lifetime attainments that are above the median individual income.

Variation in Outcome Measures for Immigrant Groups. In this section, we review evidence about the expected lifetime advancement of four Asian immigrant groups for the six outcome measures. We take age at arrival into account by standardising all outcome measures for all time periods. This means that variation in outcome measures across Asian immigrant groups: 1) is not due to variation in the age composition at arrival and 2) is not due to variation in age composition at arrival in different time periods. Variation in outcome measures reflects differences in initial attainment or lifetime advancement for a particular ethnic group in a particular time period.

Figure 6 shows that the expected lifetime attainment of official languages varies across the four Asian immigrant groups. Most of the difference in lifetime attainment of official language is due to the initial attainment as 74 per cent Chinese; 83 per cent Other Asians; 87 per cent South Asians; and 93 per cent Filipinos immigrants had knowledge of official languages at initial attainment. Moreover, the expected lifetime advancement is similar and modest for all four Asian immigrant groups. All the four groups have made gains in their knowledge of official languages, but lower initial attainment of Chinese immigrants leads to expected lower lifetime attainment – given that all groups experience similar lifetime advancement.
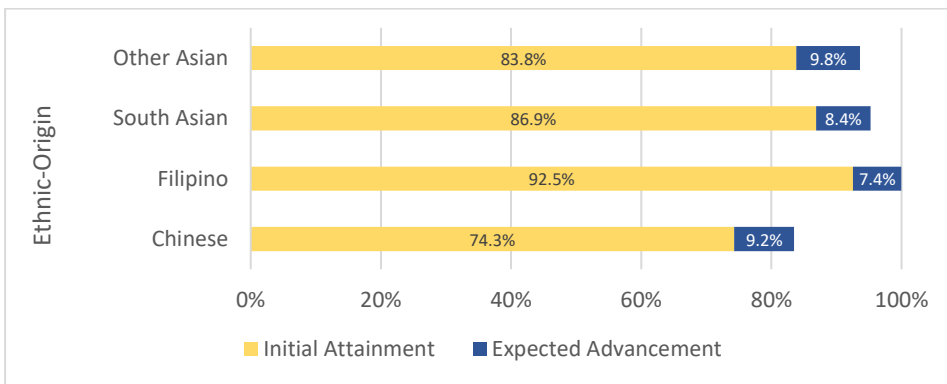

Figure 6: Initial attainment and expected lifetime advancement in knowledge of official language
Source: Author

Figure 7 shows initial attainment and expected lifetime advancement in achieving a university degree. Filipinos have lower expected lifetime attainment of a university degree compared to Chinese, Other Asians, and South Asians. The lower lifetime attainment level for Filipinos largely results from relatively low expected lifetime advancement. These are interesting differences that deserve further analysis. It would be interesting to explore further whether these differences are related to the occupations that different groups of Asian immigrants pursue. It would also be interesting to explore the differences in the educational advancement for immigrants who arrived as children compared to those who arrived as adult.
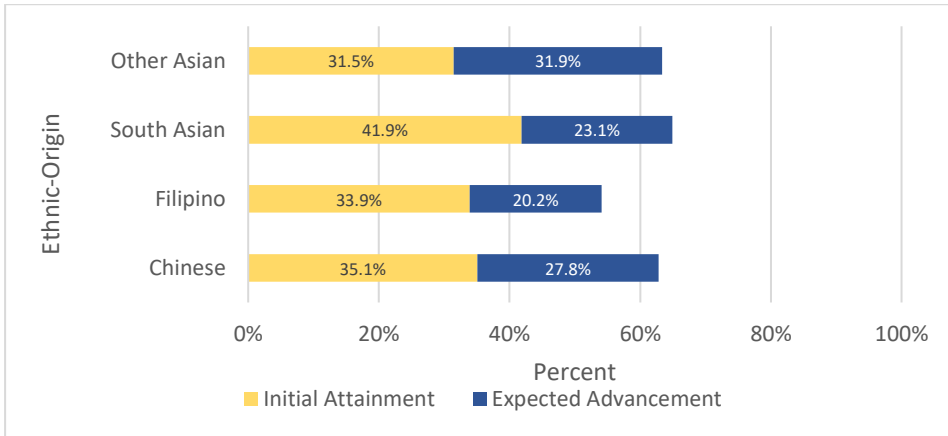
Figure 7: Initial attainment and expected lifetime advancement in achieving university degree among Asian immigrants, 2006-2016
Source: Author

Expected lifetime attainment of professional or managerial occupations has greater variation than any of the other outcome measures (Figure 8). This variation is mainly due to differences in initial attainment, but also partially influenced by differences in lifetime advancement. The lower lifetime attainment of professional or managerial occupation for Filipinos reflect the lower initial attainment and relatively low expected advancement. South Asians have relatively high lifetime advancement which helps them achieve about 20 percentage-points higher lifetime attainment than Filipinos. Chinese immigrants benefit from both higher initial attainment and high expected lifetime advancement.
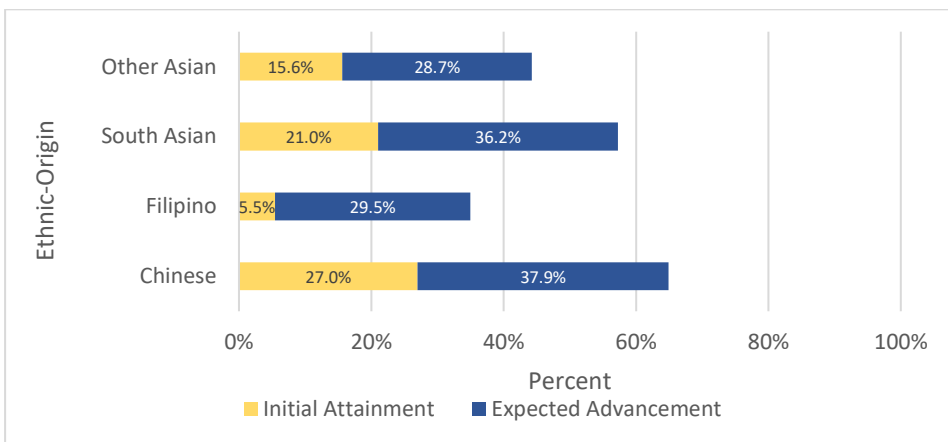

