University of Alberta

Immigration and Fertility: A Comparative Analysis of Alberta and Canada

by

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Dedication

This thesis is dedicated to my wife: Mila. Her love, patience, support, and understanding have inspired me to finish this thesis.

Abstract

The differences in fertility between first-generation immigrants and the native-born second and third generations have become an important marker of the extent to which immigrants become assimilated into a host society. Demographic research shows that first-generation immigrants have lower fertility than the native-born. In this dissertation, my main purpose was to investigate whether or not the fertility of first-generation immigrant women (including two sub-groups of first-generation immigrants: child immigrant women and adult immigrant women) and second-generation women differs from that of third-generation women in Alberta and Canada. Fertility here refers to the progression to parity-specific fertility (up to the third birth) and cumulative fertility. I examined the fertility differentials through the application of event history analysis, OLS regression estimates, and decomposition analysis, utilizing data from the 2010 Alberta Fertility Survey (AFS) and the 2006 General Social Survey (GSS) of Canada.

I found that first-generation immigrant women in general and adult immigrant women in particular had a lower progression to first and second births and a lower cumulative fertility than native-born women in Alberta and Canada. These findings are consistent with the *disruption hypothesis*, indicating that immigrant fertility is depressed because of factors associated with migration such as moving to a new country, finding a new home, and getting established socially and economically. Furthermore, I discovered that there was no significant difference in parity-specific fertility and cumulative fertility between child

immigrant women and native-born women in Alberta and Canada. These results support the *adaptation hypothesis*, suggesting that the fertility of child immigrant women converges with that of the native-born population because their younger age at immigration facilitates greater socioeconomic and cultural integration into the host society. Finally, I found that there was no significant difference in progression to parity-specific fertility or in cumulative fertility between second-generation women and third-generation women in Alberta and Canada. These results suggest that with regard to fertility there is no evidence of socioeconomic insecurity for second-generation women in the country. The theoretical and practical implications of these findings are discussed in the context of Alberta and Canada.

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CHAPTER ONE

Introduction

1.1 Background

Canada is one of the leading migrant-receiving countries in the world. In 2011, the proportion of foreign-born residents in Canada increased to 20.6 per cent from 16.7 per cent in 1995. In proportional terms, they represented the largest foreign-born population among the G-8 countries (Statistics Canada, 2013a). The percentage of foreign-born residents in Canada is projected to be between 25.0 and 28.0 per cent of the total population by 2031, exceeding the peak percentage (22.0%) observed between 1911 and 1931 (Statistics Canada, 2010).

The increasing size of the foreign-born population has become the main driving force behind Canada's population growth. Despite the below replacement level of fertility (fewer than 2.1 children per women on average), Canada's population has increased by 1.1 per cent between 2009 and 2010, which is similar to the annual rates observed since the early 2000s. Net international migration has contributed to two-thirds of the total population growth in Canada during the last two decades. During the period of 2009-2010, Canada gained 254,000 people from net international migration (Statistics Canada, 2011a). Thus due to the sustained increase rate, Canada's population reached 35.14 million in the second quarter of 2013 (Statistics Canada 2013d).

The increasing volume of immigrants has generated huge interest among researchers and policymakers in examining the extent to which immigrants become integrated and assimilated into the host society. Not surprisingly, a large body of research in Canada has investigated immigrants' education, occupation and income attainment in relation to those of the native-born population (e.g., Boyd, 2009a; Chiswick & Miller, 2010; Connor & Massey, 2010; Fong & Shen, 2011; White, Fong, & Cai, 2003). Although there are variations in findings across different countries and regions, in most cases, researchers find that immigrants have lower socioeconomic attainment than the native-born population. Moreover, they also observe that in many cases the educational credentials obtained in immigrants' countries of origin are not recognized by employers in the host country. As a result, a large number of immigrants are either employed in low-paying jobs or in jobs that do not correspond to their formal education and training. The lower socioeconomic attainment of immigrants has a wide range of consequences on many aspects of their personal lives in general and on their fertility behaviour in particular.

Another strand of literature has looked at the assimilation of immigrants into the host country in terms of their fertility (e.g., Bean, Cullen, Stephen, & Swicegood, 1984; Bean & Swicegood, 1982; Kahn, 1994; Milewski, 2010; Musino, Iaccarino, Prati, & Strozza, 2009; Schmid & Kohls, 2009; Stephen & Bean, 1992; White & Buckley, 2011). Overall, these studies document that immigrants undergo a change in their fertility behaviour after immigration

because of various factors associated with moving to a new country such as geographic separation of partners, and adjusting to a new culture and environment (Garssen & Nicolaas, 2008; Hoem & Nedoluzhko, 2008; Milewski, 2007; Mussino et al., 2009; Schmid & Kohls, 2009).

However, this literature has produced contradictory results: (1) In some studies, immigrant fertility levels decrease after migration (Beaujot, 1991; and Ram & George, 1990 in Canada; Carlson, 1985 in Australia); (2) in other studies immigrant fertility levels increase soon (in most cases during the first two years) after migration (Andersson, 2004 in Sweden; Kulu, 2005 in Estonia; Mulder & Wagner, 1993 in Germany; Ng & Nault, 1997 in Canada). (3) Some authors report that immigrant fertility levels remain at the same level as that of their country of origin (Kahn, 1994, and Stephen & Bean, 1992 in the United States); (4) others find that immigrants' fertility level converges with that of the native-born population with increasing duration of residence in the host society (Andersson, 2004, and Andersson & Scott, 2005 in Sweden; Milewski, 2008 in Germany).

We can identify four limitations in earlier studies on immigrant fertility. First, most of the studies have focused either on the current fertility or the cumulative fertility of migrants. In such cases, current fertility is often measured in terms of total number of children aged below three years, and cumulative fertility is measured in terms of total number of children ever born (Ng & Nault,

1997; Ram & George, 1990; Woldemicael & Beaujot, 2012). These studies treat current fertility of migrants as a possible indicator of the short-term effect of migration on fertility. Looking at the cumulative fertility of immigrants would provide better insight into the impact of migration on fertility over the migrants' reproductive span (Ford, 1990; Milewski, 2010; Stephen & Bean, 1992). Research needs to examine both the current and the cumulative fertility of immigrants in order to capture both short-term and long-term effects of immigration on fertility.

Second, though some of the previous research has looked at the parity-specific fertility of migrants (Andersson & Scott, 2005 in Sweden; Milewski, 2010 in Germany; Mussino et al., 2009 in Italy), this aspect has remained virtually unexplored in Canada. It is important to examine the transition to parity-specific fertility (i.e., time to first birth from age 15, time to second birth since the first, and so on) to obtain a better understanding of how migration affects fertility in a dynamic manner. Examining parity-specific fertility provides a better picture of the extent to which migrants postpone or advance their childbearing and possibly end up with a lower or higher number of children in relation to their host population. Including parity-specific fertility in the analysis would also capture the possible disruption effect of migration on fertility for those couples who may postpone their first or second birth while maintaining the total number of desired children unchanged over their reproductive span.

Third, only a few studies in the context of Canada have undertaken separate analyses of fertility behaviour based on age at immigration. Previous research shows that there are significant differences in fertility behaviour between child immigrants and adult immigrants (Adsera, 2012). Therefore, conducting separate analyses for these two sub-groups of first-generation immigrants would provide better insights into the extent to which child immigrants adapt norms and values of fertility behaviour of the host society in the one hand, and the extent to which early socialization of adult immigrants in their country of origin affects fertility in the host society on the other.

Fourth, even though the fertility of second-generation descendants of immigrants has been examined extensively in the United States (Bean et al., 1984; Bean & Swicegood, 1982; Stephen & Bean, 1992) and in Europe (Garssen & Nicolaas, 2008; Hill & Johnson, 2004; Milewski, 2010), it has received limited attention in Canada (Bélanger & Gilbert, 2002; Woldemicael & Beaujot, 2012). It is necessary to examine fertility for at least two generations to assess the extent to which reproductive norms and values of first-generation immigrants are transferred to second-generation immigrant descendants (Andersson, 2004; Bean et al., 1984; Milewski, 2010; Garssen & Nicolaas, 2008; Stephen & Bean, 1992). Doing so will help us to adequately explore the long-term effects of migration on fertility.

In this study, I examine both the short-term and long-term effects of immigration on fertility in Alberta and Canada.[1] I measure fertility in terms of the number of children ever born as well as the transition to parity-specific fertility. I investigate the fertility of various categories of immigrants (first-generation immigrants, child immigrants, and adult immigrants) and their second-generation descendants in Alberta and Canada. This approach helps to illuminate both the short-term and long-term impact of migration on the fertility of immigrants and their second-generation descendants in relation to the third generation.

Alberta is one of the provinces in Canada that receives a huge number of immigrants every year. It also has a strong economy with the lowest unemployment rate in Canada. These factors might exert a substantial influence on the fertility behaviour of immigrants in Alberta. Considering all these factors in Alberta, the question remains whether we can expect similar findings regarding the impact of migration on fertility of immigrants across Canada. For this reason, in addition to Alberta, I have conducted a separate analysis of immigrant fertility in Canada.

1.2 Operational Definition of the Concepts

In this study, *first-generation immigrant women* are those who immigrated to Canada from other countries. First-generation immigrant women are subsequently categorized into *child immigrant women* and *adult immigrant women* in order to examine the extent to which *age at immigration* affects

[1] The analysis for Canada includes all provinces including Alberta.

fertility. *Child immigrant women* are those who came to Canada before age 13 and *adult immigrant women* are those who came to Canada at age 13 or over. As such, the category of adult immigrant women also contains teen immigrants (age at migration 13 to 19). However, because the sample size for teen immigrants was small, it was not possible to conduct a separate analysis for them.

The *second-generation descendants of immigrants* (hereafter "second-generation women") are the children of immigrants who were born in Canada. In this case, respondents who were born in Canada, and at least one of whose parents was born outside of Canada, are also defined as second-generation women. Finally, *third-generation women* are the native-born Canadians whose both parents were born in Canada.

1.3 Study Objectives and Research Questions

The objective of the present research is to examine the impact of international migration on the fertility behaviour of immigrant women in Alberta and Canada. There are four exposure variables of interest (also known as independent variables) in this research: (1) first-generation immigrant women versus third- or second-generation women; (2) child immigrant women versus third- or second-generation women; (3) adult immigrant women versus third- or second-generation women; and (4) second-generation women versus third-generation women.

The outcome variable of interest, fertility, is measured in terms of two indicators: (i) transition to parity-specific fertility and (ii) cumulative fertility (i.e., total number of children ever born). By *transition to parity-specific fertility,* I denote *time to first birth from age 15, time to second birth from the first,* and *time to third birth from the second.* Sample size restriction precludes analysis of higher-order parity transitions. The age of 15 has been selected as the starting point to compute *time to first birth* because at this age women become capable of having children. Although there are variations in the age at which women become capable of having children (i.e., the onset of puberty), research shows that the age of 15 can be considered as standard (Parent et al., 2003).

This research is guided by three questions: (1) To what extent does the fertility of first-generation immigrant women (also include the contrast child/adult immigrant women) in Alberta and Canada differ from that of third-generation women? (2) Is there a significant difference in fertility between first-generation immigrant women (also include the contrast child/adult immigrant women) and second-generation women in Alberta and Canada? (3) What is the differential pattern of fertility between second-generation women and third-generation women in Alberta and Canada?

I investigate these research questions in connection with the variations in *time to first birth from age 15, time to second birth from the first,* and *time to third birth from the second* through the application of the *event history analysis,* utilizing data from the 2010 Alberta Fertility Survey and the 2006 General Social

Survey (GSS) of Canada. The *event history analysis* is widely used in duration models where the outcome variable is the time to an event of interest. More specifically, I have applied the Cox proportional hazard (PH) models to examine the transition to parity-specific fertility. An important feature of the Cox PH model is that it can take *censoring* into account. Censoring occurs when we have some information about an individual but we do not have complete information as to whether the individual experiences the event because of truncation due to end of the observational period (Kleinbaum & Klein, 2005).

I examine cumulative fertility, the second measurement of the outcome variable, utilizing the same data by applying Ordinary Least Square (OLS) regression. The interpretation of OLS regression is easy for a general audience to follow, and it has been widely used in previous research to examine cumulative fertility as an outcome variable (e.g., Bean and Swicegood 1985). In addition, it is possible to extend OLS regression to decomposition analysis for getting further insight about contribution of different components to the observed differences in outcome variable of interest. Therefore, after applying the OLS regression estimates I have also carried out *decomposition analysis* (also known as component analysis in demography) to examine the extent to which differences in cumulative fertility are explained by three components: differences due to group effects, differences due to characteristics, and differences due to slopes (this part is explained in greater detail in the methodology section).

Studying the fertility behaviour of immigrants is important for immigrant-receiving countries in general and for countries with a below-replacement level of fertility in particular. This study contributes to the literature on immigrant fertility in at least four key ways. First, examining both the short-term and long-term effects of immigration on fertility will provide us with a comprehensive understanding of the impact of immigration on the fertility behaviour of immigrants. Second, a special focus on transition to parity-specific fertility helps us understand how immigrants adapt to the new environment and culture of the host country through postponement or advancement of childbearing. Third, most studies on the fertility of immigrants in Canada have examined the differential pattern of fertility between immigrants and the native-born population at national level. This study provides insight into both the national and provincial levels. Finally, the inclusion of decomposition analysis of cumulative fertility will help policymakers to examine options for maintaining the desired level of fertility in Canada.

1.4 Context: Alberta

1.4.1 Historical Background of Alberta's Immigration

Alberta is the fourth-largest immigrant-receiving province in Canada after Ontario, Quebec, and British Columbia. On average, Alberta received approximately 9,500 net international migrants per year between 1970 and 1990, which increased to 22,000 per year from 2000 to 2005. The increasing trend continued during the period of 2006-2010 with an average of 25,087 immigrants

per year (Government of Alberta, 2009). In 2010, the number of immigrants to Alberta had increased to 32,640 (representing 11.6 per cent of all immigrants to Canada) from 20,716 in 2006 (Government of Alberta 2011a). Maintaining the increasing trend, Alberta received 40,260 net international migrants in 2012, which is the highest net international migratory gain in the province's history (Government of Alberta, 2012a). The majority of these immigrants are skilled workers (60.5%) followed by family members (28.4%) and refugees (8.6%). Philippines, India, China, and the U.K. and Colonies are consistently among the top five source countries of immigrants to Alberta (Government of Alberta, 2011a).

Moreover, Alberta is one of the few provinces in Canada that gains from net interprovincial migration. Alberta received 75,238 interprovincial migrants in 2008-09, which increased to 89,172 in 2010-11. Alberta's net gain from the interprovincial migration doubled between 2008-09 and 2011-12 (from 13,184 to 28,170 migrants). The majority of these migrants came to Alberta from Ontario and British Columbia (Government of Alberta, 2013). These migratory gains are tied to Alberta's above average economic growth across the provinces in Canada. Strong economic growth and rapidly increasing demand for labour have drawn many migrants to Alberta (Government of Alberta, 2013, Trovato, 2010).

1.4.2 Fertility Patterns in Alberta Over Time

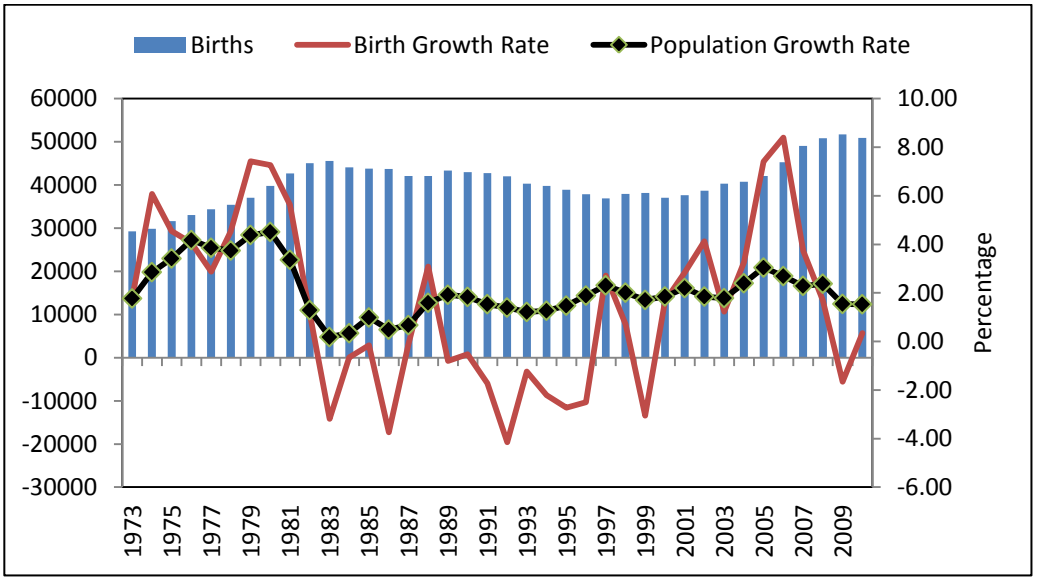
Alberta is the province with the fastest growing population in Canada, with an average growth of 367 people every day (The Huffington Post Alberta, 2012). The 2011 Census of Canada showed that Alberta had a population of 3,645,257 on May 10, 2011. This is an increase of 10.8 per cent from that of the 2006 Census count, which is almost double the national average (5.9%). As such, Alberta had the highest population growth rate in a third consecutive census, and a 10.9 per cent share of the national population, in 2011 (Government of Alberta, 2012b). The recent estimates of the total population by the Government of Alberta (2013) show that Alberta's population has increased to 3,931,341 on January 1, 2013. This is an increase of 3.07 per cent from 2012 and the highest since the third quarter of 2006.

As illustrated in Figure 1-1, due to this growing population, the number of births in Alberta has also increased significantly. In 2008, the number of births in Alberta exceeded 50,000 for the first time in the province's history (Trovato, 2010). Since then the number of births in Alberta has increased gradually, and in 2012, the number of births reached 53,099. Thus, Alberta has the highest crude birth rate (CBR, number of births per 1,000 population) among the provinces in Canada (14.4 in 2010). Alberta has experienced a gradual increase in CBR, with the exception of occasional fluctuations between 1980 and 2003 (Government of Alberta 2011b). The increasing trend in births in Alberta has generated significant

interest among researchers as well as the media (e.g., Libin, 2007; Sadava, 2008; Trovato, 2010; Walton, 2006).

Alberta is one of the five provinces with total fertility rates above the national level (1.61 in 2011). Between 1986 and 2007, the total fertility rates in Alberta rose 12.0 per cent on average compared to the national TFRs (Government of Alberta 2011b). In 2008, Alberta's total fertility rate rose to 1.92 from 1.64 in 2000. However, Alberta's fertility rate declined temporarily in 2011 to 1.81 births per woman, perhaps as a result of the economic recession of 2009-2011 (Statistics Canada, 2011b).

Figure 1-1. Historical trend of population and birth growth rates in Alberta (1973-2010)



Source: Statistics Canada. CANSIM Table 053-0001 - Estimates of births and CANSIM Table 051-0005 - Estimates of population

1.5 Context: Canada

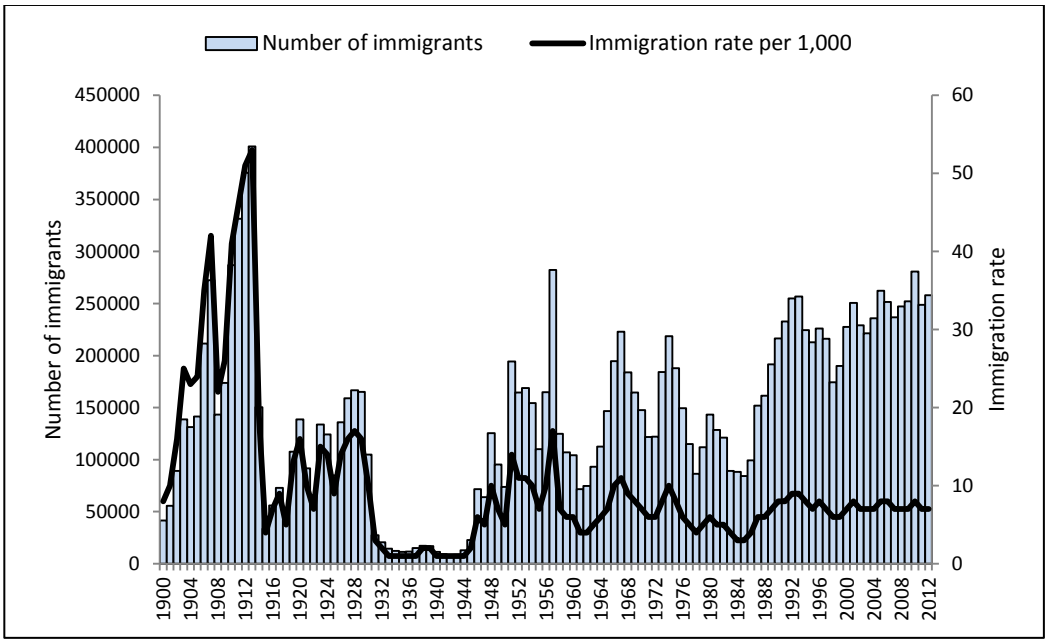
1.5.1 Historical Background of Canada's Immigration

Before 1896, most immigrants settled in Eastern Canada. Between 1896 and 1905, large numbers of immigrants from the United Kingdom, Europe, and the United States arrived, having been offered free land to settle Western Canada. The immigration acts of 1906 and 1910 opened the door for more immigrants into Canada. Likewise, in 1913, a large number of immigrants (400,000) arrived in the country (see Figure 1-2). However, there was an extreme decline in number of immigrants during World War I (1914 to 1918), the Great Depression of the 1930s, and World War II. Following these major events, there was a gradual increase in immigration to Canada. The year 1950 marked the arrival of one and a half million immigrants from Europe (Citizenship and Immigration Canada, 2011).

Until the 1950s, most immigrants in Canada were from Europe because of immigration policies that favoured the admission of immigrants from European countries (Trovato, 2009). However, the immigration regulations of 1962 facilitated entry of immigrants to Canada irrespective of their race, religion, and national origin. Another major change in immigration policy came into effect in 1967, when the government introduced the point system for selection of skilled workers and business immigrants. In addition, the *Immigration Act (1976)* of 1978 facilitated the incorporation of refugees, families, and independent immigrants into Canadian society. A new immigration policy introduced in 2008 provided an

opportunity for graduate students and people with Canadian work experience to become permanent residents of Canada known as the *Canadian Experience Class* (Citizenship and Immigration Canada, 2011).

Figure 1-2. Number of immigrants and immigration rate in Canada, 1900 to 2012



Source: Citizenship and Immigration Canada (2012), Facts and Figures 2012, p. 3

Because of changes in immigration policies over the years, Canada has received a large number of immigrants annually; for the last 20 years, for example, an average of 250,000 immigrants have arrived per year. This is equivalent to the rate of 8 immigrants per thousand population, which has remained unchanged since 1990 (Statistics Canada, 2008a). At the same time, Canada has experienced a decline in fertility rates and an aging of the population, which eventually led to immigration becoming the major determinant of the

country's population growth instead of natural increase (difference between births and deaths) (Statistics Canada, 2008a).

Due to the changes in its immigration policy in 1962, Canada started to receive increasing numbers of immigrants from various countries of origin, and the dominance of immigrants from Europe started to decline. For instance, during the 1960s, the proportion of Asian immigrants to Canada was 6.4 per cent; it increased to 60.0 per cent between 2001 and 2006. In addition, the percentage of African immigrants to Canada tripled between the early 1960s (3.0%) and the early 2000s (10.5%). On the other hand, the proportion of immigrants from the United States to Canada declined dramatically from 9.0 per cent during 1960s to 3.0 per cent during the early 2000s (Statistics Canada, 2008a).

1.5.2 Canadian Fertility Patterns Over Time

Canada started as a confederation on July 1, 1867 with a population of 3,463,000. The first census of Canada conducted in 1871 estimated the total population to be 3,689,257. In the next forty years, the population of Canada almost doubled reaching 7,206,643 in the 1911 census. By the 1951 census, Canada's population reached 14 million. It took another 40 years for the population to double, from 14 million to 28 million (28,846,761 in the 1996 Census). The country's population exceeded the 35 million mark on October 1, 2012. During the last two decades, Canada's population has increased on average

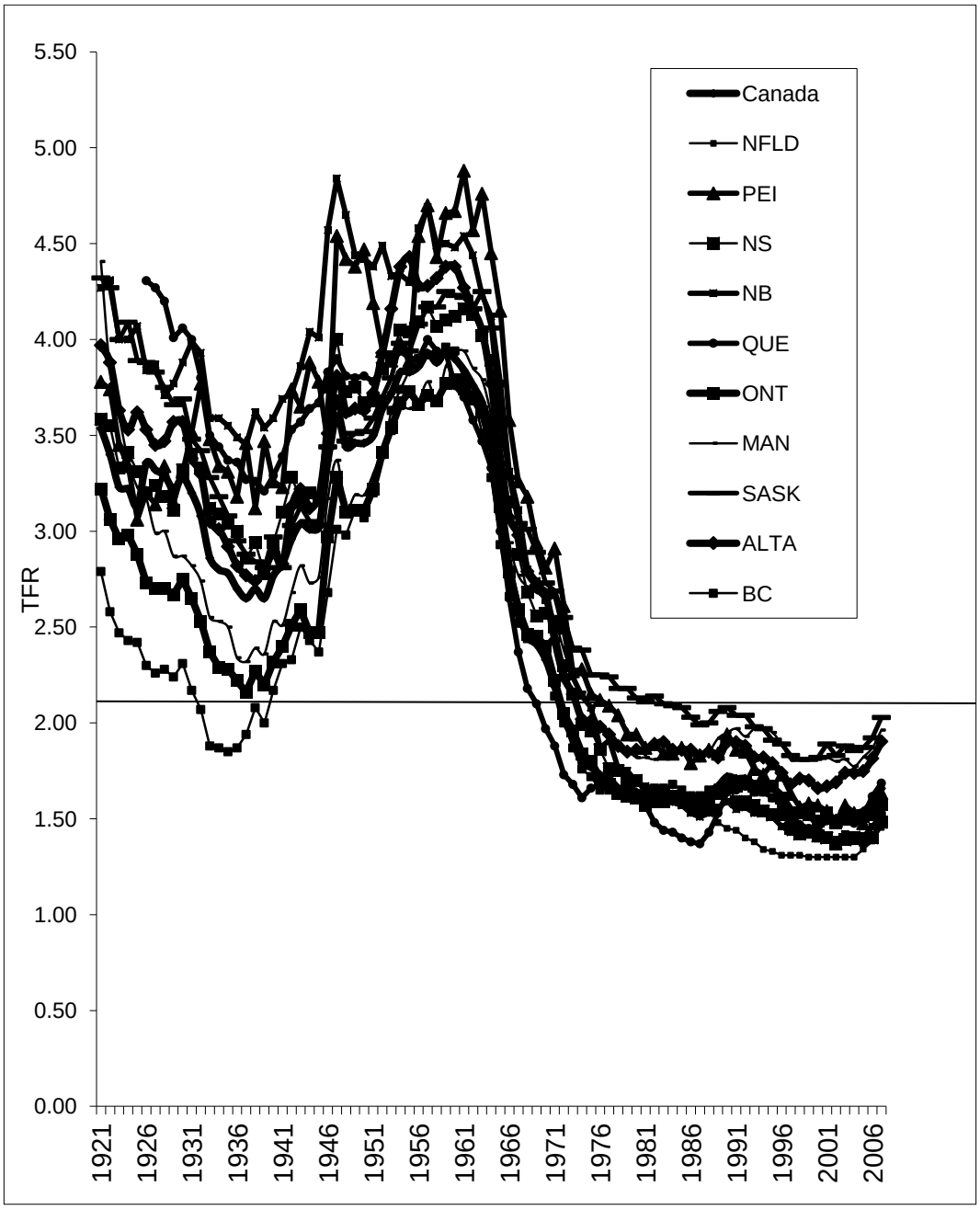
by 1.1 per cent, with some exceptions between 1998 and 2000 (Statistics Canada, 2008a, 2012, 2013b; Trovato, 2010).

Although Canada's total population has increased gradually, its total fertility rate (TFR) was well above the replacement level of 2.1 between the 1920s and 1970s with some exceptions after the great recession of 1930s and, and it has followed a declining trend thereafter. Despite that, Canada's fertility level has never fallen below 1.3, which is considered as the threshold for the "lowest-low fertility." Figure 1-3 shows that the Atlantic provinces of Prince Edward Island, Nova Scotia, New Brunswick, and Newfoundland had fertility levels above the national average until the mid-1980s. Fertility in Quebec was also well above the Canadian average until the early 1960s. Since then, Quebec's fertility first converged with that of Canada and then fell below the national average. The upward trend of Ontario's birth rate since 1925 eventually converged with the national average by 1970 (Bélanger, 2006; Trovato, 2010).

Among the provinces in Western Canada, during 1921 to 2011, the fertility level in Manitoba was above the national average, except during the period 1926 to 1960. Alberta and Saskatchewan are the only two provinces that have maintained birth rates that are consistently higher than the national average from 1921 to 2011. During the same period, birth rates in British Columbia have been below the national average except during the years 1956 to 1990 (Statistics

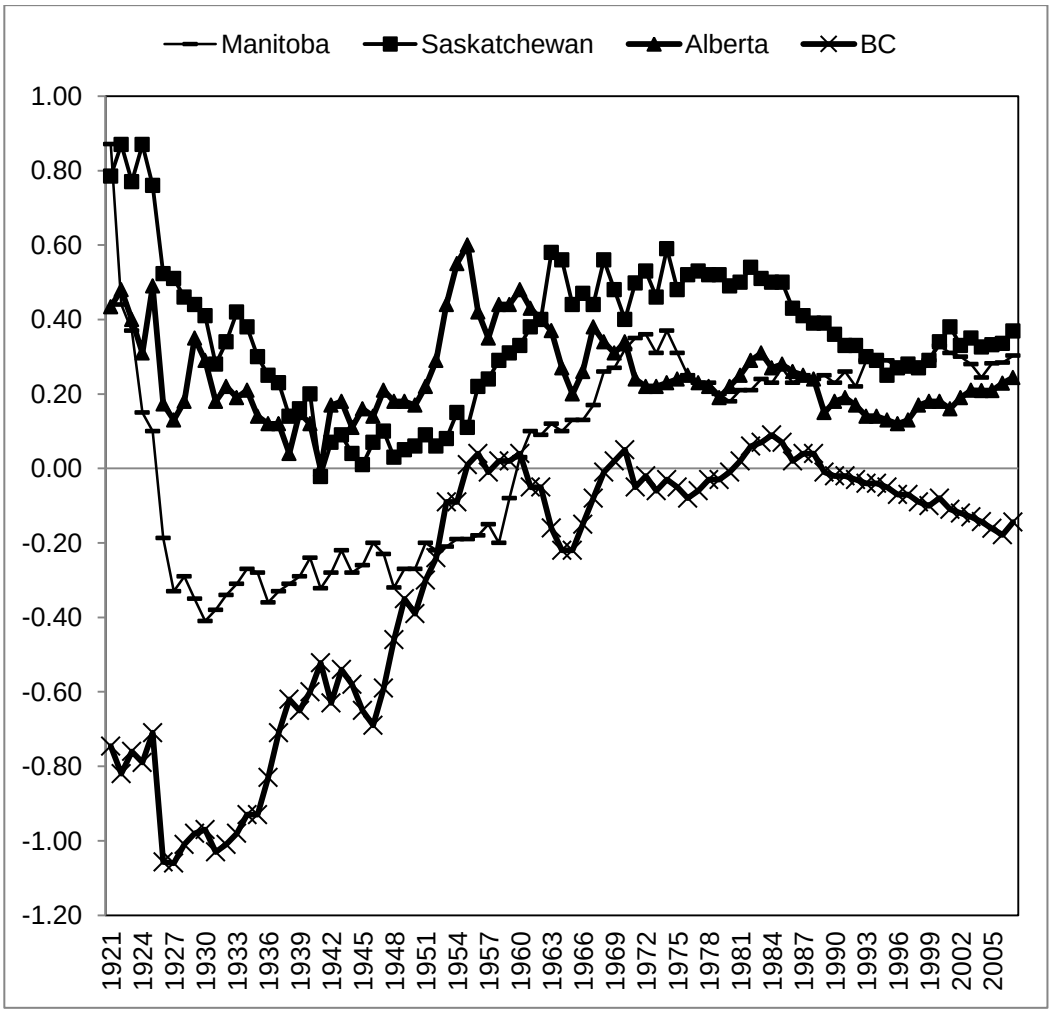
Canada, 2013c; Trovato, 2010). Figure 1-4 indicates that Alberta, Saskatchewan and Manitoba have the highest TFRs among the provinces.

Figure 1-3. Historical trend of total fertility rate by province/territory: 1921-2007



Note: This figure is reproduced from an article by Trovato (2010).

Figure 1-4. Time trend of provincial and national TFRs in relation to Canada: 1921-2007



Note: This figure is reproduced from an article by Trovato (2010).

1.6 Overview of Dissertation

The remaining chapters of the dissertation are organized as follows. Chapter 2 provides a brief discussion on theories related to fertility behaviour with a specific focus on theories that have been proposed to explain the fertility of

immigrants. Chapter 3 maps out a causal framework for each of the exposure variables of interest (first-generation immigrant women, child immigrant women, adult immigrant women, and second-generation women). It then provides the research hypotheses--generated based on the theoretical frameworks--specified for testing in this study. Chapter 4 focuses on the data, methods and analytical framework used in the study. Chapter 5 presents the results in detail, utilizing data from the 2010 Alberta Fertility Survey and the 2006 General Social Survey. It evaluates the results in relation to theories of immigrant fertility, and specifies the extent to which these results fit with the existing literature. As part of the discussion and conclusion, Chapter 6 provides a brief summary of the results, interpretation of results in a broader context, policy implications, limitations, and recommendations for future research. Finally, references, tables, and appendices are provided at the end of the dissertation.

CHAPTER TWO

Theoretical Framework

As mentioned in Chapter 1, the findings from previous research on the impact of immigration on fertility can be classified into four patterns: migrants' fertility decreases; it increases; it converges with that of native-born citizens; or it remains the same as in source country after migration. Five major hypotheses have been proposed in the literature in efforts to explain the fertility behaviour of immigrants: disruption, interrelations of events, socialization, adaptation, and selection. These hypotheses are discussed below.

2.1 The Disruption Hypothesis

The *disruption hypothesis* stipulates that migration has a depressive impact on the fertility of immigrants because of the time they need to adjust socially and economically to the host country. However, this hypothesis assumes that over time the fertility of immigrants will converge with that of the native-born population (Beaujot, 1991; Carlson, 1985; Gorwaney, Arsdol & Heer, 1990; Ng & Nault, 1997; Ram & George, 1990). This thesis is based on the premise that migration is stressful and, therefore, immigrants need ample time to get settled in their host society (Kulu, 2005; Milewski, 2010). Migrants have to deal with a variety of difficulties immediately after arrival, such as finding a new home and new job, adapting to the new language, and adjusting to the new culture and environment, which might motivate them to delay childbearing (Carlson, 1985; Milewski, 2010).

The findings of earlier research regarding this seemingly straightforward hypothesis are not always uniform. Some studies have found evidence in support of the disruption effect for international migrants to the United States, Canada, Sweden, and Italy (Andersson, 2004; Bean et al., 1984; Ford, 1990; Kahn, 1994; Mussino et al., 2009; Ram & George, 1990; Stephen & Bean, 1992). In other studies, some of them undertaken in these same countries, researchers have not found any support for this explanation (Bean & Swicegood, 1982; Milewski, 2010; Ng & Nault, 1997).

These contradictory results may be a function of the different data and methods applied by investigators. For example, by applying the "own-children" method (number of children below age five in the household) in analyzing data from the 1961, 1971, 1981, and 1986 Censuses of Canada, Ram and George (1990) showed that immigrants in general and recent immigrants in particular have a lower cumulative fertility than the Canadian-born. However, recent immigrants' fertility increased somewhat for a short period after immigration. They also noticed that over time their fertility either declined or converged with that of the native-born. Hence, they argued:

> Perhaps there is a desire among immigrants to have an additional child in their host country or there is a tendency among them to make up for the controlled or lost fertility before immigration. But once they have socially

> and economically adjusted in the host country, their fertility converges with that of the native-born population (Ram & George, 1990, p. 416).