Figure 8: Initial attainment and expected lifetime advancement in achieving university degree among Asian immigrants, 2006-2016
Source: Author

166

Filipinos have the highest rates of expected lifetime attainment of above median individual income (Figure 9), with an expected attainment of 80 per cent above the median individual income. These results for Filipinos stem from relatively high initial attainment coupled with comparatively high expected lifetime advancement. Both initial attainment and lifetime advancement in Filipinos are much higher than for the other three Asian immigrant groups.
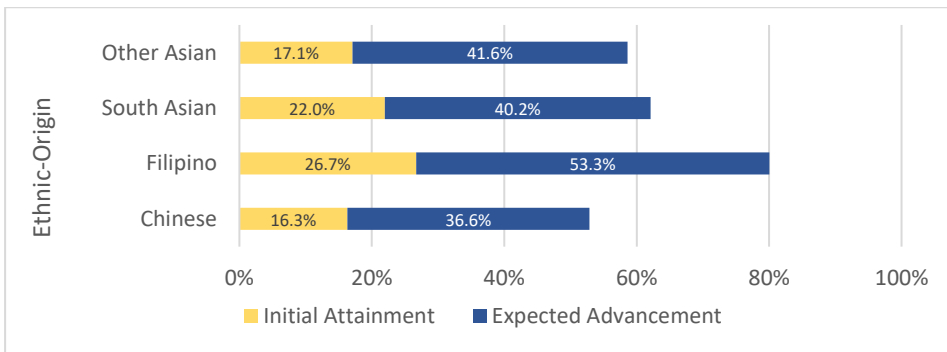

Figure 9: Initial attainment and expected lifetime advancement in median individual income among Asian immigrants, 2006-2016
Source: Author

The exceptionally high expected lifetime house ownership attainment in Chinese immigrants is primarily due to extraordinary high rates of initial attainment (Figure 10). About 55 per cent Chinese immigrants report house ownership at the first census after arrival. This suggests that many Chinese immigrants have a strong desire to buy a house, have some familiarity with the Canadian housing market, and have sufficient financial resources to purchase a house. Other Asian immigrant groups report lower initial levels of house ownership. All Asian immigrant groups have made major lifetime advancement in house ownership. Filipinos have the lowest expected lifetime attainment in house ownership.
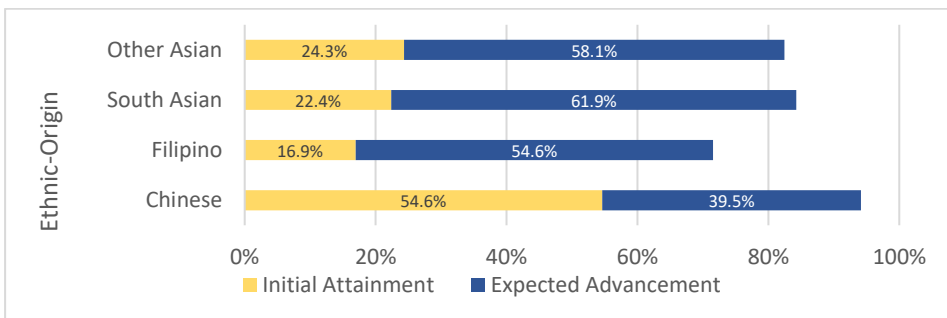

Figure 10: Initial attainment and expected lifetime advancement in house ownership among Asian immigrants, 2006-2016
Source: Author

167

Figure 11 shows differences in the expected lifetime attainment of citizenship. All the four Asian immigrant groups report similar initial attainment level of citizenship. Three groups (Filipinos, South Asians, and Other Asians) have expected lifetime advancement rate ranging from 87-91 per cent, resulting in lifetime attainment level of 94-98 per cent. Chinese immigrants have somewhat lower expected lifetime advancement which results in an expected lifetime attainment of 90 per cent.
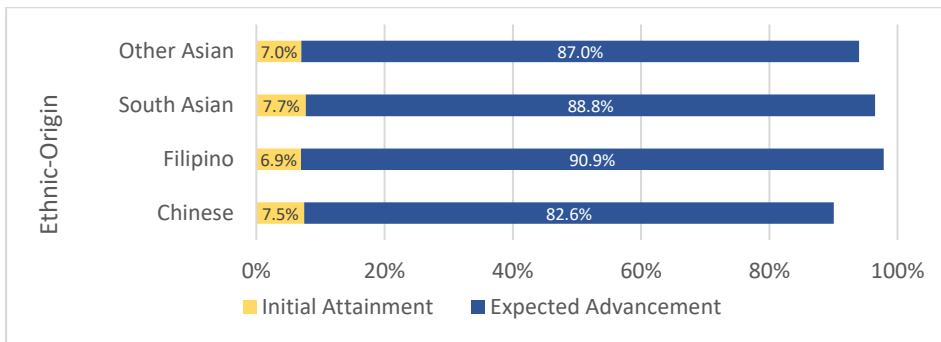

Figure 11: Initial attainment and expected lifetime advancement in house ownership among Asian immigrants, 2006-2016
Source: Author

Table 5 presents the overall summary of the analysis carried out in the present paper. The table shows the increase, decrease and no change in the expected lifetime advancement in different outcome measures considered in the present analysis. A "0" indicates the average advancement in the expected lifetime advancement; a "+" indicates the more than average advancement whereas a "-" indicates less than average advancement. The expected lifetime advancement has been average in all the six outcome measures in the South Asia immigrant group whereas volatility in the expected lifetime advancement has been the maximum in Filipino immigrants. In Chinese immigrants, expected lifetime advancement has been below average in case of the knowledge of official languages.

Table 5: Summary of expected lifetime advancement levels for Asian immigrant groups, 2006-2016

Outcome Measure	Immigrant group			
	Chinese	Filipino	South Asian	Other Asian
Know Official Languages	-	+	0	0
University Degree	0	-	0	+
Professional/Managerial Occupation	+	-	0	-
Above Median Individual Income	0	+	0	0
House ownership	+	-	0	0
Canadian citizenship	0	0	0	0

Source: Author

168

Discussions and Conclusions

This paper has argued that measuring the pace of immigrant advancement requires methodological improvements that deal with potential biases stemming from variation in the composition of immigrants groups by age, age at arrival, and duration of residence since arrival. We described a new summary period measure of advancement that provides useful information for comparisons of time periods, age at arrival, and immigrant groups. The new measure offers a more comprehensive indicator of the pace of immigrant advancement than other measures. Our analysis reveals that initial attainment accounts for some differences in expected lifetime attainment, especially for knowledge of official languages for all immigrant groups; house ownership for Chinese immigrants; and for professional or managerial occupations and above median individual income for Filipino immigrants. The contribution of expected lifetime advancement to lifetime attainment – the focus of the present analysis shows interesting variation for Asian immigrant groups for the six outcome measures:

- Chinese immigrants do well on entering managerial or professional occupations and house ownership but have lower advancement for learning official languages.
- Filipino immigrants are noteworthy for higher advancement for knowing official languages and above median individual income, but they have lower advancement in attaining university degree, professional or managerial occupation, and house ownership.
- South Asian immigrants have average advancement levels, compared to other Asian immigrants, on all outcome measures.
- Other Asian immigrants are noticeable for higher advancement in achieving university degree, but they have lower advancement for professional or managerial occupations.

This paper makes two theoretical contributions to previous research on immigrant advancement. First, it demonstrates the important distinction between initial attainment and lifetime advancement for several outcome measures of immigrant achievements. Previous work by Chiswick (2000) and others have emphasised the significance of immigrant selection effects, at the time of arrival, from the advances made by immigrants after arrival. Borjas (2014) has emphasised that interpreting changes in the initial attainment of immigrant-arrival cohorts is challenging. Changes in initial attainment, such as entry wages, may be due to differences in immigrant characteristics, labour force demands, or immigration selection policy. It is difficult in empirical research to measure links between types of immigration policies and the resulting skill composition of immigrants. Lifetime advancement needs to track a particular cohort across censuses or surveys, observing relative changes as the cohort ages over time and considering labour market conditions.

An alternative approach for measuring initial attainment and lifetime advancement is a double-cohort method, which nests immigrant cohorts within birth

cohorts (Edmonston and Lee, 2013). The double-cohort method includes both immigrants and native population for the same time period for two or more censuses or surveys. All persons have the same period changes, so differences can be interpreted as net of period effects, with the initial attainment of immigrants on arrival compared to Canadian-born residents of the same age. Changes in the native population represent lifetime advancement and provide a reference group for comparison of changes over time for immigrants. Differences between natives and immigrants of the same birth cohort, therefore, represent changes for immigrants due to duration of residence, net of period and age effects.

Longitudinal data offers a third approach for the study of immigrant arrivals and lifetime advancement. Several types of longitudinal data are potentially useful for immigration research (Edmonston, 1996). Retrospective data can be used, either by selecting respondents and asking about changes in the past or by studying synthetic cohorts in successive censuses or surveys. Prospective data requires new data collection in which respondents are surveyed and followed regularly over time. Such surveys have been conducted in several countries, including Canada and the United States. These surveys, however, have a heavy respondent burden, are expensive, take a long time to collect data, and require several new surveys over time to have comparative immigrant arrival cohorts.

The second theoretical contribution of this paper is to confirm the importance of considering variation in age, age at arrival, and duration of residence. A fundamental problem for analysis of immigrant advancement is that groups of immigrants observed at a single point vary in their age distribution, age at arrival, and duration of residence. Because age, age and arrival, and duration of residence are potentially related to initial attainment and lifetime advancement, empirical analysis needs to take all three demographic factors into account and make assumption to permit estimation of their separate effects.

There are other statistical methods to estimate changes over time for a particular response variable, such a house ownership or wages, where we need to deal with the identification problem that there are no separately identifiable age, cohort, and time effects. For multivariate analysis, one restriction that deals with the perfect collinearity built into the age-cohort-time relationship is that period effects are the same for immigrants and natives Borjas (2014). This restriction, stated differently, is the assumption that economic or social conditions affect immigrants and natives by the same proportionate amount. The double-cohort method makes a similar assumption (Edmonston and Lee, 2013).

This paper suggests four policy implications. First, the initial attainment levels for Asian immigrants indicate that Canada's point-based admission system has been relatively successful in selecting immigrants with higher levels of education and labour market skills. Second, although Asian immigrants with relatively high levels of educations are likely to have higher levels of professional or managerial occupations in their lifetime attainment, their individual income is not correspondingly high. This

suggests that education and labour market experience by Asian immigrants may be undervalued in the Canadian context, which accords with previous studies (Lewin-Epstein, et al., 2003; Picot, et al., 2007; Wu, et al., 2018).