Using the "own-children" method in the context of Canada, Ng and Nault (1997) also found that foreign-born women had lower fertility during the period of immigration than the Canadian-born. They argued that "the lower fertility observed among recent immigrant women using the own-children method may partly reflect the lower pre-migration fertility among recent immigrants" (Ng & Nault, 1997, p. 565). They then applied the "own-infant" method (number of children below age one) to estimate the current fertility rates by years since immigration, and found that immigrants' fertility immediately after migration was not disrupted. In addition, they observed that long-term immigrants (more than 10 years of residence in Canada) had fertility levels either below or near the rate of the Canadian-born, which would offer evidence for an assimilation effect on the part of migrants.

Using data from the *1976 Survey of Income and Education* in the United States, Bean and Swicegood (1982) examined the fertility of Mexican immigrants in relation to that of White Americans. They reported that both first-generation and second-generation Mexican Americans had higher levels of current and cumulative fertility than White Americans, even after controlling for age, education, family income, region, marital disruption, farm residence, and labour force participation. However, they also observed a declining trend in the

differences in current fertility between Mexican Americans and White Americans, which lends partial support to the premise of the disruption hypothesis that fertility is interrupted by immigration.

The support for the disruption hypothesis was more pronounced in a subsequent analysis by Bean et al. (1984) in the United States. They found that first-generation immigrants had a lower cumulative fertility than other White Americans. In addition, it was shown that first-generation immigrants aged 20 to 24 had a lower current fertility (measured in terms of number of children below age three) than other White Americans in the same group, suggesting that the younger age groups are more vulnerable to the disruption effect of migration.[2]

On the other hand, using data from the 1996 wave of the German Socioeconomic Panel, Mayer and Riphahn (2000) found no support for the disruption hypothesis in Germany. They included immigrant women's *duration of fertile time* (i.e., the number of years spent in the host country during the fertile period) in Germany in their analysis instead of using *years since immigration*. They argued that controlling *years since migration* is not an appropriate duration measure because "when one is interested in fertility outcomes it is not the total duration of stay which should affect the number of births but the duration of stay

[2] In regard to research based on internal migration, the literature shows that this type of migration also has a disruptive effect on fertility (Goldstein & Goldstein, 1984 in Malaysia; Goldstein & Goldstein, 1981 in Thailand; Hervitz, 1985 in Brazil; Jensen & Ahlburg, 2004 in Philippines; Kulu, 2005 in Estonia; Trovato & Halli, 1983 in Canada). On the other hand, Gabrielli et al. (2007) and Nedoluzhko and Andersson (2007) found no evidence of disruption in fertility among internal migrants in Italy and Kyrgyzstan, respectively.

in the receiving country which occurs during a woman's reproductive phase" (Mayer & Riphahn, 2000, p. 2). Hence, they attributed the support for the disruption hypothesis found in most studies to the inclusion of years since immigration instead of the duration of the fertile period.

2.2 The Interrelation of Events Hypothesis

The *interrelation of events hypothesis* posits that immigrant fertility should increase immediately (in most of the cases during first year) after immigration because of various interrelated events that take place simultaneously, such as marriage and migration (Andersson, 2004; Kulu, 2005; Mulder & Wagner, 1993; Ng & Nault, 1997; Schmid & Kohls, 2009). This hypothesis builds on the premise that migration is related to many other events during the life course such as union formation (Andersson, 2004), reuniting with partners (Milewski, 2010), and desire to have more children in the host society (Ram & George, 1990), and that these interrelated events are likely to accelerate the fertility of immigrants soon after migration. Some studies have confirmed this type of relationship (e.g., Andersson & Scott, 2005 in Sweden; Garssen & Nicolaas, 2008 in the Netherlands; Milewski, 2010 in Germany; Mussino et al., 2009 in Italy; Woldemicael & Beaujot, 2012 in Canada).

Most of these studies have looked at current and cumulative fertility as the outcome variables (e.g., Garssen & Nicolaas, 2008; Ng & Nault, 1997; Ram & George, 1990; Schmidt & Kohls, 2009; Woldemicael & Beaujot, 2012). For

example, Garssen and Nicolaas (2008) examined the fertility of Turkish and Moroccan women in the Netherlands using data from the 2005 Dutch Municipal Population Registrar. Overall, they noticed higher cohort fertility among Turkish and Moroccan women compared to the native-born Dutch women. This is further confirmed by the lower mean age at first birth among Turkish and Moroccan women. However, for higher order births the differences in fertility between Turkish and Moroccan women and the Dutch women were not pronounced and tended to diminish gradually.

Some studies have investigated the transition to parity-specific fertility by applying event history analysis to test the interrelation of events hypothesis (e.g., Andersson, 2004; Andersson & Scott, 2005; Milewski, 2010). Using longitudinal data from the Swedish Population Register for the years 1961-1999, Andersson (2004) studied the relative risk of having first, second, and third births among immigrants in Sweden. The author observed that shortly after immigration the foreign-born women had a higher relative risk of having a first birth than the native-born Swedish women in the same calendar year. Andersson (2004) attributed the elevated levels of childbearing among foreign-born women in Sweden soon after immigration to the interrelated events of immigration and family formation.

In a subsequent analysis, Andersson and Scott (2005) examined the relative risk of giving birth to a first child among immigrant women aged 16-45 in Sweden using data from the Swedish Population Registers for the years 1982-

1997. They revealed that the relative risk was higher among immigrants shortly after immigration to Sweden, when standardized for age, year, and labour market status. However, this finding was not robust across different income groups among immigrants. For example, immigrant women in the low-income group had a lower relative risk of having a first child than did those in the medium-income group. In addition, women in the high-income group who migrated from Iran, Turkey, and Chile had a lower risk of becoming a mother, whereas women in the high-income group who migrated from Germany, Poland, Greece, Somalia, and Vietnam had a higher risk of having first birth than did those in the medium-income group. Furthermore, labour market status influenced the risk of becoming a mother such that employed women were more likely to have higher transition to first birth than unemployed women. These findings suggest that in actuality the decision to have a child is largely determined by the interplay of migration, socioeconomic conditions, country of origin, and the purpose of migration.

Other studies (i.e., Milewski, 2010, and Woldemicael & Beaujot, 2012 in Germany and Canada respectively) have focused on the fertility of second-generation women as well as first-generation immigrants in order to capture the long-term impact of immigration on fertility. Milewski (2010) investigated the transition to parity-specific fertility in Germany using data from the German Socio-Economic Panel Study (waves 1984-2002). First-generation immigrants had higher rates of transition to first, second, and third births as compared to West Germans, net of socio-demographic characteristics. Second-generation

descendants had either higher or similar transition rates as compared to West Germans (Milewski, 2010).[3]

2.3 The Adaptation Hypothesis

The *disruption hypothesis* and the *interrelation of events hypothesis* focus on the short-term impact of migration on fertility. The *adaptation hypothesis*, looks at the long-term impact of migration on fertility. The *adaptation hypothesis* is based on the assertion that the socioeconomic conditions and the cultural values and norms regarding reproductive behaviour in the host society lead to convergence of immigrant fertility with that of the native-born population as immigrants reside in the host country for longer periods of time (Gabrielli et al., 2007; Kulu, 2005; Milewski, 2008; Schmid & Kohls, 2009).[4]

Research has found evidence in support of the adaptation hypothesis (e.g., Abbasi-Shavazi & McDonald, 2000; Ford, 1990; Garssen & Nicolaas, 2008; Milewski, 2010; Ram & George, 1990; Schmid & Kohls, 2009; Woldemicael & Beaujot, 2012). Stephen and Bean (1992) examined the effects of adaptation, assimilation, and disruption processes on the fertility (measured in terms of current fertility and cumulative fertility) of Mexican-origin ever married women aged 15-49 in the United States using data from the 1970 and 1980 censuses.

[3] Researchers have also found evidence in support of the *hypothesis of interrelated events* in the context of internal migration (e.g., Kulu, 2006, 2005; Nedoluzhko & Andersson, 2007). Nedoluzhko and Andersson (2007) found that those who migrated due to union formation had a higher risk of first birth as compared to native-born.

[4] The *adaptation hypothesis* has been used interchangeably with the *assimilation hypothesis* in the literature.

They reported lower fertility among recent immigrants. However, ten years later, the immigrant women's fertility started to converge with that of the native-born population net of differences in age, education, rural/urban residence, marital disruption, region, employment, and family income. These findings essentially lend support to the disruption hypothesis for recent immigrants and to the adaptation hypothesis for long-term immigrants.

Ford (1990) examined the fertility of immigrants, measured in terms of cumulative and current fertility, using data from the 1970 and 1980 U.S. censuses in a multivariate context. In general, the multivariate estimates showed that recent immigrant women (0-5 years of residence) had lower current fertility than the long-term immigrants (more than 20 years of residence). The reason that long-term immigrants had higher fertility, wrote Ford, is "perhaps because immigrants were making up for births or marriages that might have been postponed due to the move" (p. 34). However, as immigrants resided in the host country for longer periods of time, the differences in current and cumulative fertility between recent immigrant women and long-term immigrant women started to disappear, which is consonant with the adaptation hypothesis. This convergence of immigrant fertility persisted even after controlling for marital status, age, race, education, occupation, family income, fertility in the country of origin, place of residence, and citizenship (Ford, 1990).

While Woldemicael and Beaujot (2010) also found that recent immigrants in Canada had higher current and cumulative fertility than third-generation Canadians, the differences virtually disappeared when socio-demographic characteristics were taken into account. Similarly, they found no significant difference in cumulative fertility between long-term immigrants and the third generation after adjusting for socio-demographic covariates. Hence, they argued that "differences in the fertility patterns of long-term immigrants in Canada are likely to diminish as their socio-economic and cultural characteristics converge to those of the Canadian-born" (Woldemicael & Beaujot, 2010, p. 1).

2.4 The Socialization Hypothesis

Contrary to the assertion of the adaptation hypothesis, that immigrant fertility levels converge to that of the native-born population, the *socialization hypothesis* posits that immigrants' fertility will remain at the same level at the place of destination as it was in their country of origin. This hypothesis is based on the premise that socialization, and in particular the norms and values embedded through the process of socialization, have a long-term impact on human behaviour (Gabrielli et al., 2007; Milewski, 2010; Schmid & Kohls, 2009).

There is evidence in support of the socialization hypothesis in various national contexts with regard to international migrants (Andersson, 2004; Mussino et al., 2009; Schmidt & Kohls, 2009).[5] For instance, Anderson (2004)

[5] There is also evidence in support of the *socialization hypothesis* with regard to internal migrants (Gabrielli et al., 2007; Hervitz, 1985). Gabrielli et al. (2007) observed that women born in

found that the relative risk of childbearing in all parities was higher for immigrant women in Sweden who were from Turkey, Pakistan, Bangladesh, Afghanistan, Somalia, and Arab countries (i.e., "Moslem" countries) than for the reference category of women born in Sweden (controlling for calendar period, age, and number of youngest children before immigration). However, Iranian immigrant women in Sweden presented an interesting exception to the higher fertility found among immigrant women from Moslem countries. They had a higher relative risk of having a first birth but a lower relative risk of having second and third births than the Swedish-born women net of the sociodemographic characteristics. In addition, the author observed that women from the United States, Australia, and Canada had a lower relative risk of having a first birth in Sweden, with increasing parity progression in higher-order births. In general, these findings are consistent with the presumption of the socialization hypothesis, and suggest that the birth country of immigrants is an important determinant of the fertility of immigrant women in the host country.

Similarly, Schmid and Kohls (2009) observed higher completed fertility for Turkish women in Germany aged 40 and over after controlling for several socio-demographic covariates (i.e., religious affiliation, emotional ties to the country of origin, native language skills, and German language skills). They attributed the higher prevalence of fertility among Muslim women to their

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Southern Italy had higher fertility than other women even after controlling for key sociodemographic characteristics such as age, education, employment status, and type of first union. They argued that "the behavioral difference is consistence with the process of socialization, where women adopt the fertility norms of their place (region) of socialization" (p. 729).

socialization experiences in the country of origin, and to some extent to their religious affiliation and high levels of religiosity.

Most of the earlier research used either census or cross-sectional survey data to examine the effect of migration on fertility. However, using longitudinal data may provide a better understanding of the changing pattern of immigrant fertility, and is likely to facilitate a better test of the research hypotheses. Using longitudinal data from the 2002-2006 Survey on Live Births in Italy, Mussino et al. (2009) found that immigrant women from Asia and North and West Africa were at a higher risk than those from Central and Eastern Europe of having a second birth.[6] In general, these findings are in accordance with the expectation of higher fertility among immigrant women from high-fertility regions and lower fertility for immigrant women from low-fertility regions. The underlying causal mechanism behind the higher fertility among immigrant women from certain regions might be due to the socialization process through which they adopted fertility norms and values.

2.5 The Selection Hypothesis

Finally, the *selection hypothesis* predicts that migrants will have levels of fertility similar to that of the native-born population at the place of destination. This hypothesis is based on the premise that migration is selective, and because migrants are different from other members of the population in their place of

[6] However, there is an exception. Among the groups of immigrant women, only those from Central and South America had lower risk of having a second birth than the reference category of Central and Western Europe.

origin, their fertility behaviour will be more similar to that of the people in their place of destination. Personal characteristics of immigrants such as education, occupation, and fertility intentions are considered as pivotal determinants of their fertility in the host society (Gabrielli et al., 2007; Milewski, 2010; Kahn, 1988; Kulu, 2005; Schmidt & Kohls, 2009; White & Buckley, 2011). In connection with this, White and Buckley (2011) argued that selection effects are mediated through several pathways, including "stage in the life course, place of residence, level of educational attainment, marital arrangements, and perceptions of traditional gender roles" (p. 129).

Milewski (2010) found evidence in support of the selection hypothesis in Germany. The author noticed that the difference in fertility between immigrant women and West Germans disappeared after controlling for group differences in socio-demographic factors:

> The results of the transitions to three births in this study suggest that women of the first immigrant generation are a selected group with an ideal of having children, but of a family size that is somewhat smaller than is typical of the respective countries of origin (Milewski, 2010, p. 139).[7]

[7] Studies conducted in the context of internal migration have attributed the fertility differentials between internal migrants and non-migrants to personal characteristics such as education, employment, and values regarding large family size (e.g., Gabrielli et al., 2007; Hervitz, 1985). For example, Gabrielli et al. (2007) analyzed data from the Italian Households Panel Surveys (1997, 1999, 2001, and 2003) to look at the transition to first birth among internal migrants within Italy. They found evidence consistent with the selection hypothesis. "The magnitude of coefficients for migration and region-of-birth effects… is reduced when covariates measuring socioeconomic traits are introduced. Thus, the evidence indicates that these traits are differentially

This raises the question of how one can distinguish the "selection" from the "adaptation" effect. The selection hypothesis suggests that migrant "reproductive behaviour is from the beginning more similar to the fertility prevalent in the country of destination than in the country of origin" (Schmidt & Kohls, 2009, p. 3). This approach indicates that once personal characteristics are taken into account, there will be no difference in fertility between migrants and the native-born.

On the other hand, the "adaptation" effects refer to the convergence of migrant fertility behaviour to that of the native-born as immigrants resided in the host country for longer periods. In this case, migrant fertility may be either higher or lower at the beginning (i.e., initially after immigration) than that of the native-born.

One way to distinguish the "selection" effect from the "adaptation" effect is to do separate analysis for recent immigrants and long-term immigrants. Researchers have uncovered evidence consistent with the selection effect on fertility among immigrants in Turkey (White & Buckley, 2011), Germany (Milewski, 2010; Schmid & Kohls, 2009), and in Brazil (Hervitz, 1985).

Concerning the fertility of second-generation descendants of immigrant origins, the findings of earlier research can be categorized in terms of three

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distributed among regions and migrant streams, and that demographic selection operates" (Gabrielli et al., 2007, p. 730).

outcomes: (1) the second generation had lower fertility than the native-born (Bélanger & Gilbert, 2002, and Woldemicael & Beaujot, 2010 in Canada; Goldscheider, 1967, and Kahn, 1994 in the United States), (2) the second generation had higher fertility than the native-born (Bean et al., 1984, and Bean & Swicegood, 1982 in the United States), and (3) the second generation had similar levels of fertility to that of the native-born (Garssen & Nicolaas, 2008 in the Netherlands; Milewski, 2010 in Germany; Goldscheider, 1965, and Rosenwaike, 1973 in the United States; and Abbasi-Shavazi & McDonald, 2000 in Australia).

The lower fertility of second-generation women compared to that of other Canadian-born females can be explained under the framework of the "minority-group status" hypothesis (Goldscheider & Uhlenberg, 1969; Trovato, 1981; van Heek, 1956). Essentially, the *minority-group status hypothesis* suggests that socioeconomic insecurity associated with minority status motivates minority couples to have small families, as this helps them to maximize their opportunities in the larger society.

2.6 Shortcomings of Previous Research

There are some shortcomings in the research on migration and fertility. First, most of the earlier research has looked at either cumulative fertility or transition to parity-specific fertility, and very few studies have examined both these types of fertility in order to derive a comprehensive understanding of the effect of migration on fertility. Second, none of the earlier research has considered

parity-specific employment duration (e.g., duration of employment in relation to the timing of first birth, from first birth to the second, and from second birth to the third) and the financial status of respondents at each birth event in the analysis. Both of these factors would be expected to exert a strong influence on fertility. Finally, although studies have introduced various control variables in the statistical analyses, most fail to conduct decomposition analysis for separating the group effects from that of sociodemographic characteristics and differences in slopes.

In this dissertation, I address these gaps in the literature. I investigate the effect of migration on the fertility of immigrants in the context of Alberta and Canada using a variety of methods, including event history analysis and OLS regression. Using the decomposition analysis (also known as component analysis in demography) to separate observed differences in cumulative fertility into various components, I am able to recommend better policy options in order to increase fertility of immigrants in the host society. This aspect of the thesis is explained in greater detail in Chapter 4. The next chapter discusses the causal framework for each of the exposure variables of interest and their effect on fertility.