Third, Asian immigrants display relatively large gains in lifetime advancement for occupational status, individual income, house ownership, and citizenship. Although it is noteworthy that Asian immigrants report high levels of English or French language skills upon arrival in Canada, there is relatively small improvement in official language skills, particularly for Chinese immigrants, after arrival. Lack of official language skills hinder social integration and stymies socioeconomic advancement and is worth further study in search of possible improvements. Finally, older Asian immigrants do well in improving their occupational skills and in acquiring Canadian citizenship with the passage of time. Older arrivals, however, do not advance their educational attainment but display two indicators of policy concern: 1) little improvement in official language skills after arrival; and 2) lower than median income.

Although this paper primarily offers descriptive analysis, the findings raise questions about explanation for differences seen for the four Asian immigrant groups. First, the differences in expected lifetime attainment of knowledge of official languages is mostly due to initial attainment. Previous useful analysis of language acquisition by Canadian immigrants using 1991 census data (Chiswick and Miller, 2001) suggests that there is greater knowledge of English or French for immigrants who arrive at younger ages, who have resided longer in Canada, have higher educational attainment, are from countries closer to Canada, have mother tongue that is linguistically closer to English or French, and from a former British, French, or American colony. This suggests that it may be useful to replicate the previous Chiswick and Miller study with more recent data to examine knowledge of English or French at the time of arrival for Asian immigrant groups. Second, analysis of the initial attainment and expected lifetime advancement for a university degree reveals interested differences that need further analysis, especially in the context of how much of the overall gains for Other Asians and Chinese are possibly due to higher advancement rate of immigrants who arrived as children and youth. Third, analysis of attainment of professional or managerial occupation and attainment of median individual income reveals a peculiar situation for Filipinos that needs to be investigated further in terms of the relationship between occupation and other labour force characteristics for Filipino immigrants, compared to other Asian immigrants. Fourth, analysis of above median individual income shows that Filipino immigrants have both a relatively high initial attainment and a comparatively high expected lifetime advancement. There is a need to undercover reasons for these variations in individual income for Asian immigrants, with a focus of uncovering possible explanations for the higher levels of Filipino immigrants. Wang and Lo (2005) provide analysis for Chinese immigrants in Canada. Wu and others (2018) present a related study of income of Chinese immigrants in Canada and the United States). Fifth, although Asian immigrants are expected to achieve relatively high lifetime levels of house ownership, this paper does not analyse how Asian immigrants responded to fluctuations in housing markets in recent decades. Edmonston and Lee (2013) present

171

a related study of homeownership trends for immigrants in Canada. An unusually high proportion of Asian immigrants live in Canada's two most expensive metropolitan areas – Toronto and Vancouver. Finally, the analysis of citizenship acquisition revealed variations for Asian immigrant groups that warrant further study. The eligibility for acquiring Canadian citizenship has changed in recent decades, and these changes may have affected the timing of acquisition of Canadian citizenship. Several conditions affect the acquisition of citizenship, including individual characteristics as well as factors at the country of origin and country of destination. Individual differences in language competence, years of residence, age, and education have been found to be important predictors (Dronkers and Vink, 2012). Factors at the country of origin affect naturalization rates. In addition, some origin countries may prohibit dual citizenship and the loss of citizenship may prohibit land ownership or restrict inheritance of property. Factors at the destination country also influence naturalization. Destination countries often institute rules for citizenship, including several years of residence; exhibiting knowledge of the official language(s); demonstrating knowledge of social, political, and economic institutions; be willing to do military service; or renouncing citizenship in other countries. Research on explanations of naturalization rates in Canada should not only consider institutional conditions but also other destination and origin country factors and individual characteristics of immigrants. Further study is needed to examine the factors affecting citizenship acquisition.

Acknowledgements

References

Borjas GJ (1985) Assimilation, changes in cohort quality, and the earnings of immigrants. *Journal of Labour Economics* 3(4): 463-489.

Borjas GJ (2014) *Immigration Economics*. Cambridge, MA, Harvard University Press.

Chiswick BR (2000) Are immigrants favorably self-selected? An economic analysis. Bonn, Germany, Forschungsinstitut zur Zukunft der Arbeit GmbH (IZA). IZA Discussion Paper No. 131.

Chiswick BR, Miller PW (2001) A model of destination-language acquisition: application to male immigrants in Canada. *Demography* 38(3): 391-409.

Dronkers J, Vink MP (2012) Explaining access to citizenship in Europe: how citizenship policies affect naturalization rates. *European Union Politics* 13 (3): 390–412.

Edmonston B (1996) *Statistics on U.S. Immigration*. Washington, DC, National Academy Press.

Edmonston B (2016) Canadian immigration trends and patterns. *Canadian Studies in Population* 43(1-2): 78-116. Special Issue on Demographic Trends in Canada and Australia.

Edmonston B, Lee SM (2013) Immigrants' transition to homeownership, 1991 to 2006. *Canadian Studies in Population* 40(1-2): 57-74. Special Issue on Lifecourse Perspectives on Immigration.

Immigration, Refugees and Citizenship Canada (2017) *Facts and Figures 2017: Immigration Overview - Permanent Residents*. Data set IRCC_FF_PR_2017_15_E. Downloaded 29 September 2019.

Lee SM (2011) Ethnic origins of Canadians. In B Edmonston, E Fong (Eds), *The Changing Canadian Population*. Montreal and Kingston: McGill-Queen's University Press.