CHAPTER THREE

Research Hypotheses

In this dissertation, the study population comprises three generations: first-generation immigrant women, second-generation women, and third-generation women. First-generation immigrant women are those who immigrated to Canada and were born outside of Canada. Second-generation women are the Canadian-born descendants of first-generation immigrant parents. Third-generation women are the children of Canadian-born parents.

Prior research has shown that there are significant variations in fertility between *child immigrants* and *adult immigrants* because of their divergence in socioeconomic attainment and degree of cultural integration into the mainstream society (Adserà, Ferrer, Sigle-Rushton & Wilson, 2012; Kahn, 1988). Therefore, it is important to do a separate analysis of immigrant fertility by age at immigration. For this purpose, first-generation immigrant women are categorized into two groups: *child immigrant women* (those who immigrated before age 13) and *adult immigrant women* (those who immigrated at age 13 or above). A separate analysis for *child immigrant women* in relation to third-generation women will broaden our knowledge of the extent to which women who migrate at younger ages adapt to the cultural values and norms of reproductive behaviour of the host society. Age at immigration and duration of residence in Canada are highly collinear (see Appendix 3-1a, column 5); it is therefore not advisable to

include both variables in the same regression model (a correlation matrix of all variables related to this study is shown in Appendices 3-1a and 3-1b).

An independent analysis for *adult immigrant women* in relation to third-generation women will facilitate better understanding of the effect of immigration on fertility of immigrants who undergo the process of socialization during their childhood and early adolescence in their country of origin, and who gather the necessary experience for adjusting to the new culture and environment in the host country.

Thus, I consider four key categories of immigrant status, treating each as an independent variable. I compare the fertility of women in each category to that of second- and third-generation women, as follows:

- First-generation immigrant women versus second- or third-generation women
- Child immigrant women versus second- or third-generation women
- Adult immigrant women versus second- or third-generation women
- Second-generation women versus third-generation women

As noted in Chapter 1, most of the previous studies have examined immigrant fertility in relation to the third generation. However, comparing immigrant fertility with the second generation would provide a better understanding of the extent to which second-generation women adopt the fertility

norms and values of their immigrant parents. For this reason, fertility in the three categories of immigrants (first generation, child immigrants, and adult immigrants) is also compared with that of the second generation.

The dependent variable of interest, fertility, consists of two measures: (1) transition to parity-specific fertility (up to third birth), and (2) cumulative fertility (i.e., total number of children ever born). The term *parity* refers to the number of live births a woman has. In this study, the term *transition to parity-specific fertility* indicates the progression to first birth from age 15, the progression to second birth from the first, and the progression to third birth from the second. The progression of parity-specific fertility is examined using Cox regression estimates, which take the duration of the event (e.g., time to first birth from age 15) into account.

The estimates obtained from a Cox regression are known as hazard ratios. The null value of a hazard ratio, 1, suggests that there is no significant difference in the risk of experiencing the event (e.g., having a first birth) between the study group and the reference group[8]. A hazard ratio of greater than 1 indicates a higher risk of event occurrence, and a hazard ratio of less than 1 denotes a lower risk of having the event for the study group as compared to the reference group. Given that Cox regression is a type of duration model (i.e., the dependent variable is the

[8] Event history analysis (also known as survival analysis) is widely used in Public Health Sciences to study events related to health such as heart attack and death. Hence, they use the term "risk" of getting the event. In the application of event history analysis in Social Sciences, the term "risk" indicates the chance/possibility of experiencing the event of interest (e.g., risk of having first birth).

time to an event) a hazard ratio of less than 1 also suggests that it would take longer for the study group to have the event of interest than the reference group. Similarly, a hazard ratio of greater than 1 indicates a shorter time to the event for the study group than for the reference group. Thus, a lower hazard of parity-specific fertility for first-generation immigrant women in relation to third-generation women would indicate that first-generation immigrant women not only have lower risk of parity-specific fertility but also have wider spacing of births (e.g., from first birth to the second). A visual outline of parity-specific fertility is shown below in Figure 3-1.

Figure 3-1. Examples of progression to parity-specific fertility and related interpretation using Cox regression estimates.

Case A: I——————————I Age 15 birth at age 27	Case A takes longer time to have a first birth than does case B. Therefore, A will show a hazard ratio of less than 1 in relation to B. This suggests that A has lower risk of having a first birth.
Case B: I——————I Age 15 First birth at age 22	Case B takes lower time to have first birth; therefore, B will show a hazard ratio of greater than 1, suggesting that B has a higher risk of having a first birth than A and takes less time to have the first birth.
Case C: I——————————I Age 15 End of study period	Case C does not have any birth, but her time from age 15 is included in the analysis of first birth. This is known as a right censored case. It is explained in detail in the Data and Method section.

The transition to parity-specific fertility is related to cumulative fertility because a lower transition to parity-specific fertility (wider spacing between births) leads to a lower number of children ever born. This aspect is explained in detail in the Data and Method section (Chapter 4).

3.1 Fertility of First-generation Immigrant Women in Relation to that of Third-generation Women

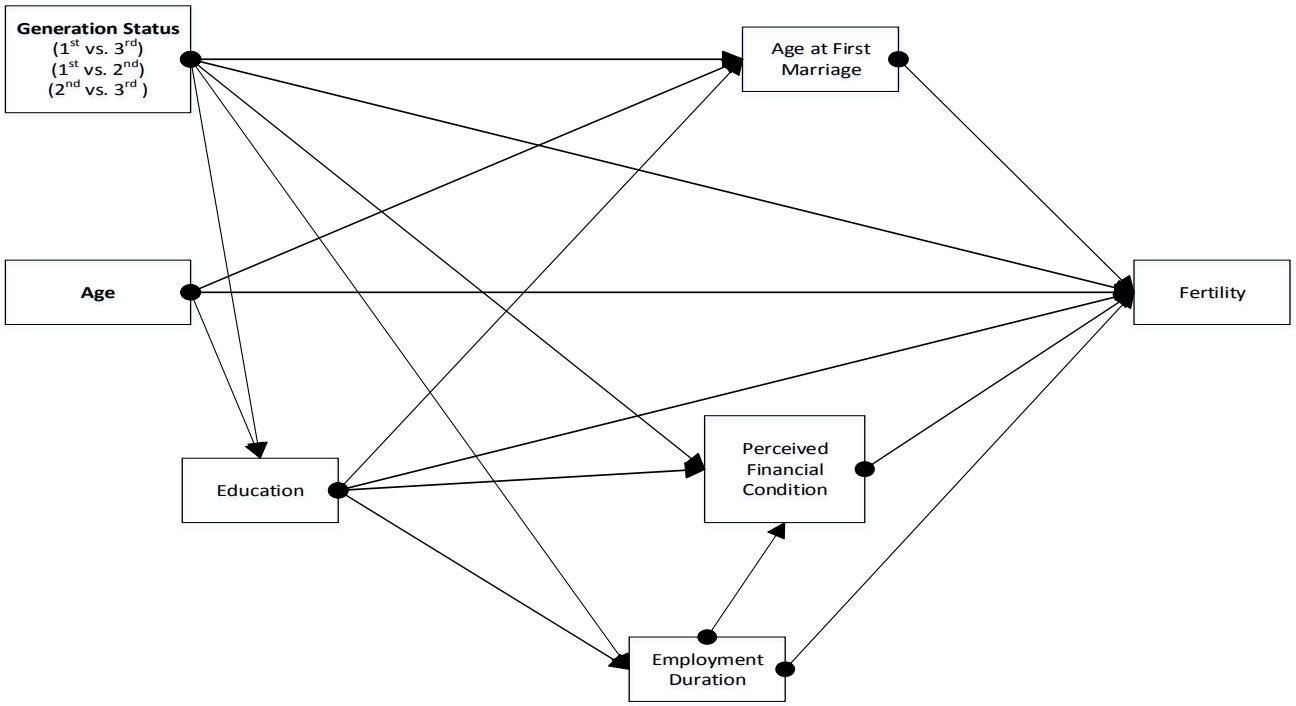
The framework adopted for the analysis of fertility differentials by generation status is shown in Figure 3-2. The framework includes sociodemographic characteristics such as age, age at first marriage, education, employment duration, and perceived financial condition. This framework is derived based on previous research which shows that fertility is influenced by a host of sociodemographic factors including age, age at first marriage, education, employment status, and income. The framework is consistent with the objectives of this study mentioned in Chapter 1.

Figure 3-2 assumes that generation status has both direct and indirect effects on fertility mediated through education, age at first marriage, employment duration, and perceived financial condition. The expectation of both direct and indirect effects of generation status on fertility is due to the multidimensional nature of fertility mechanisms. As is mentioned above, fertility is the interplay of social, demographic, biological, and cultural factors. The indirect effects of fertility provide insight into the role of selected covariates in determining fertility

of immigrant generations. Nonetheless, it is not possible to include all possible explanatory variables in the analysis because of data limitations. In this case, the direct effect will enable us to assess whether there is significant difference in fertility between the study group and the reference group independent of the selected explanatory variables included in the analysis as well as any unobserved factors not included in the study models.

Age is an important determinant of fertility and many other social-demographic processes (Abada, Hou, & Ram, 2009; Woldemicael & Beaujot, 2012); therefore, it is included explicitly as a causal variable. Although there are some variations in the relationship between age and education, most of the recent studies show that younger ages are more likely than older ages to be associated with higher education levels (Beyer, 2005). However, age is positively associated with age at first marriage (Manda & Meyer, 2005). On the other hand, the age-specific pattern of fertility shows that the relationship between age and fertility is curvilinear; at younger ages fertility starts to increase with increasing age, but at some point fertility starts to decline with increasing age (Lichter, Johnson, Turner, & Churilla, 2012). Therefore, age is entered into the analysis with both a linear and a quadratic term. The measurement of these variables is explained in more detail in the Data and Methods section (Chapter 4).

Figure 3-2. Conceptual framework of fertility by generation status



One of the key hypotheses of this study is that the fertility of first-generation immigrant women differs significantly from that of third- generation women because of differences in four key sociodemographic characteristics -- education, age at first marriage, employment duration, and perceived financial condition -- and related variations in the women's attitudes towards reproductive norms and values. As concerns the first of these characteristics, education, we may assume that first-generation immigrant women in Alberta and in Canada will have lower fertility because of their higher educational attainment. This is consistent with previous research in Canada (Akbari, 2011; Beyer, 2005; Krahn & Taylor, 2005; Statistics Canada, 2005, 2003a). Using data from the 2001, 1991, 1981, and 1971 Canadian censuses, Beyer (2005) found that immigrants had higher levels of educational attainment than did the Canadian-born. This is particularly true for adult immigrants (age 21 or more). The author also noted that the difference in educational attainment diminished for younger immigrants (age below 21). For both categories of immigrants (young and adult), women had consistently higher levels of education than men (Beyer, 2005). The percentage of working-age immigrants with a university degree has increased over time (from 10% in 1980 to 55% in 2000) in Canada (Statistics Canada, 2005). Consistent with this trend, Statistics Canada (2008b) reported that recent immigrants (those who migrated to Canada after 2000s) are among the most educated immigrants in the immigration history of Canada. Part of the reason is that Canadian immigration policies since the late 1960s have given the most weight to educational attainment, along with other sociodemographic characteristics, in

selecting *independent immigrants* (also known as skilled workers) (Beyer, 2005; Pendakur, 2000; Stafford, 1994).[9]

However, one can argue that there might be some variations in educational attainment among first-generation immigrant women based on their period of immigration and category of immigration (i.e., spousal category). In fact, researchers have found evidence of lower educational attainment among some immigrants in Canada, particularly those who migrated before the 1990s (Boyd & Norris, 1994; Isajiw, Sev'er, & Driedger, 1993; Richmond, 1986; Jones, 1985; Richmond & Verma, 1978). In connection with this, previous research shows that immigrants who have lower educational attainment frequently try to pursue higher education in the host country in order to advance their success in the labour market (Adamuti-Trache, Anisef, Sweet, & Walters, 2013; Banerjee & Verma, 2012; Kaida, 2013).

How does higher education lead to lower fertility? An inverse relationship between education and fertility is well established in the literature (Bagavos, 2010; Bongaarts, 2010, 2003; de Oliveira, 2009; Tanfer, 1984). The negative effect of education on fertility operates through several pathways. For example, highly educated women are more likely to marry at a higher age, use contraceptives, and postpone having children than are less-educated women

[9] There are also variations in educational attainment among immigrants based on their age at immigration. For example, child immigrants who migrate to Canada at younger ages with their immigrant parents are more likely to have education that is similar to the education level of the Canadian born (Boyd, 2009; Lee & Edmonston, 2011; Lee & Boyd, 2008).

(Derose & Kravdal, 2007; Saleem & Bobak, 2005; Skirbekk, Kohler, & Prskawetz, 2004). In addition, some other factors, such as lower desired family size, greater acceptance of childlessness, and greater autonomy in decision making, can depress the fertility of higher educated women (Bagavos, 2010; Davie & Mazuy, 2010). Therefore, the expectation is that higher level of educational attainment of first-generation immigrant women will lead to wider spacing of their birth intervals and lower cumulative fertility as compared to third-generation women.

The second key sociodemographic characteristic is age at first marriage. We may assume that first-generation immigrant women will have lower fertility because their age at first marriage is higher than that of third-generation women. This is the result of various factors associated with migration that may interfere with marriage, such as moving to a new country, getting settled in the new country socially and economically, and breaking down of social network (Dale & Ahmed, 2011; Hertrich & Lesclingand, 2012; Voland & Dunbar, 1997). Immigrants may also postpone marriage to complete the immigration process so that they can establish themselves successfully in the labour market (Carlson, 1985; Hertrich & Lesclingand, 2012; OECD, 2007). The higher age at first marriage eventually leads to lower fertility among first-generation immigrant women as compared to third-generation women (Bongaarts, 1978).

Third, first-generation immigrant women are expected to have lower fertility because they face longer working hours (employment duration) than third-generation women. First-generation immigrant women are more likely to work extra hours during the working week, and in some cases to do more than one job simultaneously, in order to deal with the additional expenditures associated with getting settled in the host society. They often find jobs that are not commensurate with the educational credentials they obtained in their country of origin (Akbari, 2011; Gilmore, 2009; Granier & Xue, 2011; Grant & Nadin, 2007; Lauer, Wilkinson, Yan, Sin, & Tsang, 2012). In addition, there is perceived discrimination (e.g., based on sex, race etc.) in the labour market (Boyd, 1984; Godin & Renaud, 2005; Mathews, 2006). As a result, most will accept low-paying jobs that require working longer hours to cover their household expenditures (Bauder, 2001; Frenette, Hildebrand, McDonald, & Worswick, 2003; Girard & Smith, 2013; Frank, 2011). The greater work involvement and higher prevalence of working in low paying jobs among first-generation immigrant women thus negatively affect their fertility (Abbasi-Shavazi, 2012; Robinson, Lee, & Kramer, 2008). More specifically, first-generation immigrant women would have lower cumulative fertility compared with third-generation women, and their spacing of births would be wider.

The link between female employment and fertility is well established in the demographic and economic literature (Brewster & Rindfuss, 2000; Li, 1993; Mishra, Neilsen, & Smith, 2010; Papapetrou, 2004; Rosenfeld, 1996). One aspect

of this literature suggests that increasing labour force participation of women decreases their fertility due to the "opportunity costs" of having children and parenting[10] (Becker, 1965; Becker & Lewis, 1973; Willis, 1973, Mincer, 1985, Butz & Ward, 1979). Doing so means having to discontinue work, and thus losing both income and possible opportunities for advancement in the workplace (Trovato, 2010). For immigrant women, it may be difficult to interrupt work and to incur a loss of income. Some immigrant women may need to work in more than one job simultaneously, which furthermore depresses their fertility.[11] Therefore, it is reasonable to assume that on the whole, first-generation immigrant women have lower fertility than third-generation women.

Fourth, first-generation immigrant women may also be expected to have lower fertility because they have lower income attainment (or a poorer perceived financial condition) than third-generation women. Research in Canada shows that immigrants have higher prevalence of working in low paying jobs as compared to the native-born and, in most cases, have problems in terms of full recognition of their educational credentials in the labour market (Hum & Simpson, 2000; Li, 2004; Pendakur & Pendakur, 2011; Raza, Beaujot, & Woldemicael, 2013). In

[10] Another aspect of literature suggests that women's labour force participation has a positive effect on their fertility in cases where excellent maternity benefits, full time daycare facilities, re-employment opportunity after childbirth, and other incentives for having additional children are available (Michaud & Tatsiramos 2008). However, evidence in support of this argument is scarce in the context of Canada.

[11] There are also variations in fertility among employed women. For example, Andersson and Scott (2005) observed that women who are working in low-paying jobs have a lower propensity to have children than those who are well established in the labour market. Part of the reason is that they have lower income as compared to those who are well established in the labour market, and the lower income deters them from having more children.

addition, several other factors might contribute to immigrants' lower income, including the possibility of discrimination in the labour market, lower level of proficiency in the official languages, and lack of work experience in the context of Canada (Beach & Worswick, 1993; Boyd, 1984; Gee & Prus, 2000; Hiebert, 1999; Sloan & Vaillancourt, 1994; Wilkinson, Peter & Chaturvedi, 2006).

In general, higher household income is positively related to fertility. Higher income enables parents to bear the costs of having children while also allowing greater investment in them (Easterlin, 1969; Krishnan, 1994; Willis, 1974). In addition, periods of rapid economic growth are typically associated with increased fertility, as has been observed in Alberta in recent years (Trovato, 2010). Krishnan (1994) examined the effect of income on fertility among Canadian women drawing on data from the 1984 Canadian Fertility Survey. The author noted that income has a positive effect on current family size across first, second, and third generations. Therefore, the expectation is that first-generation immigrant women are more likely to have lower cumulative fertility and more delayed birth intervals than third-generation women because they have poorer perceived financial condition/ lower income.

In this study, income is measured indirectly in terms of respondents' perceived financial condition at the time of the birth of a child, based on the 2010 Alberta Fertility Survey (AFS). The 2010 AFS classified respondents' perceived financial condition into one of four categories: poor, fair, good, and very good.

This information is used to compute the variable labeled "financial condition." The 2010 AFS also collects respondents' average annual income at the time at which the survey was administered, but it is not used in the analysis. This is because the average annual income at the time the survey was prepared does not accurately represent the financial situation respondents faced at the time of their child's birth. However, the 2006 General Social Survey (GSS) does not contain any information on respondents' perceived financial condition at the time of each birth. For this reason, respondents' average annual income is used while analyzing data from the 2006 GSS. The coding and related procedure of using these two variables (perceived financial condition and income) in the analysis is discussed in detail in the Data and Method section in Chapter 4.

The causal mechanisms summarized above, then, are considered as the indirect effects of first-generation immigrant status on fertility, as mediated through the sociodemographic covariates. However, first-generation immigrant women may have lower fertility even after adjusting for age, age at first marriage, education, employment duration/status, and perceived financial condition/income (a result referred to hereafter as the *direct effect*) due to other factors associated with migration. For example, stress related to aspects of migration (such as moving to a new country, adjusting to new culture and environment, and building new social network) can also depress the fertility of first-generation immigrant women in relation to third-generation women (Carter, 2000; Garssen & Nicolaas, 2008; Ford, 1990; Stephen & Bean, 1992). This is particularly true for adult

immigrants, who, unlike child immigrants, experienced most of their early socialization in their country of origin. Moreover, variations in attitude towards reproductive norms and values can also lead to substantial differences in fertility between first-generation immigrant women and third-generation women. Thus, the direct effect actually captures residual variation in fertility that is unaccounted for by the predictors in the model.

Looking at the direct effect of generation status will provide some insight into the net effect of generation status on fertility independent of the selected sociodemographic characteristics. However, if we are also interested in assessing the relative contribution of explanatory variables on fertility, then we need to examine the indirect effects as well. This is particularly important for policy recommendations. For instance, if the government wants to increase the fertility of immigrants by raising their income, we can evaluate whether or not the intervention would be effective by looking at the indirect effect of generation status on fertility mediated through income. A negative indirect effect would suggest that increasing income would not raise the fertility of immigrants. For this reason, it is worthwhile to investigate both the direct and the indirect effects of generation status on fertility.

The above mentioned mechanisms for first-generation immigrant women are also assumed to apply in comparisons between adult immigrant women and third-generation women. Adult immigrant women are more likely than child

immigrant women to experience greater disruption associated with migration. As a result, they are likely to have lower educational and occupational achievement and higher age at first marriage than third-generation women (Adamuti-Trache, Anisef, & Sweet, 2013; Reitz, 2007; Worswick, 2004).

The disruptive effects of migration on fertility should not apply to *child immigrant women* because of their longer duration of residence in the host country and their younger age at immigration. The sociodemographic characteristics of child immigrants should be very similar to that of third-generation women. They are expected to be highly integrated culturally into the host society (Aydemir & Sweetman, 2008; Beck, Corak, & Tienda, 2012; Bleakley & Chin, 2010; Boyd, 2009b; Jones, 1987; Lee & Edmonston, 2011; Lee & Boyd, 2008). Indeed, as shown by Lee and Edmonston (2011) based on American and Canadian data, immigrants who migrated as children are more likely to have higher educational and occupational success than those who immigrated at older ages (18 or above). Similar findings were also reported by Boyd (2009b) for 1.5 generation (those who immigrated before age 15) in relation to the native-born population in Canada. Consequently, the expectation is that there will be no significant difference in cumulative fertility and progression to parity-specific fertility between child immigrant women and third-generation women.

The roles of the causal mechanisms of fertility in the three types of comparisons described above (between first generation, child, and adult immigrant women) are also assumed to apply in comparisons involving second-generation women. Members of the second generation do not experience the disruptive effects of immigration because they are born in the host country. In addition, they "experience greater and faster processes of adaptation into the host society than do the first generation" (Abbasi-Shavazi, 2012:834). Therefore, I expect that first-generation immigrant women in general and adult immigrant women in particular will have lower cumulative fertility and lower risk of having first, second, and third births than second-generation women.

However, there will be no significant difference in cumulative fertility and transition to parity-specific fertility between child immigrant women and second-generation women. This expectation is based on the premise that child immigrant women obtain their education in the host country. At the same time, they are expected to integrate socially and culturally into the new society (Schaafsma & Sweetman, 2001). Therefore, child immigrant women are not likely to experience any disruption effect of migration on their fertility. Hence, it is hypothesized that there will be no significant difference in fertility between child immigrant women and second-generation women.

3.2 Fertility of Second-generation Women in Relation to that of Third-generation Women

The third research question in this study inquires into the extent to which fertility of second-generation women differs from that of third-generation women. I hypothesize that second-generation women will have a lower cumulative fertility and a lower hazard of having first, second, and third births than third-generation women because they may perceive "socioeconomic insecurity". This is explained in detail below.

The effect of second-generation status on women's fertility also operates through the causal mechanisms shown in Figure 3-2. In the first place, second-generation women have higher educational attainment and higher labour force participation than do third-generation women (Boyd & Grieco, 1998; Grayson, 2009; Hébert, Sun, & Kowch, 2004). A primary motive for second-generation women is to establish themselves successfully socioeconomically. For this reason, they may frequently seek to obtain higher education and professional occupations.

This is consistent with research in North America (e.g., Abada et al., 2009; Boyd, 2009b, 2008; Boyd & Grieco, 1998; Chiswick & DebBurman, 2004; Grayson, 2009; Hirschman, 2001; Kao & Thompson, 2003; Keller & Tillman, 2008; Portes & Rumbaut, 2001; Zhou & Xiong, 2005). Boyd and Grieco (1998) assessed the educational and occupational performance of the second-generation women in Canada using data from the 1994 Canadian General Social Survey.

They noticed that the second generation had a higher level of educational and labour market achievements than did the third generation. In another study, Boyd (2009b) observed similar findings regarding the educational and occupational achievements of the second generation in Canada.

The higher educational attainment and higher success in the labour market of the second generation have been attributed to the higher expectations placed by immigrant parents on their descendants, and to their own experience of "marginality" [12] in the host society (Boyd, 2009b; Boyd & Grieco, 1998; Do Nascimento & Lefebvre, 1999). Furthermore, Portes and Fernández-Kelly (2008) attributed the higher educational attainment and higher labour force participation of the second generation to multi-level factors related to the family (strict family discipline, cultural capital, and birth order), the individual (fear of becoming unsuccessful in the labour market), and the community (colleges and educational programs designed to support disadvantaged minorities).

The higher educational attainment and greater labour force participation of second-generation women as compared to third-generation women should exert a negative impact on the fertility of the former group relative to the latter (de Oliveira, 2009; Derose & Kravdal, 2007; Kravdal, 1994; Muresan & Hoem, 2010; Musick et al., 2009; Skirbekk, 2008). Therefore, the expectation is that second-

[12] The term "marginality" refers to the situation of becoming unimportant and powerless in an unfair way or getting less preference in jobs despite having similar qualifications. In this case, second-generation immigrant descendants believe that there are discriminations in the labour market based on race and sex. As such, they should have higher education and superior professional skills which would work as a buffer against those discriminations.

generation women will have a lower cumulative fertility and a lower risk of having first, second, and third births as compared to third-generation women.

Second, it is anticipated that second-generation women will marry for the first time at a higher age than third-generation women, thus contributing to their own lower fertility. This is because second-generation women tend to postpone marriage in order to invest more time in their education and professional development (Brown et al., 2008; Glick, Ruf, Goldscheider, & White, 2006; Huschek, Liefbroer, & de Valk, 2010). This may be because of the generally poor success of their immigrant parents in the labour market of the host country. This is further reinforced by the higher aspirations and expectations of immigrant parents for their offspring (Feliciano, 2005; Kao & Tienda, 1995; Krahn & Taylor, 2005). Therefore, it is hypothesized that the second generation will try to concentrate on the goal of obtaining higher education, and will therefore marry relatively late as compared to third-generation women (Abada et al., 2009; Torr, 2007; Quisumbing & Hallman, 2003).

In general, there is an inverse relationship between higher age at marriage and fertility (Davis & Blake, 1956; Bongaarts, 1978). Thus the higher age at marriage among second-generation women should be associated with lower cumulative fertility, and a lower hazard of having first, second, and third births, as compared with third-generation women.

Third, it is expected that second-generation women will have lower fertility than third-generation women because of poorer perceived financial conditions or lower income attainment. Indeed, although members of the second generation tend to have higher educational attainment (Boyd, 2009b; Boyd & Grieco, 1998; Chiswick & DebBurman, 2004; Grayson, 2009), there is little evidence that their educational success translates into a higher income. In fact, recent studies conducted in Canada show that there is significant wage differential between the second generation and the third generation (Halli & Vedanand, 2007; Kazemipur & Halli, 2001). Halli and Vedanand (2007) reported that despite higher educational attainment, the second generation are "overrepresented in the lower income categories and underrepresented in the higher income groups" (p. 286). The lower-than-expected earnings of the second generation have been attributed to the "economic discrimination" that prevails in the labour market of host countries (Kazemipur & Halli, 2001) and to the women's lack of professional skills (Halli & Vedanand, 2007). Therefore, it is anticipated that the poorer perceived financial condition or lower income attainment of second-generation women will eventually lead to lower cumulative fertility and to a wider spacing of births, than is the case among third-generation women.

In addition to the indirect effects of second-generation status on fertility mediated through the sociodemographic covariates, second-generation women are expected to have lower fertility even after adjusting for age, age at first marriage, education, employment duration/status, and poorer perceived financial condition/lower income attainment. Therefore, the direct effect of second-

generation status is interpreted as a measure of "socioeconomic insecurity", which translates into lower fertility for second-generation women (Goldscheider & Uhlenberg, 1969; Trovato, 1981). The presumption that socioeconomic insecurity exists among members of the second generation is based on the idea that they are caught between two worlds, that of their immigrant background and that of the larger society. This state of being between two worlds is often a source of psychological insecurity (Goldscheider & Uhlenberg, 1969). This situation may lead second-generation women to devote more effort to establishing themselves socioeconomically, and not only to delay marriage, but also to have fewer children. The feeling of insecurity among the second generation may be further aggravated by various forms of discrimination (e.g., based on race and sex) experienced by their immigrant parents in the Canadian labour market (Fuller & Vosco, 2008; Galabuzi, 2006; Hou & Balakrishnan, 2004; Massey, 1981; Pendakur & Pendakur, 2007).

Therefore, it is postulated that second-generation women will have lower cumulative fertility and a lower hazard of having parity-specific fertility (meaning a wider spacing of births) than third-generation women.

3.3 Hypotheses Summarized

A detailed outline of these hypotheses and support for relevant theories is provided in Tables 3-1 to 3-4. Table 3-1 presents an overview of the hypotheses in relation to the relevant theories pertaining to immigrants (first-generation

immigrant women, child immigrant women, and adult immigrant women) in the context of multiple regression analysis. If the effects of first-generation immigrant status on cumulative fertility--mediated through education, age at first marriage, employment duration/status, perceived financial condition/ income attainment, and a combination of indirect effects--are lower than those for third-generation women, the results will lend support to the *disruption hypothesis*. In addition, lower cumulative fertility among first-generation immigrant women than among third-generation women, controlling for the sociodemographic characteristics (i.e., direct effect), will provide support for this hypothesis. This interpretation is also applicable to adult immigrant women in relation to third-generation women.

On the other hand, lower cumulative fertility among second-generation women due to direct and indirect effects will provide support for the *socioeconomic insecurity hypothesis* (Table 3-2).

If there is no significant difference in the effects of child immigrant status on cumulative fertility--mediated through education, age at first marriage, employment duration/status, perceived financial condition/income, and a combination of indirect effects--in relation to third-generation women, then the results will provide support for the *adaptation hypothesis*. The result of a non-significant difference in cumulative fertility between child immigrant women and third-generation women net of the sociodemographic characteristics (i.e., direct effect) will also provide support for this hypothesis (Table 3-1).

Table 3-3 provides an overview of the hypotheses in relation to theories related to three types of comparisons in the context of Cox proportional hazard estimates. If the hazard of having first, second, and third births is lower for first-generation immigrant women than for third-generation women net of the sociodemographic characteristics (i.e., age, age at first marriage, education, employment duration, and financial condition), then the results will indicate support for the *disruption hypothesis*. This is also true for adult immigrant women in relation to third-generation women. Conversely, similar results for second-generation women will provide support for the *socioeconomic insecurity hypothesis* (Table 3-4). As hypothesized in the causal framework, if there is no significant difference in the hazard of having first, second, and third births between child immigrant women and third-generation women, the results will provide support for the *adaption hypothesis* (Table 3-3).

(H1) *First-generation immigrant* women have lower cumulative fertility than the reference category of second- or third-generation women. Similarly, they have a lower hazard of having parity-specific fertility than do second- or third-generation women. The expectation is also the same for *adult immigrant women* in relation to second- or third-generation women.

(H2) There is no difference in cumulative fertility and transition to parity-specific fertility between *child immigrant women* and the reference category of second- or third-generation women.

(H3) *Adult immigrant* women have lower cumulative fertility than the reference category of second- or third-generation women. Similarly, they have a lower hazard of having parity-specific fertility as compared to second- or third-generation women.

(H4) Second-generation women have lower cumulative fertility and their progression from one parity to the next will be wider than that of third-generation women.

These hypotheses facilitate our understanding of fertility differentials among first-generation immigrant women, second-generation women, and third-generation women in Alberta and Canada. The comparison of differentials in fertility by generation status adds to our knowledge of how the children of first-generation immigrants respond to growing "insecurities" about their career. Of particular importance to policy makers is the extent to which immigrants' fertility is disrupted by factors associated with migration. Insights into this issue will enable them to design appropriate programs to assist immigrants. Finally, this study will not only contribute to demographic literature but will also generate interest among researchers to conduct further studies on this issue.

The following chapter begins with an overview of the data that I used in the analysis. This is followed by the approach applied to analyze the data.

CHAPTER FOUR

Data and Methods

I utilize data from the 2010 Alberta Fertility Survey (AFS) and the 2006 General Social Survey (GSS) to investigate the impact of migration on the fertility of immigrants in Alberta and in Canada, respectively. Both surveys have been designed with a special focus on marriage, family, and fertility. Because of the differences in coding for some variables in these two datasets, the coding procedure is presented separately for each dataset.

The focus of this study is to examine the fertility behaviour of married women (including those who are separated, divorced, or widowed). Therefore, several exclusion criteria have been applied in selecting the study population (i.e., final sample size). First, cohabiting women who have never married are excluded from the analysis. The reason for exclusion is that there are apparent differences in childbearing between married women and women who are in a cohabiting union. For example, some women who do not have as great a desire for children as married women may delay marriage and compensate with cohabitation. Therefore, it is best to examine fertility behaviour separately for married women and women in cohabitation. However, because of the smaller sample size in the datasets, it is not possible to conduct separate analysis for women who are in a never married cohabiting union.

Second, never married/single women are excluded from the analysis because the focus of this study is on the fertility behaviour of married women. Another reason is that they have a relatively much lower chance of having children. Although there is a growing trend of having children out of wedlock in recent years, the trend is much lower among immigrants because of their diverse values and norms of childbearing (Beaujot, 2009; Ventura, 2009). Thus including never married/single women in the analysis might lead to a degree of bias in the results.

Third, those who had children before immigration are also excluded from the analysis. This is because having children before immigration might decrease their probability of having children after immigration. Therefore, including these respondents in the analysis might exaggerate the disruption effects of migration.

Finally, the study population comprises women aged 18-49. The 2010 Alberta Fertility Survey provides information only on women aged 18-49. To make the analysis consistent with the 2010 AFS, and because women's typical childbearing age ends before age 50, only women aged 18-49 are selected from the 2006 General Social Survey.

4.1 The 2010 Alberta Fertility Survey (AFS)

The 2010 AFS includes a randomly selected sample of 1,105 women ages 18-49 from three areas of Alberta: metropolitan Edmonton (N=403), metropolitan

Calgary (N=400), and Other Alberta (N=302). The data were collected by the Population Research Laboratory (PRL) at the University of Alberta through Random-Digit Dialling (RDD), using a computer-assisted telephone interviewing (CATI) system. The survey includes information on women's fertility histories in detail, along with many socio-demographic variables for immigrant as well as Canadian women. The response rate for the survey was 27.0 per cent.

To assess the quality of the 2010 AFS data, I initially select only women ages 18-49 living in Alberta from the 2006 General Social Survey (GSS) and compare the sociodemographic characteristics of respondents between the two surveys. The comparison of age distribution between the two surveys (see Appendix 4-1) shows that the percentages of respondents in the three higher age groups (35-39, 40-44, and 45-49) are almost identical. However, there are slight differences between the surveys in terms of the younger age groups. For example, in the 2010 AFS the percentage of respondents in the youngest age group (18-24) is higher than that of the 2006 GSS in the same age category (13.2% versus 9.3%). This is not unusual given that Alberta is the youngest province in Canada in terms of age composition. The change in age distribution in Alberta is partly due to the increasing number of immigrants it receives every year. In addition, comparisons of other sociodemographic characteristics, such as number of children ever born, time to first, second, and third births, average age at first marriage, and percentage by generation status and education, between the two datasets (Appendix 4-1) show that despite its small sample size, the 2010 AFS is a

rich dataset, and it reproduces valid and reliable estimates about the population of Alberta when proper weights are included in the analysis.

After exclusion, the final sample size for this study is reduced to 810. The study population is divided into three groups: (1) first-generation immigrant women (n_1=143), (2) second-generation women (n_2=147), and (3) third-generation women (n_3=520). First-generation immigrant women are further categorized into two sub-groups based on age at immigration: *child immigrant women* (n=41) and *adult immigrant women* (n=102). The operational definitions of these sub-groups are discussed below.

4.1.1 Independent Variables

There are three key exposure variables in this study: first-generation immigrant women versus third-generation women, first-generation immigrant women versus second-generation women, and second-generation women versus third-generation women. The 2010 AFS places respondents' country of birth into one of two categories: (1) born in Canada; and (2) born in another country. Those who were *born in other countries* are defined as *first-generation immigrant women*.