Lee SM (2021) Canada's immigrant families: growth, diversity, and socioeconomic well-being. Victoria, University of Victoria, Department of Sociology. Unpublished conference paper.

Lee SM, Edmonston B (2011) Age at immigration effects on socioeconomic outcome measures: a comparative study of Asian Immigrants in Canada and the United States. *International Migration Review* 45 (3): 527-561.

Lewin-Epstein N, Semyonov M, Kogan I, Wanner RA (2003) Institutional structure and immigrant integration: a comparative study of immigrants' labour market attainment in Canada and Israel. *International Migration Review* 37(2): 389-420.

Picot G, Hou F, Coulombe S (2007) Chronic low income and low-income dynamics among recent immigrants. Statistics Canada. Canadian Labour Market and Skills Researcher Network, Working Paper Number, 26.

Pitkin J, Myers D (2011) A summary period measure of immigrant advancement in the U.S. *Demographic Research* 24: 257-292.

Smith J, Edmonston B (1997) *The New Americans: Economic, Demographic, and Fiscal Effects of Immigration*. Washington, DC, National Academy Press.

Wang S, Lo L (2005) Chinese immigrants in Canada: their changing composition and economic performance. *International Migration* 43(3): 35-71.

Wu Z, Lee SM, Hou F, Edmonston B, Carmichael A (2018) Earning gaps for Chinese immigrants in Canada and the United States. *International Migration* 56(2):18-36.

Appendix A

A Summary Period Measure of Lifetime Advancement

This appendix describes the definition and derivation of a summary period measure that is applied to the calculation of lifetime advancement of status attainment variables for immigrants. The calculation of the new summary period measure is described below, based on the original formulation of Pitkin and Myers (2011).

For an outcome measure for attainment in a census year, we write:

$$x^{year}_{age,duration}$$

where age is a five-year age group and duration is a five-year group since arrival in Canada. If the outcome measure is Canadian citizenship, for example, then the tabulation is the number who do not have citizenship and the number that have citizenship, with both tabulations by age and duration of residence. If two censuses are 10 years apart, then the 10-year change for the outcome measure is defined for any birth-arrival cohort as:

$$\Delta age = age2 - age1$$

where *age1* is the age group in the first census and *age2* (10 years older than *age1*) is the age group in second census, and:

$$\Delta duration = duration2 - duration1$$

where, again, *duration2* is 10 years more than *duration1*.

We also define 5-year age at arrival groups for 0-4 to 70-74 years of age for analysis, *arrival*, where *arrival1* are immigrants who arrived at age 0-4 years, *arrival2* are immigrants who arrived at age 5-9 years, and incremented to *arrival15* for age 70-74 years.

We describe the cohort advancement between two censuses, *year1* and *year2*, as the difference, *change*, in the observed status attainment as:

$$change^{year2}_{age1+\Delta age,duration1+\Delta duration} = x^{year2}_{age1+\Delta age,duration1+\Delta duration} - x^{year1}_{age1,duration\ 1} \quad (1)$$

which shows the ten-year advancement of the outcome measures between *year1* and *year2* for birth and arrival cohorts in *year2* in which *age1>0* or *duration1>0*.

We combine observed changes in attainment for different cohorts into a synthetic estimate of the expected advancement to a particular older age, called *AGE*. Such a synthetic measure – similar to the demographic calculation of the total fertility rate from an observed set of age-specific fertility rates – uses observed changes for cohorts at each age, *agei*, and observed changes by duration of residence, *durationi*, during the census period *year1* to *year2*. The observed change in attainment per person is calculated as a hazard rate for the number of persons advancing, *change*, relative to the risk population (that is, the number who have not attained the status), or

$$hazard^{year2}_{age1+\Delta age,duration1+\Delta duration} = \frac{change^{year2}_{age1+\Delta age,duration1+\Delta duration}}{1-x^{year1}_{age1,duration1}} \qquad (2)$$

Then, the total advancing to an older age, $l^{year2}_{agei \rightarrow AGE}$, is the cumulative hazard of advancing, or:

$$l^{year2}_{agei \rightarrow AGE} = 1 - \left[(1 - x^{year1}_{agei,0}) * \prod_{k=1 \ to \ \frac{(AGE-agei)}{\Delta age}}(1 - hazard^{year2}_{agei+k\Delta age,k\Delta age})\right] \ (3)$$

for each age at arrival group, *arrivalj*. Because of smaller numbers of older immigrants and immigrants who arrived many years ago, it is reasonable to calculate a cumulative hazard up to age 75 years and to assume that the longest duration of residence is 30 years. The effect of ignoring advancement after age 75 years or after 30 years of residence is negligible.

Because some measures of advancement reach a peak before maximum age 75 years, and then decline, we define the peak advancement for each age at arrival group as L^{year2}_{agei}, at age *agei* as:

$$L^{year2}_{arrivalj} = \max(l^{year2}_{arrivlaj \rightarrow arrivalj+\Delta arrival}, ..., l^{year2}_{arrivalj \rightarrow 75}) \qquad (4)$$

Equation (4) shows the lifetime expected advancements selected for the maximum lifetime value for each age at arrival. All ages at arrival can be combined in a summary expected value as an average weighted by the number of immigrants that arrive at each age for year *yearT*, or $n^{yearT}_{arrivalj}$:

$$\overline{L}^{yearT} = \frac{\sum_{arrivalj=0 \ to \ 74} L^{year2}_{arrivalj} * n^{yearT}_{arrivalj}}{\sum_{arrivalj=0 \ to \ 74} n^{yearT}_{arrivalj}} \qquad (5)$$

which offers a synthetic lifetime measure of changes for the outcome measure. In order to consider possible differences in the age at arrival composition of different periods or different immigrant groups, it is preferable to standardize comparisons by using a common age at arrival distribution. For this paper's analysis, we standardize comparisons by using the age at arrival distribution for Asian immigrants arriving in Canada during 2006 to 2016 as common distribution for all immigrant groups and time periods.