As noted in Chapter 1, first-generation immigrant women are subsequently classified into two categories based on their age at immigration: *child immigrant women*, and *adult immigrant women*. The 2010 AFS provides respondents' *year*

of birth and *year of immigration.* Using these two variables, respondents' *age at immigration is* computed. Respondents who immigrated to Canada before age 13 are coded as *child immigrant women*, and those who immigrated to Canada at age 13 or above are coded as *adult immigrant women*.[13]

The dataset also includes information about the *country of birth* of the respondents' parents, which is categorized in three ways: (1) both parents were born in Canada, (2) one parent was born in Canada, and (3) both parents were born outside of Canada. Respondents who were born in Canada and who have at least one parent born outside of Canada are defined as *second-generation women*. Respondents who were born in Canada and have two parents who were also born in Canada are defined as *third-generation women.*

4.1.2 Dependent Variables

The dependent variable of fertility is measured in terms of *transition to parity-specific fertility* (i.e., time to first, second, and third births) and *cumulative fertility.* The 2010 AFS contains data on respondents' ages and on the timing of parity-specific fertility. Using the information on age and on the timing of first birth, *time to first birth from age 15* (in years) is computed. In the event history analysis for first birth, having a first birth is coded as *event* (status =1), and those who do not have any child are coded as *censored* (status =0). For censored cases,

[13] It would have been better to create separate categories for teen and adult immigrant women; but because of smaller sample size in teen category, it was not possible to conduct a separate analysis. Hence, these two categories (teen and adult) have been combined together and defined as adult immigrant women.

the survival time is computed by subtracting age 15 from respondents' age at the time of survey (i.e., current age).

Time to second birth from the first is computed using information about timing of first birth and the timing of the second birth. In the event history analysis for second birth, having a second birth is defined as the *event* (status = 1). Those who have a first birth but do not have a second birth are *censored* (status = 0). The survival time for the censored cases is computed by taking the difference between the time of the first birth and the time at which the survey was administered (i.e., May 2010). Those who do not have any child are excluded from the analysis of transition to second birth.

Time to third birth from the second is computed in the same way. In the event history analysis for third birth, having a third birth is defined as the *event* (status = 1). Those who have a second birth but do not have a third birth are *censored* (status = 0). The survival time for the censored cases is computed by taking the difference between the respondents' age at the time at which the survey was conducted (i.e., May 2010) and their age when they gave birth for the second time. Those who have not given birth a second time are excluded from the analysis of transition to third birth.

Concerning *cumulative fertility*, the 2010 AFS has information about respondents' *number of children ever born.* Therefore, this variable is used directly to measure the *cumulative fertility* of the respondents.

4.1.3 Control Variables

The 2010 AFS includes the respondents' *age* in years from 18 to 49. In addition to respondents' age, the variable is used as a quadratic term (age squared) to examine the curvilinear effect of age on fertility. Moreover, information regarding respondents' date of birth and date of first marriage are collected in the 2010 AFS. Respondents' *age at first marriage* is computed by taking the difference between the two dates (date of birth and date of first marriage) using the date function in STATA.

Education is one of the intervening variables in the models explained in the theoretical framework (Figure 3-2). Education is coded into two categories: less than post-secondary and post-secondary. In the analysis, post-secondary education is used as the reference category.

Like education, *employment duration* is considered as a mediating variable in the models for this study. The 2010 AFS dataset provides detailed information on the respondents' employment history for up to ten jobs. The availability of complete employment history facilitates the computation of employment duration for first, second, and third births. The duration of employment (in years) for first

birth is computed by taking employment duration between age 15 and the date of the first birth. Similarly, the number of years in which the respondent was employed between the first and second birth is computed as employment duration for the second birth. The same procedure is applied in order to compute employment duration for the third birth. For *cumulative fertility*, employment duration is computed using respondents' employment history from age 15 to the birth of their last child.

Finally, the respondents' *self-perceived financial condition* at the time of each birth is divided into four categories: poor, fair, good, and very good. This variable is coded as 0=poor, 1=fair, 2=good, and 3=very good. It is assumed that the underlying distribution of the variable is continuous for the purposes of statistical analysis.[14]

In this study, I assume that the missing values are completely at random (MCAR). Therefore, a listwise-deletion procedure is applied to cases where the missing values do not exceed five per cent of the total sample. In fact, all variables relevant for this study have missing values that are less than five per cent except for *self-perceived financial condition* at the time of birth (15.6%). The dataset also provides information on respondents' overall self-perceived financial

[14] It is reasonable to use *self-perceived financial condition* directly as the categorical variable. However, because of smaller sample size (less than 5) in some categories this variable has been coded as a continuous variable. Otherwise, there is risk of getting biased estimates in regression models in cases where any cell frequency is less than 5 (Powers & Xie, 2000).

condition at the time of the survey. This variable is used to impute missing values for self-perceived financial condition during first, second, and third births.

4.2 The 2006 General Social Survey (GSS)

The 2006 GSS was designed specifically to study family formation, marriage, cohabitation, and fertility. The target population for the 2006 GSS was all persons 15 years of age and older in Canada, excluding residents of institutions and those in military service, as well as residents of Yukon, Northwest Territories, and Nunavut. The data were collected by Statistics Canada using a computer-assisted telephone interviewing (CATI) system. The target population was divided into geographic strata for the purpose of sampling. The Random Digit Dialing (RDD) method was used to select households that give each telephone number in a stratum an equal chance of being selected. One person aged 15 or older was randomly selected from each household to participate in the survey. Data were collected from June to October 2006. The 2006 GSS contains information about 23,608 respondents. The non-response rate was 33 per cent. The dataset also includes sampling weights adjusted to represent all persons in the target population, including those without telephones.

To be consistent with the study population in the 2010 Alberta Fertility Survey, only female respondents ages 18-49 in Canada are selected from the 2006 GSS for this study. Those who are cohabiting but not married and those who are never married/single are excluded from the analysis. For the 2010 AFS, it is

assumed that the missing values are completely at random (MCAR). Therefore, a listwise deletion procedure is followed where the missing values are less than five per cent. Thus, the final sample size of female respondents ages 18-49 in Canada based on the 2006 GSS is reduced to 3,291 for the analysis. The numbers of respondents in the first, second, and third generations are 488, 522, and 2281, respectively. The two further categories of first-generation immigrant women based on age at immigration comprise *child immigrant women* (n=175) and *adult immigrant women* (n=313).

4.2.1 Independent Variables

The 2006 GSS dataset provides information on respondents' country of birth divided into two categories: (1) those born in Canada and (2) those born outside of Canada. Those who were born outside of Canada are coded as *first-generation immigrant women.*

The 2006 GSS includes respondents' age at immigration classified into 10 categories: 0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45-49. Using this information, two other categories of first-generation immigrant women, namely *child immigrant women*, and *adult immigrant women*, are also defined. Respondents who migrated to Canada between the ages of 0 and 14 are coded as *child immigrant women,* and respondents who migrated to Canada at age 15 or above are defined as *adult immigrant women*.

The dataset also provides information on country of birth of respondents' mother and father separately. Respondents who were born in Canada and who have at least one parent born outside of Canada are coded as *second-generation women.* In addition, respondents who were born in Canada and have two parents who were also born in Canada are coded as *third-generation women.*

4.2.2 Dependent Variables

The computation of the *time to first birth from age 15, time to second birth from the first,* and *time to third birth from the second* for the 2006 GSS dataset are similar to the one applied to the 2010 AFS (see section 4.1.2).

Concerning c*umulative fertility,* the 2006 GSS dataset includes data on the number of children to whom respondents have given birth based on following categories: 0, 1, 2, 3, 4, 5, and 6 or more. The dataset also includes respondents' birth history (up to 8) in detail (including whether it was a birth or adopted child). Using this information, the last category of number of children (6 or more) is extended to 8 or more. In this case, those who had both seventh and eighth births are coded as "7" and "8 or more" respectively. Thus, the number of children to whom respondents have given birth is coded as a new variable ranging values from 0 to 8. This variable is labelled as *cumulative fertility* in the analyses. For the purposes of statistical analysis, it is assumed that the distribution of *cumulative fertility* is continuous.

4.2.3 Control Variables

The 2006 GSS dataset contains respondents' age (in years) at the time at which the survey was conducted. Therefore, age is included in the analysis as a continuous variable. Age is also entered into the analysis through the addition of a quadratic term (age squared) to take the curvilinear effects of age on fertility of immigrants into account in the analysis.

The dataset provides information on respondents' age at first marriage. This information is directly used to measure *age at first marriage* (in years).

Respondents' *education* is coded into two categories: less than post-secondary = 1 and post-secondary = 0. As in the case of the 2010 AFS, post-secondary education is used as the reference category.

Respondents' *employment status* in the past 12 months is also coded into two categories: employed = 1 and not employed = 0. The *employed* category includes respondents who have been working in a paid job or business. The *not employed* category comprises respondents who are looking for paid work, going to school, caring for children, doing household work, retired, on maternity leave, suffering from long-term illness, and/or living in other circumstances. It should be noted that the 2006 GSS does not include data on respondents' complete employment history as does the 2010 AFS. As a result, it is not possible to compute respondents' *duration of employment* for parity-specific fertility.

The 2006 GSS dataset includes data on the annual personal income of the respondents, categorized (in dollars) as follows: 0 (no income); less than 5,000; 5,000 to 9,999; 10,000 to 14,999; 15,000 to 19,999; 20,000 to 29,999; 30,000 to 39,999; 40,000 to 49,999; 50,000 to 59,999; 60,000 to 79,999; 80,000 to 99,999 and 100,000 or more. A new variable of *respondents' annual income* is created by taking the mid-points of respondents' income categories. There is a large number of missing values (12.4%) in these categories. The missing values are replaced using multiple imputations through the application of OLS regression estimates. In this case, income is considered as a function of respondents' age, age squared, marital status, education, employment status, and generation status (the OLS regression for estimating income is shown in Appendix 4-2).

Since the 2006 GSS dataset does not provide information on respondents' self-perceived financial condition at the time of each birth, the average annual income of the respondents ($44,126.50) is used to construct the two categories of income for the analysis: *low income* and *high income*. Respondents who have annual income of less than $44,126.50 are included in the *low income* category, and those who have annual income equal to or higher than $44,126.5 fall into the *high income* category. It should be noted that the 2010 AFS contains respondents' perceived financial condition at the time of birth divided into four categories: poor, fair, good, and very good. Since there is no standard cut-off point in individual income for each of these categories, it is not possible to construct

similar categories of income based on the 2006 GSS data. A summary of coding for these two datasets is presented in Appendix 4-3. The statistical software STATA is used to analyze the data.

4.3 Analytical Approach

In this study, the outcome variables of interest are *transition to parity-specific fertility* and *cumulative fertility.* The transition to parity-specific fertility is analyzed using two applications of *event history analysis*: Kaplan-Meier survival estimates and Cox proportional hazards (PH) regression. The second outcome variable, *cumulative fertility*, is first analyzed using Ordinary Least Square (OLS) estimates. The differences in observed cumulative fertility are then examined using decomposition analysis.

The 2010 Alberta Fertility Survey includes individual weights based on age, sex, and region, derived by the Population Research Laboratory. When a probability sample is used, as is the case in the 2010 Alberta Fertility Survey, this individual weight (also known as sampling weight) should be used to make the sample comparable to the population of Alberta. Similarly, the 2006 General Social Survey provides a weighting factor at personal level that can be used for all individual-level estimates. However, using these individual weights directly in the analysis will inflate the sample size (i.e., will reproduce the population) and the estimation of standard errors will be biased towards the population (since the sample size is limited to women ages 18-49). Therefore, I used *normalized weight*

to overcome the problem of standard error and to make the sample representative of the population while keeping the sample size unchanged. The procedure of deriving the normalized weight is first to compute the mean weight based on individual weights, and then to divide the individual weights by the mean weight. Another advantage of using the normalized weight is that it enables us to maintain the same distribution as those of the original weights while avoiding underestimation or overestimation of various sub-groups of the study population (Heeringa, West, & Berglund, 2010; Singer & Willet, 2003; Statistics Canada, 2003b).

4.3.1 Kaplan-Meier (KM) Survival Estimates

The transition to parity-specific fertility is examined using Kaplan-Meier (KM) survival estimates and Cox PH models. The KM survival estimates are considered as a starting point in event history analysis and are appropriate for small samples with accurate duration variables as the outcome of interest. The KM survival estimates are plotted in graphs known as KM curves (Mills, 2011). We can test the statistical significance of the difference in KM estimates for two or more groups using a Log-rank test. The KM survival estimates also provide us with a first glance at the effect of independent variable(s) on the outcome variable(s) of interest. However, these estimates do not allow us to adjust for socio-demographic covariates in the analysis.

4.3.2 Cox PH Regression

One way of taking the sociodemographic covariates into account in the analysis is to apply the Cox PH models, which is widely used in the event history analysis. Another advantage of the Cox PH model is that it can take censoring into account. In fact, censoring occurs when we have some information about an individual but do not have complete information (Kleinbaum & Klein, 2005). For example, some respondents may be married and included in the analysis but do not have any children at the time the survey is conducted. The Cox PH model allows us to include those respondents in the analysis.

4.3.3 Interpretation of the Hazard Ratio

The Cox PH model provides an estimate of the instantaneous risk of event occurrence for an individual/group compared to another. Thus, the Cox model provides estimates for the hazard at time *t* for an individual with a given specification of a set of explanatory variables. With explanatory variables, Cox model takes the following form:

$$h(t, \boldsymbol{X}) = \boldsymbol{h_0 e^{\sum_{i=1}^{p} \beta i X i}}$$

Where the first term (h_0) is the baseline hazard function, and the second term ($\boldsymbol{e^{\sum_{i=1}^{p} \beta i X i}}$) is the exponential expression of a vector of predictor X (Kleinbaum & Klein, 2005). The interpretation of hazard ratio and further explanation of the Cox model are given below.

The null value of hazard ratio is 1, which suggests that there is no significant difference in the risk of having parity-specific fertility between the two groups (the study group and the reference group). A hazard ratio of less than 1 indicates the study group is at a lower risk of having parity-specific fertility than the reference group. For example, if the hazard ratio of having a first birth for first-generation immigrant women in relation to third-generation women is 0.75, the interpretation is that first-generation immigrant women have a 25.0 per cent (0.75 -1.00=-0.25) lower risk of having a first birth than third-generation women. On the other hand, a hazard ratio of greater than 1 indicates a higher risk of having parity-specific fertility for the study group than for the reference group. For instance, a hazard ratio of 1.25 indicates that first-generation immigrant women have 25.0 per cent (1.25 -1.00=0.25) higher risk of having a first birth than third-generation women (Kleinbaum & Klein, 2005).

In reporting the Cox regression estimates, the log likelihood is not reported; instead, F-test is used to evaluate the model. When we run the Cox PH models on an estimation sample (i.e., using sampling weights), STATA output (by default) does not provide the value of the log likelihood for the model. This is because when we run a Cox regression using the sampling weight for survey data, the standard errors are based on the robust variance estimator. In this case, the likelihood ratio test is not appropriate (Cleves, Gould, Gutierrez, & Marchenko, 2008; Singer & Willet, 2003). For this reason, F-tests are reported in presenting the findings of Cox regression analysis.

Therefore, the Cox PH model is used to test the research hypotheses related to the transition to parity-specific fertility for each of the exposure variables of interest in this study. The Cox regression model of having first, second, and third births after adjusting for relevant covariates for the three categories of immigrant status (first-generation immigrant women, child immigrant women, adult immigrant women) and second-generation status in comparison with third-generation women is shown below.

$$h_i(t) = h_0(t)\ \{\exp(\beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + \beta_5 x_{i5} + \beta_5 x_{i5} + \beta_6 x_{i6} + \beta_7 x_{i7}\}$$

Where $h_i(t)$ is the hazard for individual i at time t for the vector of predictors x; $h_0(t)$ is the base line hazard; β_1 is the coefficient for the first exposure variable of interest: generation status (first-generation immigrant women or child immigrant women or adult immigrant women or second-generation women) versus third-generation women (x_1); β_2 is the coefficient for age (x_2); β_3 is the coefficient for age squared (x_3); β_4 is the coefficient for age at first marriage (x_4), β_5 is the coefficient for education (x_5); β_6 is the coefficient for employment duration/employment status (x_6), and β_7 is the coefficient for self-perceived financial condition (at the time of birth of each child)/annual income (x_7) (Mills, 2011).

The Cox regression model for the effect of three immigrant statuses (first generation, child, and adult immigrant) compared with second-generation women on having first, second, and third births takes the similar form as that of the estimates for third-generation women.

4.3.4 Ordinary Least Square (OLS) Regression Model of Cumulative Fertility

The OLS regression model for *cumulative fertility* between first-generation immigrant women (or child immigrant women or adult immigrant women or second-generation women) and third-generation women takes the following form:

$$Y_i = \alpha_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon_i$$

where Y_i is the cumulative fertility of women *i*, α_o is the intercept representing mean fertility of first-generation immigrant women (or child immigrant women or adult immigrant women or second-generation women) when no other control variable is included in the model; β_1 is the coefficient for immigrant status--first-generation immigrant women (or child immigrant women or adult immigrant women or second-generation women) versus third-generation women (X_1); β_2 is the coefficient for age (X_2); β_3 is the coefficient for age squared (X_3), β_4 is the coefficient for age at first marriage (X_4); β_5 is the coefficient for education (X_5); β_6 is the coefficient for employment duration/employment status (X_6); β_7 is the coefficient for self-perceived average financial condition/annual income (X_7); and ε_i is the error term.

The OLS regression model for the effect of three immigrant statuses (first generation, child, and adult immigrant) compared with second-generation women on cumulative fertility takes a form similar to that of estimates for third-generation women.

4.3.5 Decomposition Analysis of the Differences in Cumulative Fertility

The OLS regression shows the effects of independent variables on a dependent variable. It is possible to extend the OLS model to decompose a difference in means on a dependent variable into three components: (1) difference in characteristics means; (2) difference in slopes; and (3) difference in intercepts. (In some circumstances, there is also a fourth component: the interaction of (1) and (2)). For example, by using OLS regression estimates we can determine that females have lower income than males, even after controlling for age, marital status, education, and employment status. However, we do not know how much of the difference in mean income is due to differences in average levels of characteristics variables or to differences in how males and females translate unit change in characteristics variables into unit change in income (i.e., slope effect) or how much of the difference is due to gender discrimination (i.e., the effect of being male versus female). Decomposition analysis is an efficient way to determine the contribution of different components to group difference on a dependent variable.[15]

Thus, the objective of regression decomposition analysis is to quantify the contribution of three independent components to the observed differences in

[15] Evelyn M. Kitagawa introduced decomposition analysis in 1955. This method was further developed by others including Das Gupta (1978, 1993), Keyfitz (1968), Pollard (1988), Vaupel and Canudas-Romo (2002), and Trovato and Lalu (1995). Decomposition analysis was also extended to the linear regression model for individual-level data (Duncan, 1969; Coleman, Berry, & Blum, 1971; Althauser & Wigler, 1972; Jones, 1983; Iams & Thornton, 1975; Oaxaca, 1973; Blinder, 1973; Cotton, 1988; Yun, 2006, 2003).

means: differences in characteristics component; differences in slopes[16]; and differences in intercepts. In conducting decomposition analysis of cumulative fertility between first-generation immigrant women and third-generation women, the first component allows us to determine the relative contribution of difference in characteristics variables to the observed differences in cumulative fertility. The second component (difference in slopes) is an indirect measure of differences in behaviour because it is based on the difference in slope coefficients, which measure the effect on Y (dependent variable) of a unit change in X (independent variable). Finally, the difference in group intercepts is interpreted as a measure of group effect, net of all other effects in the model (i.e., independent of first and second components). The interpretation of these three components is explained in detail in the subsequent text.

In this study, I apply the decomposition model introduced by Althauser and Wigler (1972). This approach of decomposition analysis is widely used in social and demographic research because of its simplicity in computation and interpretation. This model of decomposition analysis is virtually identical with that of Oaxaca's (1973) decomposition analysis, which was introduced to examine male-female wage differentials in the USA. The software used in this analysis, STATA, does not have any syntax for Althauser and Wigler decomposition, but it does contain a syntax command for Oaxaca decomposition analysis, which

[16] The difference in slopes also contains an interaction component, which measures the contribution of the interaction between group status and different characteristics in order to observe differences. Since the contribution of the interaction component to the differences is very small, it is often merged with differences due to slopes. However, if there are reasonable grounds to have significant interaction effects, then it is possible to report them separately (Althauser & Wigler, 1972).

essentially gives the same output as that of the Althauser and Wigler decomposition model. For this reason, I have used "oaxaca" syntax to produce the decomposition outputs for this study.

The Althauser and Wigler (1972) model of decomposition analysis is based on mean characteristics and coefficients obtained from two separate regression equations for two groups (the study group and the standard group). For example, for decomposition analysis of cumulative fertility between first-generation immigrant women and third-generation women, we run two separate equations for the two groups.

(1) The OLS regression estimates of cumulative fertility for first-generation immigrant women take the following form:

$$\overline{Y}_F = b_{0F} + \sum_{j=1}^{n} b_{jF} X_{jF} + \varepsilon$$

Where $\overline{Y}_F$ is the mean cumulative fertility of first-generation immigrant women; $b_{0F}$is the value of the intercept for first-generation immigrant women when all covariates are set to zero; b_{jF} is the coefficients for predictor variables X_{jF}, where j indexes the variables (age, age squared, age at first marriage, education, employment duration/status, and perceived financial condition/income of first-generation immigrant women); and ε is the error term.

(2) The OLS regression estimates of cumulative fertility for third-generation women take the following form:

$$\overline{Y}_T = b_{0T} + \sum_{j=1}^{n} b_{jT} X_{jT} + \varepsilon$$

Where $\overline{Y}_T$ is the mean cumulative fertility of third-generation women; b_{0T} is the value of intercept for third-generation women when all covariates are set to zero; b_{jT} is the coefficients for predictor variables X_{jT} (age, age squared, age at first marriage, education, employment duration/status, and perceived financial condition/income of third-generation women); and ε is the error term.

Using the regression coefficients (b_{jF} and b_{jT}) and intercepts (b_{0F} and b_{0T}) obtained from the two equations shown above and the mean characteristics of each of the covariates for the two groups ($\overline{X}_{jF}$ and $\overline{X}_{jT}$), the decomposition analysis of cumulative fertility between first-generation immigrant women and third-generation women takes the following form:

$$\overline{Y}_F - \overline{Y}_T = \sum_{j=1}^{n} b_{jT} \left(\overline{X}_{jF} - \overline{X}_{jT}\right) + \sum_{j=1}^{n} \overline{X}_{jF} \left(b_{jF} - b_{jT}\right) + (b_{0F} - b_{0T})$$

Where $\overline{Y}_F - \overline{Y}_T$ is the mean difference in cumulative fertility between first-generation immigrant women (study group) and third-generation women (standard group). As explained earlier, the mean difference in cumulative fertility is decomposed into three components. The first component $\{\sum_{j=1}^{n} b_{jT} \left(\overline{X}_{jF} - \overline{X}_{jT}\right)\}$ is the difference in cumulative fertility due to differences in means of characteristics variables. Within this component, the mean differences in

characteristics between first-generation immigrant women and third-generation women are weighted by the slopes of the third generation (b_{jT}).

The second component $\{\sum_{j=1}^{n} \overline{X}_{jF}(b_{jF} - b_{jT})\}$ measures the difference in Y due to differences in slopes weighted by the mean characteristics of first-generation immigrant women ($\overline{X}_{jF}$). Finally, the third component $(b_{0F} - b_{0T})$ is the differences in group intercepts. This component indicates the differences in cumulative fertility independent of the first two components.

4.3.6 Interpretation of Decomposition Analysis

Suppose we find that first-generation immigrant women have significantly lower cumulative fertility than third-generation women. We are interested in knowing how much of the differences in cumulative fertility are due to differences in mean levels of characteristics variables, differences in slopes, and differences in intercepts. The decomposition model helps us to quantify these differences. For example, it might be the case that the first component serves to widen the difference in cumulative fertility while the second component acts to narrow the difference in cumulative fertility between the two groups. Similarly, it might be the case that within the first component, one characteristic variable contributes to increasing the differences in cumulative fertility, while another characteristic variable acts to decrease the difference in cumulative fertility.

For simplicity of presentation, assume a hypothetical example with only one covariate in the model (income). Also assume that the difference in cumulative fertility between the first-generation immigrant women and third-generation women (the first value minus the second) is -2.00, indicating that first-generation immigrant women have two fewer children on average. We then decompose this difference into three independent components using the OLS regression equations for each group and find that: (1) the component due to group differences in characteristics variables is -1.635; (2) the component due to differences in group specific slopes is -0.865; and (3) the difference in intercepts is 0.500.

Given that we have only one covariate in the hypothetical model, the first component suggests that first-generation immigrant women have 1.635 lower cumulative fertility because of their lower average income (assuming that the relationship between income and cumulative fertility is positive) than third-generation women. Therefore, equalizing income would increase the cumulative fertility of first-generation immigrant women by 1.635. The second component implies that the effects of covariates on cumulative fertility are less strong for first-generation immigrant women than for third-generation women. In this hypothetical case, first-generation immigrant women have 0.865 lower cumulative fertility than third-generation women due to the difference in the slope of income. Thus, if first-generation immigrant women were to receive the slope of income of third-generation women, their cumulative fertility would have

increased by 0.865. The third component suggests that first-generation immigrant women have higher cumulative fertility (0.500) independent of the first two components.

It is useful to mention again that the objective of using the decomposition model in this study is to quantify the relative contribution of characteristics variables to the observed differences in cumulative fertility between the study groups (first-generation immigrant women, child immigrant women, adult immigrant women, and second-generation women) and the standard group (second- or third-generation women).

CHAPTER FIVE

Results

The objective of this study is to examine fertility differentials between immigrant generations in Alberta and Canada in order to determine the mechanisms through which the effects of generation status on fertility operate. I compare the effects of the four exposure variables on fertility: (a) first-generation immigrant women as compared to second- and third-generation women; (b) child immigrant women in relation to second- and third-generation women; (c) adult immigrant women with reference to third- or second-generation women; and (d) second-generation women as compared to third-generation women. The outcome variable of fertility is measured in terms of transition to parity-specific fertility (i.e., timing of first, second, and third births) and cumulative fertility (i.e., total number of children ever born).

The results related to the study groups are presented in four sections: Part A presents results related to first-generation immigrant women; Part B shows results regarding child immigrant women; Part C illustrates results associated with adult immigrant women; and Part D provides results concerning second-generation women. Each of these sections begins with a comparison of sample characteristics to provide better insight about the differences in characteristics between the study group and the reference group.

The findings from the 2010 Alberta Fertility Survey (AFS) are presented in detail, followed by the comparisons of these findings with that of the 2006 General Social Survey (GSS). For the 2006 GSS findings, I highlight only those findings that are different from the 2010 AFS results. In fact, the results based on the 2010 AFS and the 2006 GSS are very similar except in a few instances (Appendices 5-1 and 5-2). Thus, the 2006 GSS findings help to validate the 2010 AFS data, and the two datasets lead to the same conclusions. I have placed the Kaplan-Meier survival curves obtained based on the 2010 AFS and the 2006 GSS in appendices 5-3 to 5-44.

In presenting the findings of the 2010 AFS, descriptive statistics of average time to parity-specific fertility are reported at the beginning. This is followed by a summary of the Kaplan-Meier (KM) survival estimates of progression to parity-specific fertility using the Log-rank test. As mentioned in Chapter 4, the KM estimates do not consider sociodemographic characteristics. Hence, Cox regression estimates are presented in order to examine the progression to parity-specific fertility. All Cox regression estimates adjust for sociodemographic characteristics of age, age squared, age at first marriage, education, employment duration/status, and income/self-perceived financial condition at the time of each birth.

The differentials in cumulative fertility across three generation status are examined using the OLS regression estimates. This is followed by a description of the decomposition analysis of differences in cumulative fertility.

Part A: First-generation Immigrant Women

The first objective of this study is to examine the extent to which progression to parity-specific fertility among, and cumulative fertility of, first-generation immigrant women differs from that of third-generation women in Alberta and Canada. In Chapter 3, I hypothesized that first-generation immigrant women would have lower risk than third-generation women of having a birth of given parity and lower cumulative fertility because of factors associated with migration such as moving to a new country, finding a new home, and getting established socially and economically. This hypothesis is tested using data from the 2010 AFS and the 2006 GSS through the application of event history analysis (for parity-specific fertility) and OLS regression and decomposition analysis (for cumulative fertility).

Another objective of this study is to investigate the fertility differentials between first-generation immigrant women and second-generation women in order to assess the extent to which their progression to parity-specific fertility and cumulative fertility differ. I also predicted a lower risk of parity-specific fertility and a lower cumulative fertility for first-generation immigrant women than for second-generation women because the latter were born in Canada and, therefore, do not experience the adjustment challenges associated with migration (e.g., moving to a new country and getting settled socially and economically in the host society). The empirical findings are presented below.

5.1 Sample Characteristics of First-Generation Immigrant Women

Table 5-1 shows the sample characteristics of first-generation immigrant women, second-generation women, and third-generation women in Alberta based on the 2010 Alberta Fertility Survey. The mean age of first-generation immigrant women is lower than that of third-generation women. First-generation immigrant women have a higher mean age at first marriage, a higher rate of post-secondary education, and longer employment duration than do third-generation women. Overall, first-generation immigrant women reported poorer perceived financial conditions than did third-generation women in Alberta (Table 5-1). The sample characteristics of first-generation immigrant women also show a similar pattern when compared with second-generation women in Alberta (Table 5-1).

Most of the sample characteristics by generation status are similar in Canada to those in the Alberta findings; the exceptions are employment status and educational attainment (Table 5-31). Fewer first-generation immigrant women than third-generation women are employed. In addition, a slightly lower proportion of first-generation immigrant women have post-secondary educational attainment than do second-generation women in Canada (Table 5-31).

5.2 Transition to Parity-specific Fertility

The average time to first, second, and third births is longer for first-generation immigrant women than for third-generation women in Alberta (Table 5-1). The log-rank test based on the Kaplan-Meier (KM) survival estimates show

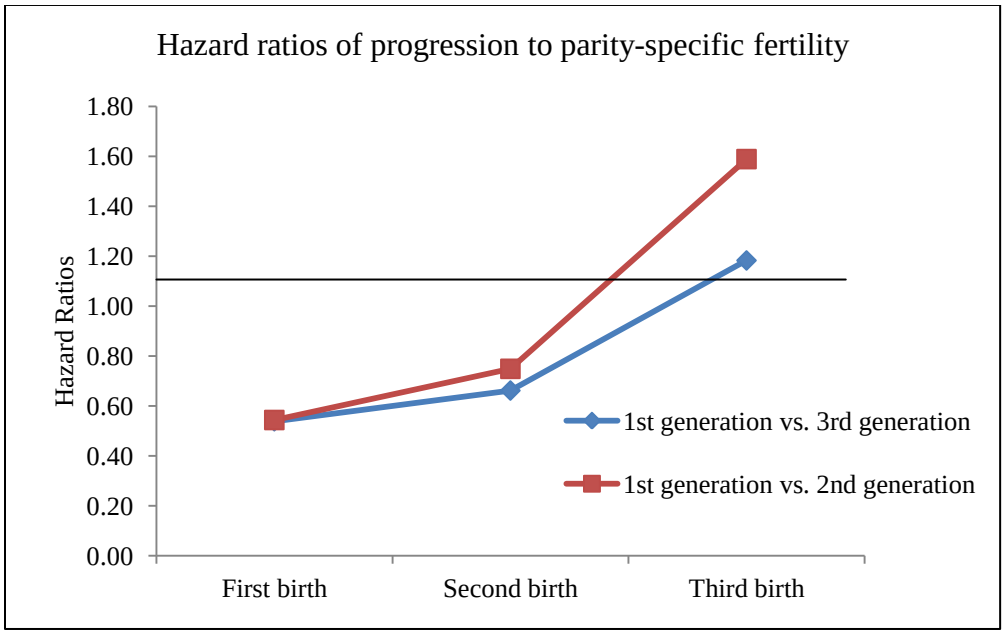
that first-generation immigrant women take significantly longer to have their first and second births than do third-generation women. However, there is no significant difference in the KM survival estimates for transition to third birth between first-generation immigrant women and third-generation women (Appendices 5-3 to 5-5).

Table 5-3 presents the Cox regression estimates for first, second, and third births among first-generation immigrant women and third-generation women in Alberta. The Cox estimates show that first-generation immigrant women have lower hazards of having first and second births (46.1% and 33.8% respectively) than do third-generation women; this suggests a wider spacing in birth intervals. However, there is no significant difference in progression to third birth between first-generation immigrant women and third-generation women after controlling for the selected sociodemographic characteristics. The hazard ratios for progression to parity-specific fertility among first-generation immigrant women in Alberta, as compared with those for second- and third-generation women, are shown in Figure 5-1 below.

These results suggest that the disruption effect of migration is pronounced for the progression to first and second births among first-generation immigrant women. However, at parities beyond second birth there is no significant difference in the spacing of births from those of third-generation women. This

implies that the migrant women adopt the birth patterns of the host society at higher parities.

Figure 5-1. Hazard ratios of progression to parity-specific fertility among first-generation immigrant women in comparison with second- and third-generation women in Alberta[17]



Comparing the progression to parity-specific fertility with reference to second-generation women in Alberta shows that first-generation immigrant women have a lower hazard of having a first birth, but that there is no significant difference in progression to second and third births (Table 5-4). This result suggests that first-generation immigrant women experience a lower degree of disruption in their fertility than do second-generation women in Alberta.

[17] Hazard ratio of below 1.00 indicates first-generation immigrant women have lower progression to parity-specific fertility than third-generation women. The hazard ratios of having third birth for both datasets are greater than 1.00 suggesting higher risk of having third birth but the difference is not statistically significant.

Cox regression estimates of the progression to parity-specific fertility across generation status in Canada based on data from the 2006 General Social Survey reveal findings similar to those of the 2010 Alberta Fertility Survey, with one exception. First-generation immigrant women in Canada have a lower risk of having a second birth than do second-generation women (Tables 5-33 and 5-34).

The lower progression to first and second births among first-generation immigrant women, as compared to that among third-generation women, in both Alberta and Canada provides support for the *disruption hypothesis.* As noted above, this hypothesis suggests that the fertility of first-generation immigrant women is depressed due to migration. It also assumes that immigrant fertility will converge with that of the native born population with increasing duration of residence in the host society. This assumption is confirmed by the non-significant difference in progression to third birth between first-generation immigrant women and the Canadian-born (both the second and third generations).

Thus, the results related to the progression to parity-specific fertility between first-generation immigrant women and third-generation women imply that the former not only experience disruption effects of migration on their fertility but also undergo a process of adaptation with increasing duration of residence (manifested in higher order births beyond the second) in the host society.

The lower hazard of first and second births among first-generation immigrant women raises the question of the extent to which the postponement of childbearing affects their cumulative fertility. Wider spacing of births usually results in fewer children.

5.3 Cumulative Fertility

There are two aspects of the expectations for lower cumulative fertility among immigrant women noted in Chapter 3: (1) the indirect effects on cumulative fertility of first-generation immigrant status mediated through education, age at first marriage, employment duration, and perceived financial condition are expected to be negative, providing evidence for the *disruption hypothesis*; and (2) the direct effect of first generation immigrant status on cumulative fertility (i.e., adjusted for the sociodemographic characteristics) is expected to be negative, providing support for the *disruption hypothesis* as well.

OLS regression estimates for the effects of first generation immigrant status on education, age at first marriage, employment duration, perceived financial condition, and cumulative fertility in relation to third-generation women are presented in Table 5-5. These estimates are (Models 1 to 4) used to derive the indirect effects of first generation immigrant status on fertility shown in Table 5-6.

The basic model of cumulative fertility in Table 5-5 (Model 5) shows that, as expected, first-generation immigrant women have lower cumulative fertility than third-generation women. This finding remains statistically significant even after controlling for age, age at first marriage, education, employment duration, and self-perceived financial condition (Model 6 in Table 5-5). Consistent with the expectations, the indirect effects of first generation immigrant status on cumulative fertility mediated through education, age at first marriage, and perceived financial condition are negative, which indicates lower cumulative fertility for first-generation immigrant women in Alberta (Table 5-6).

First-generation immigrant women also have lower cumulative fertility than second-generation women in Alberta net of sociodemographic characteristics (Tables 5-7). The indirect effects of first generation immigrant status in relation to second-generation women mediated through education, age at first marriage, and perceived financial condition are also negative, which likewise indicates that first-generation immigrant women have lower cumulative fertility than second-generation women (Table 5-8).