This measure combines all age groups, however, and includes immigrants who arrive at younger ages and have different experiences over their lifetimes compared to immigrants arriving at older ages (Lee and Edmonston, 2011). Immigrants arriving at ages 0 to 4 years, for example, receive all their schooling in Canada and have higher language fluency in English, French, or both than immigrants arriving at older ages. It is useful to compute expected lifetime advances for three general age groups: immigrants arriving before age 20 years, immigrants arriving as adults at ages 20 to 49 years, and immigrants arriving at ages 50 to 74 years. Other age groups could also be defined. For immigrants arriving before age 20 years, we compute:

$$\overline{L}_{<20}^{year2} = \frac{\sum_{arrivalj=0\ to\ 19} L_{arrivalj}^{year2} * n_{arrivalj}^{yearT}}{\sum_{arrivalj=0\ to\ 19} n_{arrivalj}^{yearT}} \tag{6}$$

For immigrants arriving between ages 20 to 49 years, we have:

$$\overline{L}_{20-49}^{year2} = \frac{\sum_{arrivalj=20\ to\ 49} L_{arrivalj}^{year2} * n_{arrivalj}^{yearT}}{\sum_{arrivalj=20\ to\ 49} n_{arrivalj}^{yearT}} \tag{7}$$

And for immigrants arriving between ages 50 and 74 years, we compute:

$$\overline{L}_{50-74}^{year2} = \frac{\sum_{arrivalj=50\ to\ 74} L_{arrivalj}^{year2} * n_{arrivalj}^{yearT}}{\sum_{arrivalj=50\ to\ 74} n_{arrivalj}^{yearT}} \tag{8}$$

Appendix B

Calculation of Lifetime Advancement

This appendix describes the tabulation of census data on attainment thresholds and the calculation of lifetime advancement and attainment. Tabulations and calculations are illustrated for Chinese-origin immigrants for Canadian citizenship attainment between the censuses of 2006 and 2016. The appendix includes three tables. Table B.1 displays the share of the Chinese immigrants at or above the attainment threshold – meaning that they have become Canadian citizens – by age and time of entry to Canada for 2006 and 2016. Table B.2 organizes the tabulations to show the proportion of immigrant cohorts, by age at the end of decade and age at arrival, that have attained Canadian citizenship at the beginning and end of the 2006-2016 decade. Finally, Table B.3 presents (a) the calculation of hazard rates for changes in the attainment of Canadian citizenship for arrival cohorts by age; (b) shows the initial attainment, expected lifetime attainment, and expected lifetime advancement for arrival cohorts; (c) notes the standard distribution of immigrants arrivals by age based on 2006 to 2016 data on age at arrivals for all Asian immigrants to Canada; and (d) shows summary results for initial attainment, expected lifetime attainment, and expected lifetime advancement for all ages and for three selected age at arrival groups.

The data required for the calculation of initial attainment, expected lifetime attainment, and expected lifetime advancement are tabulations of an immigrant group at the beginning and end of a decade. For Chinese immigrants advancing to Canadian citizenship during 2006 to 2016, we tabulate foreign-born Chinese, by age and time of entry, using Canadian microdata census samples for 2006 and 2016. Two tabulations by age and time of entry are required for 2006 and another two for 2016: one for individuals who do not have Canadian citizenship and another for individuals who report having Canadian citizenship. Population censuses vary in the type of questions asked of foreign-born residents. If a census does not ask "when did you arrive", the census may ask "how long have you lived here since arriving as an immigrant" or "how old were you when you arrived" that can be used to calculate the time of entry.

The first calculation made from the tabulated data are the shares of the immigrant group that are at or above the attainment threshold for the two censuses. In this case, we calculate the proportion who are report that they are Canadian citizens by age and time of entry for 2006 and 2016 (see Table B.1). As expected, immigrants report lower levels of Canadian citizenship soon after arrival and higher levels of Canadian citizenship with longer residence in Canada.

An intermediate step is needed to calculate the number of immigrants who have attained Canadian citizenship by age and age at arrival, based on their age at the end of the decade (see Table B.2). There is a peculiar feature in the top panel of Table B.2 for 2006: individuals aged 0 to 9 years at the end of the decade were not yet born at the beginning of the decade. Children less than 10 years of age, however, do arrive during the decade and are observed in the 2016 census.

For status attainment during a decade, a distinction needs to be made for whether individuals arrived in the first half or second half of the decade. Immigrants who arrived in the first half of the decade (years ending in 6, 7, 8, 9, or 0 for these census data) are observed for more than 5 years after arrival. Immigrants who arrived in the second half of the decade (years ending in 1, 2, 3, 4, 5), on the other hand are observed for no more than 5 years. To make comparable estimates for the "first-half" and "second-half" immigrant arrivals, five-year advances for the first-half arrivals need to be estimated. Following Pitkin and Myers (2011: footnote 25), a synthesized estimate of the five-year advance for the first-half arrivals can be made from the difference between the end-of-decade attainment at the first observed age and the mid-decade attainment at the reported age at arrival.

Based on Table B.1 and B.2, we can calculate the summary period measures in several steps shown in Table B.3. In panel A of Table B.3, we calculate the proportional decrease in the hazard of non-attainment for the 10-year advance between 2006 and 2016, underlining cohorts who arrived in the first half of the decade so that we make separate calculations for the first half and second-half cohorts. Next, in panel B of Table B.3, we calculate the expected lifetime attainment at age 75 years based on the cumulative proportional decreases in the hazard of non-attainment, separately for the first half, and second half cohorts. The two estimates are combined into a single mean estimate for lifetime attainment to age 75 years.

Panel C of Table B.3 displays the initial attainment and expected lifetime attainment for age-at-arrival cohorts. Estimates of expected lifetime advancement are calculated as the difference between expected lifetime attainment and initial attainment.

In order to obtain comparable weighted estimates for different immigrant groups and different time periods, the observed age-at-arrival data are weighted by the age-at-arrival distribution for Asian immigrants arriving in Canada during 2006 to 2016, shown in panel D of Table B.3.

Panel E of Table B.3 shows weighted estimates for initial attainment, expected lifetime advancement, and expected lifetime attainment for all ages as well as ages less than 20 years, 20 to 49 years, and 50 years and older.

Table B1: Share of the Chinese immigrants at or above the attainment threshold for Canadian citizenship, by age and year of entry in Canada, 2006 and 2016.

Age (Years)	Time of entry in Canada							
	Less than 5 years ago	5 to 9 years ago	10 to 14 years ago	15 to 19 years ago	20 to 24 years ago	25 to 29 years ago	30 to 39 years ago	40 or more years ago
					2006			
<5	0.0859							
5-9	0.1498	0.7782						
10-14	0.0569	0.7968	0.9253					
15-19	0.0873	0.8062	0.9303	0.9459				
20-24	0.0727	0.8173	0.9595	0.9751	0.9999			
25-29	0.0640	0.7979	0.9605	0.9781	0.9900	0.9999		
30-34	0.0991	0.7523	0.9262	0.9780	0.9836	0.9843	0.9999	
35-39	0.0626	0.7995	0.9394	0.9727	0.9781	0.9774	0.9999	
40-44	0.0690	0.7401	0.9439	0.9454	0.9774	0.9747	0.9762	0.9999
45-49	0.0733	0.7371	0.9091	0.9442	0.9635	0.9891	0.9868	0.9999
50-54	0.1284	0.7341	0.9178	0.9734	0.9717	0.9875	0.9715	0.9048
55-59	0.1324	0.6194	0.9045	0.9650	0.9632	0.9803	0.9789	0.9999
60-64	0.0541	0.7108	0.8919	0.9481	0.9481	0.9929	0.9856	0.9999
65-69	0.0633	0.7711	0.9358	0.9921	0.9846	0.9888	0.9827	0.9999
70-74	0.0635	0.6447	0.9187	0.9612	0.9886	0.9899	0.9918	0.9999

Age (Years)	Time of entry in Canada							
	Less than 5 years ago	5 to 9 years ago	10 to 14 years ago	15 to 19 years ago	20 to 24 years ago	25 to 29 years ago	30 to 39 years ago	40 or more years ago
				2016				
<5	0.0435							
5-9	0.1881	0.7440						
10-14	0.0979	0.6652	0.8982					
15-19	0.0921	0.6103	0.8667	0.9552				
20-24	0.0872	0.7178	0.8472	0.9760	0.9655			
25-29	0.0481	0.6599	0.9083	0.9668	0.9548	0.9605		
30-34	0.0643	0.5726	0.8690	0.9462	0.9917	0.9893	0.9999	
35-39	0.0872	0.5301	0.8115	0.9221	0.9786	0.9781	0.9999	0.8261
40-44	0.0784	0.5025	0.8246	0.9333	0.9424	0.9660	0.9999	0.9885	0.9999
45-49	0.0714	0.4686	0.7717	0.9504	0.9317	0.9528	0.9779	0.9900	0.9518
50-54	0.0428	0.3278	0.6998	0.9124	0.9531	0.9763	0.9507	0.9912	0.9911	0.9999
55-59	0.0704	0.3333	0.6447	0.9036	0.9575	0.9564	0.9781	0.9679	0.9718	0.8889
60-64	0.0331	0.4639	0.6944	0.9327	0.9544	0.9688	0.9821	0.9956	0.9680	0.9999
65-69	0.0049	0.5079	0.6860	0.9180	0.9431	0.9554	0.9809	0.9749	0.9837	0.9821
70-74	0.0054	0.2239	0.5303	0.8286	0.9388	0.9680	0.9487	0.9740	0.9792	0.9667

Table B2: Proportion of Chinese immigrant cohorts, by age at the end of the decade (2016) and age at arrival who have attained Canadian citizenship at the beginning (2006) and at the end (2016)

Age in 2016 (Years)	Age at arrival (Years)												
	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
							2006						
<5													
5-9													
10-14	0.0859												
15-19	0.7782	0.1498											
20-24	0.9253	0.7968	0.0569										
25-29	0.9459	0.9303	0.8062	0.0873									
30-34	0.9999	0.9751	0.9595	0.8173	0.0727								
35-39	0.9999	0.9900	0.9781	0.9605	0.7979	0.0640							
40-44	0.9999	0.9843	0.9836	0.9780	0.9262	0.7523	0.0991						
45-49	0.9999	0.9999	0.9774	0.9781	0.9727	0.9394	0.7995	0.0626					
50-54	0.9999	0.9762	0.9762	0.9747	0.9774	0.9454	0.9439	0.7401	0.0690				
55-59	0.9999	0.9999	0.9868	0.9868	0.9891	0.9635	0.9442	0.9091	0.7371	0.0733			
60-64	0.9048	0.9048	0.9048	0.9715	0.9715	0.9875	0.9717	0.9734	0.9178	0.7341	0.1284		
65-69	0.9999	0.9999	0.9999	0.9999	0.9789	0.9789	0.9803	0.9632	0.9650	0.9045	0.6194	0.1324	
70-74	0.9999	0.9999	0.9999	0.9999	0.9999	0.9856	0.9856	0.9929	0.9481	0.9481	0.8919	0.7108	0.0541

Age in 2016	Age at arrival (Years)												
(Years)	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
							2016						
<5													
5-9	0.7440	0.1881											
10-14	0.8982	0.6652	0.0979										
15-19	0.9552	0.8667	0.6103	0.0921									
20-24	0.9655	0.9760	0.8472	0.7178	0.0872								
25-29	0.9605	0.9548	0.9668	0.9083	0.6599	0.0481							
30-34	0.9999	0.9893	0.9917	0.9462	0.8690	0.5726	0.0643						
35-39	0.8261	0.9999	0.9781	0.9786	0.9221	0.8115	0.5301	0.0872					
40-44	0.9999	0.9885	0.9999	0.9660	0.9424	0.9333	0.8246	0.5025	0.0784				
45-49	0.9518	0.9518	0.9900	0.9779	0.9528	0.9317	0.9504	0.7717	0.4686	0.0714			
50-54	0.9999	0.9911	0.9911	0.9912	0.9507	0.9763	0.9531	0.9124	0.6998	0.3278	0.0428		
55-59	0.8889	0.8889	0.9718	0.9718	0.9679	0.9781	0.9564	0.9575	0.9036	0.6447	0.3333	0.0704	
60-64	0.9999	0.9999	0.9999	0.9680	0.9680	0.9956	0.9821	0.9688	0.9544	0.9327	0.6944	0.4639	0.0331
65-69	0.9821	0.9821	0.9821	0.9821	0.9837	0.9837	0.9749	0.9809	0.9554	0.9431	0.9180	0.6860	0.5079
70-74	0.9667	0.9667	0.9667	0.9667	0.9667	0.9792	0.9792	0.9740	0.9487	0.9680	0.9388	0.8286	0.5303

Table B3: Increase in synthetic immigrant cohort in the share of attainment of Canadian citizenship up to age 75 years for 2006-2016. (Cohorts arriving in the first half of the decade are underlined. Separate calculations are made for the first half and the second half of the decade as described in the text)

Age in 2006 (Years)	Age at arrival (in years)												
	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
A. Proportional decrease in the hazard of non-attainment for the 10 years advance between 2006 and 2016													
10-14	0.8982												
15-19	0.7981	0.8432											
20-24	0.5385	0.8820	0.8380										
25-29	0.2697	0.3508	0.8286	0.8995									
30-34	0.0000	0.5704	0.7951	0.7054	0.8588								
35-39	0.0000	0.9900	0.0033	0.4592	0.6144	0.7986							
40-44	0.0000	0.2701	0.9939	0.0000	0.2193	0.7308	0.8054						
45-49	0.0000	0.0000	0.5567	0.0000	0.0000	0.0000	0.7528	0.7565					
50-54	0.0000	0.6250	0.6250	0.6496	0.0000	0.5654	0.1643	0.6629	0.6776				
55-59	0.0000	0.0000	0.0000	0.0000	0.0000	0.4000	0.2189	0.5329	0.6333	0.6166			
60-64	0.9990	0.9990	0.9990	0.0000	0.0000	0.6507	0.3662	0.0000	0.4458	0.7470	0.6494		
65-69	0.0000	0.0000	0.0000	0.0000	0.2288	0.2288	0.0000	0.4803	0.0000	0.4039	0.7846	0.6382	
70-74	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0128	0.3840	0.4337	0.4071	0.5035

					Age at arrival (in years)							
<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
B. Advancement to age 75 years based on cumulative proportional decrease in hazard of non-attainment												
Maximum in the 1st half of the decade												
1.0000	0.9990	1.0000	0.9456	0.8898	0.9068	0.8969	0.9409	0.8236	0.8153	0.8015	0.7118	0.5035
Maximum in the 2nd half of the decade												
0.9648	1.0000	0.9646	0.9616	0.8751	0.9802	0.8935	0.8070	0.7795	0.8840	0.8731	0.6221	
Mean of the maximum of the two halves of the decade												
0.9824	0.9995	0.9823	0.9536	0.8824	0.9435	0.8952	0.8739	0.8016	0.8497	0.8373	0.6669	0.5035
C. Initial attainment and expected lifetime attainment, as proportion of immigrant cohort, at age of arrival observed in 2006												
Initial attainment												
0.0000	0.1881	0.0979	0.0921	0.0872	0.0481	0.0643	0.0872	0.0784	0.0714	0.0428	0.0704	0.0331
Expected lifetime attainment												
0.9824	0.9996	0.9840	0.9579	0.8927	0.9462	0.9019	0.8849	0.8171	0.8604	0.8442	0.6904	0.5199
Exp. Lifetime Advancement												
0.9824	0.8115	0.8861	0.8658	0.8055	0.8981	0.8377	0.7977	0.7388	0.7890	0.8015	0.6200	0.4868
D. Standard distribution of age (proportion) at arrival (Asian immigrants arriving in Canada during 2006 to 2016)												
0.0727	0.0686	0.0734	0.0677	0.0825	0.1531	0.1419	0.1081	0.0805	0.0636	0.0318	0.0260	0.0301

E. Summary results (Panel C weighted by Panel D)

Age at Arrival (in years)			
All Ages	Arrive less than Age 20	Arrive at Age 20 to 49	Arrive at Age 50 or older
Initial attainment			
0.0745	0.0933	0.0698	0.0476
Expected lifetime advancement			
0.8262	0.8879	0.8243	0.6406
Expected lifetime attainment			
0.9007	0.9811	0.8941	0.6882