The direct and indirect effects of first-generation immigrant status on cumulative fertility as compared to both second- and third-generation status, based on the 2006 Canada-wide GSS, are similar to findings based on the 2010 Alberta Fertility Survey (Tables 5-35 to 5-38).

In the multivariate analysis, the lower cumulative fertility of first-generation immigrant women in both Alberta and Canada implies that migration has a depressing effect on cumulative fertility. The lower progression to first and second births among first-generation immigrant women translates into lower cumulative fertility. Because of the wider spacing of lower-order births, first-generation immigrant women are not able to have the same number of children as second- or third-generation women. These results appear to be consistent with the *disruption hypothesis* for first-generation immigrant women.

5.4 Decomposition Analysis

In this study, the objective of the decomposition analysis of cumulative fertility is to quantify the relative contribution of characteristics variables to the observed differences in cumulative fertility between the study group and the standard group. The decomposition analysis of cumulative fertility between first-generation immigrant women and third-generation women is discussed below.

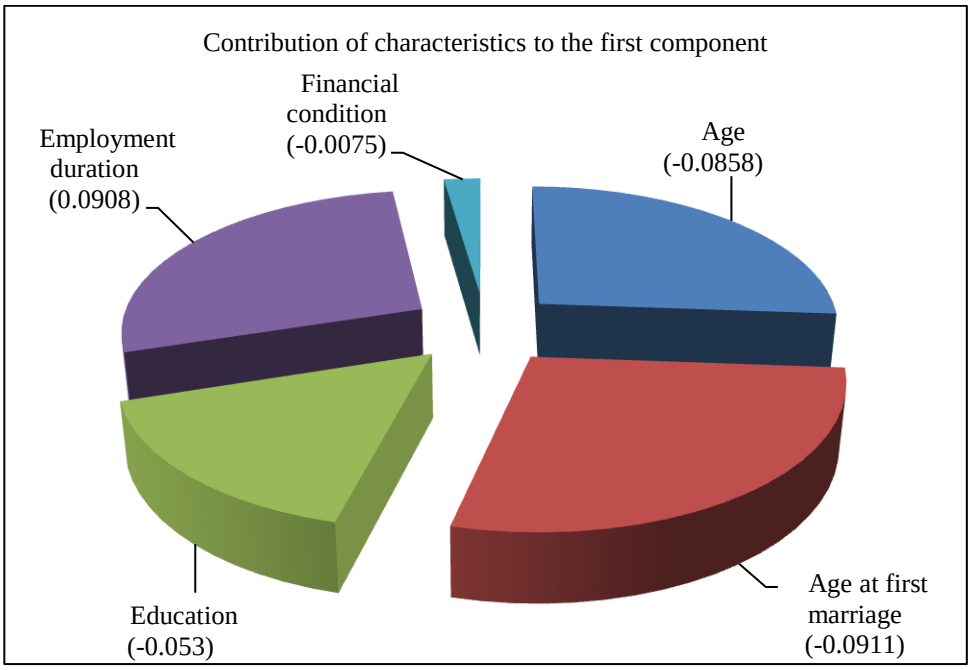
Table 5-9 shows that the mean difference in cumulative fertility between first-generation immigrant women and third-generation women (the first value minus the second) in Alberta is -0.3786. Thus, on average first-generation immigrant women have 0.3786 fewer children than third-generation women. This difference is decomposed into three components. The contribution of difference due to characteristics variable means is -0.1466; the contribution due to difference

in slopes is -0.3260; and the contribution due to difference in intercepts is 0.0940 (Table 5-9).

Thus, first-generation immigrant women have 0.1466 fewer children than third-generation women in Alberta due to differences in means of the characteristics variables. Consistent with expectations, the first component shows that first-generation immigrant women have lower cumulative fertility because of their higher age at first marriage (-0.0911), higher level of education (-0.0530), and poorer financial condition (-0.0075) than third-generation women (Table 5-9). The contribution of differences due to characteristics variable means to the observed difference in cumulative fertility is displayed below in Figure 5-2.

The second component shows that first-generation immigrant women have fewer children because of differences in slopes of age (-0.1875) and age at first marriage (-0.4865). These differences are narrowed to some extent by the contributions of slope differences in education (0.1125), employment duration (0.2142), and perceived financial condition (0.0213). Thus, the net contribution of differences in slopes to the observed difference in cumulative fertility is negative (-0.3260), which suggests that if first-generation immigrant women were to receive the slopes of third-generation women, their cumulative fertility would increase by 0.3260 (Table 5-9).

Figure 5-2. Contribution of differences due to characteristics variable means to the observed difference in cumulative fertility between first-generation immigrant women and third-generation women in Alberta



The third component of differences in intercepts (0.0940) suggests that first-generation immigrant women have higher cumulative fertility than third-generation women independent of the first two components (Table 5-9). This higher cumulative fertility may be attributed to the pronatalist norms and values of first-generation immigrant women.

The decomposition analysis of the difference in cumulative fertility between first-generation immigrant women and second-generation women in Alberta (-0.2086) is presented in Table 5-10. This difference is decomposed into three components: contribution due to differences in characteristics variable

means (0.0203), contribution due to differences in slopes (-1.6302) and contribution due to difference in intercepts (1.4013). These results suggest that the significant difference in cumulative fertility between first-generation immigrant women and second-generation women is not due to their differences in characteristics variable means but rather because of differences in slopes.

The results of decomposition analyses of cumulative fertility for first-generation immigrant women in Canada based on the 2006 GSS are similar to those based on the 2010 AFS for all contrasts with one exception (Tables 5-39 and 5.40). First-generation immigrant women have lower cumulative fertility (-0.2761) than third-generation women in Canada due to difference in intercepts. This implies that the fertility of first-generation immigrant women is also depressed because of other factors that are not included in the model. Possible factors may include disruption of the social network (Milewski, 2010), lower proficiency in official languages (Adesra & Ferrer, 2013), and a lower level of cultural integration into the mainstream society (Woldemicael & Beaujot, 2012).

The overall findings based on the Cox regression estimates, the OLS regression estimates, and the decomposition analysis support our first hypothesis (mentioned in Chapter 3) that first-generation immigrant women have lower progression to parity-specific fertility and lower cumulative fertility than both second- and third-generation women in Alberta and Canada. These results are consistent with earlier research conducted by Bean et al. (1984), Hill and Johnson

(2004), Kahn (1994), Mussino et al. (2009), Mussino and Raalte (2012), Ram and George (1990), and Stephen and Bean (1992). Based on Canadian census data, Ram and George (1990) showed that immigrants have lower cumulative fertility (number of children ever born) than the Canadian-born because of the time they need to establish themselves socially and economically in the host country. Hill and Johnson (2004) also reported lower numbers of children ever born among the first-generation immigrants than among members of the third generation using data from the Current Population Survey (1995 and 1998) and the 1990 Census of the United States. The authors attributed this effect to higher education levels of first generation and to decreasing trends in poverty and marriage rates.

The lower progression to first birth among first-generation immigrant women in comparison with third- or second-generation women in Alberta and Canada is consistent with the research conducted by Mussino and Raalte (2012). The authors reported that immigrants experienced a lower transition to first birth than did the native-born in Italy and Russia using data from the 2003 Italian Families and Social Subjects Survey and the 2004 Russian family and Society Survey, respectively. The lower transition to first birth was more pronounced among immigrants ages 21-30, suggesting that this group tended to postpone childbearing, and focused more on finishing education and getting established in the labour market of the host society (Mussino & Raalte, 2012).

Part B: Child Immigrant Women

Do the attributes of first-generation immigrant women -- lower progression to parity-specific fertility and lower cumulative fertility -- remain the same if we subdivide the women into groups based on their age at immigration to Canada? In Chapter 3, I hypothesized that there would be no significant difference in progression to parity-specific fertility and cumulative fertility between child immigrant women and second- or third-generation women. If this is confirmed by the statistical analysis, it will provide evidence in support of the *adaptation* hypothesis.

5.5 Sample Characteristics of Child Immigrant Women

Among first-generation immigrant women, 28.67 per cent are child immigrant women (Table 5-2). They are younger than third-generation women (mean ages are 31.44 and 36.46 years respectively). Child immigrant women have a higher age at first marriage and higher rate of post-secondary education than do third-generation women. They have lower employment duration than third-generation women at the time of all births except for the first birth, when they have been employed for a nearly similar length of time (Tables 5-1 and 5-2). Overall, child immigrant women reported a poorer perceived financial condition than did third-generation women at the time of each birth. Their patterns of age, age at first marriage, education, employment duration, and perceived financial

condition are similar to those of second-generation women in Alberta (Tables 5-1 and 5-2).

The sample characteristics of child immigrant women in Canada based on the 2006 General Social Survey are similar to those emerging from the 2010 Alberta Fertility Survey, with one exception: income attainment. A larger proportion of child immigrant women than of second- or third-generation women in Canada belong to a high income category (Tables 5-31 and 5-32).

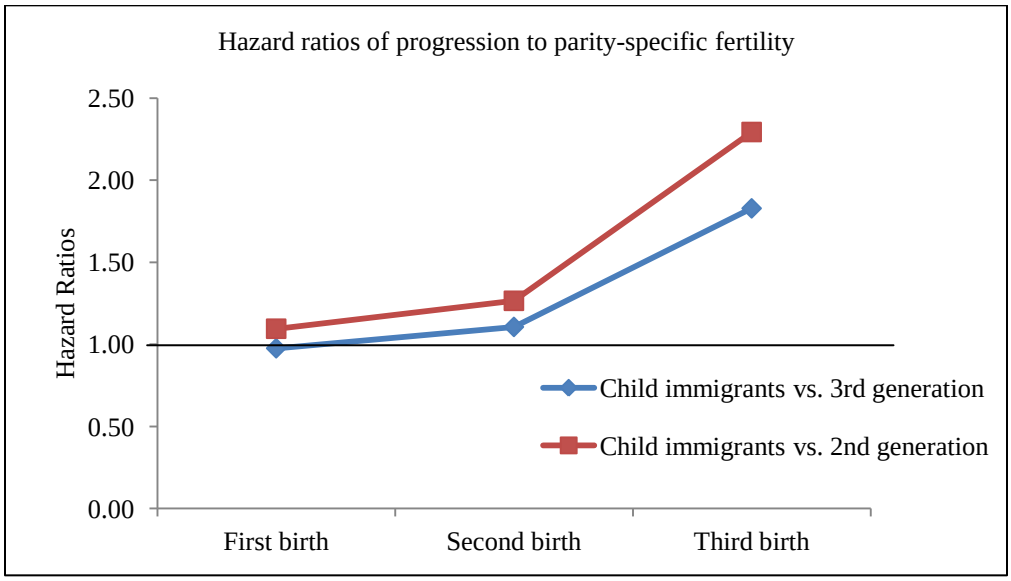
5.6 Transition to Parity-Specific Fertility

The average time to first birth from age 15 is slightly longer for child immigrant women (11.60 years) than for third-generation women (11.34 years) in Alberta (Tables 5-1 and 5-2). However, the average time to second birth from the first, and to third birth from the second, is shorter for child immigrant women than for third-generation women. The Kaplan-Meier (KM) survival estimates illustrate that the differences in time to first and second births between child immigrant women and third-generation women are not statistically significant. However, child immigrant women take significantly less time to have their third child than do third-generation women (Appendices 5-6 to 5-8).

The Cox regression estimates in Table 5-11 indicate that there is no significant difference in progression to first birth from age 15, and to second birth from the first, between child immigrant women and third-generation women in

Alberta. In addition, child immigrant women have an 82.8 per cent higher risk of having a third birth than do third-generation women, even after controlling for the sociodemographic characteristics. The hazard ratios of progression to parity-specific fertility for child immigrant women in relation to second- and third-generation women are displayed in Figure 5-3.

Figure 5-3. Hazard ratios of progression to parity-specific fertility for child immigrant women as compared to second- and third-generation women in Alberta[18]



Comparison of progression to parity-specific fertility between child immigrant women and second-generation women in Alberta also shows no significant difference in the hazards of having their first and second births. In

[18] The only significant difference in this figure is the higher progression to third birth among Child immigrant women in Alberta (2010 AFS).

addition, child immigrant women have a higher risk of having a third birth than do second-generation women, after adjusting for sociodemographic characteristics (Table 5-12). This suggests that child immigrant women may feel secure socioeconomically, and are therefore more likely to have higher-order births.

A comparison between Cox regression estimates of the progression to parity-specific fertility for child immigrant women and those of second- and third-generation women in Canada, based on the 2006 GSS, reflects a trend similar to that noted in Alberta, with one exception. There is no significant difference in progression to third birth between child immigrant women and third-generation women in Canada. This is also true when compared with second-generation women in Canada (Tables 5-41 and 5-42).

The similarity in the progression to first and second births among child immigrant women, and among both second- and third-generation women in Alberta and in Canada, suggests that child immigrant women do not experience disruption in their fertility. This is further confirmed by their higher progression to third birth. These findings support the *adaptation hypothesis*, which asserts that child immigrants incorporate fully the cultural values and norms of the host society, and this explains the convergence in their fertility with that of their native-born counterparts (Gabrielli et al., 2007; Kulu, 2005; Milewski, 2008; Schmid & Kohls, 2009).

5.7 Cumulative Fertility

I made two predictions regarding the cumulative fertility of child immigrant women. The first was that there would be no significant difference in cumulative fertility between child immigrant women and third/second-generation women after adjusting for the sociodemographic characteristics (direct effect). The second is that there would be no significant difference in cumulative fertility between child immigrant women and third/second-generation women mediated through age at first marriage, education, employment duration, and perceived financial condition (indirect effect). Both predictions are based on the *adaptation hypothesis,* which suggests that child immigrants experience greater integration into the host society socioeconomically and culturally because of their younger age at immigration.

OLS regression estimates of the effect of child immigrant status on age at first marriage, education, employment duration, perceived financial condition, and fertility in Alberta are presented in Table 5-13. Using the basic model for OLS regression estimates reveals that child immigrant women have lower cumulative fertility than third-generation women (Model 5 in Table 5-13). However, when age, age at first marriage, education, employment duration, and self-perceived financial condition are included in the model, the difference in cumulative fertility is no longer statistically significant (Model 6 in Table 5-13). This suggests that a significant part of the variation in cumulative fertility between child immigrant women and third-generation women is explained by these sociodemographic

characteristics. These results also hold in relation to second-generation women based on the 2010 Alberta Fertility Survey (Table 5-15). The non-significant difference in cumulative fertility between child immigrant women and second/third-generation women in Canada, based on the 2006 GSS, remains similar to the findings of the 2010 AFS (Tables 5-43 to 5-46).

These findings are consistent with our second hypothesis (noted in Chapter 3), which predicted that there would be no significant difference in cumulative fertility between child immigrant women and second/third-generation women. These results for child immigrant women in Alberta and Canada provide evidence for the *adaptation hypothesis,* which posits that over time, immigrants become assimilated into the mainstream society and that child immigrants' fertility converges with that of the native-born population.

The average number of children ever born is lower for child immigrant women (1.317) than for third-generation women (1.845) in Alberta (Tables 5-1 and 5.2), though the difference does not remain statistically significant after adjusting for the sociodemographic characteristics. Decomposition analysis will provide further insight into the sources of the fertility difference.

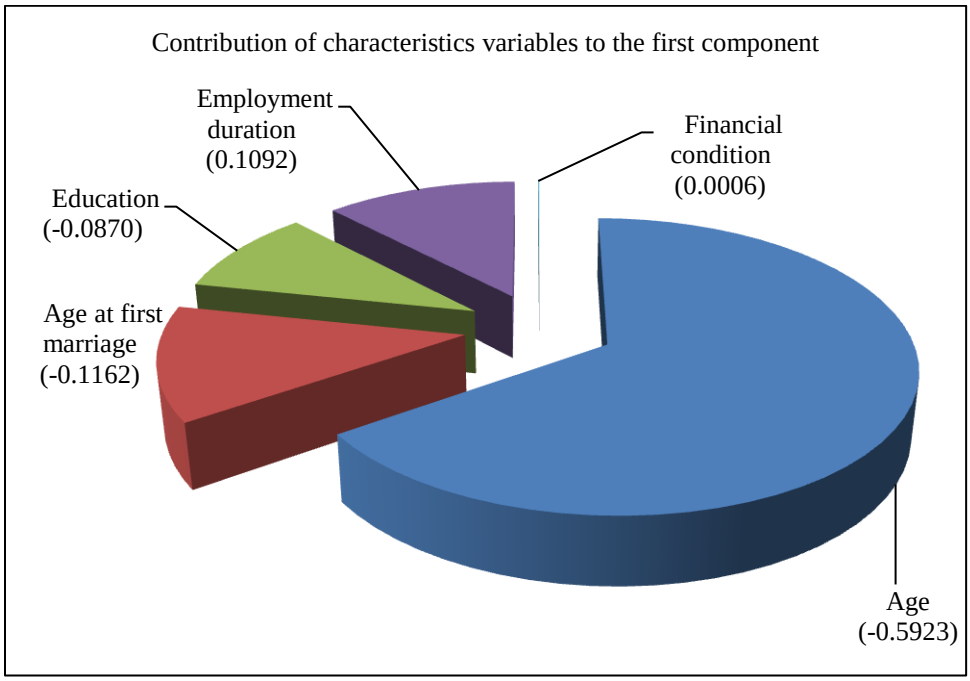
5.8 Decomposition Analysis

Table 5-17 presents the decomposition analysis of observed difference in cumulative fertility between child immigrant women and third-generation women in Alberta. The observed difference in cumulative fertility (the first value minus

the second) is -0.5276. This indicates that on average, child immigrant women in Alberta have 0.5276 fewer children than third-generation women. This observed difference is decomposed into three components: the difference due to characteristics variable means is -0.6857; the contribution due to difference in slopes is -0.4157; and the difference in intercepts is 0.5738.

The first component of the decomposition analysis shows that child immigrant women in Alberta have 0.6857 fewer children than third-generation women due to differences in characteristics variable means. In this case, the largest contribution comes from difference in mean age (-0.5923) followed by age at first marriage (-0.1162), employment duration (0.1092), education (-0.0870), and perceived financial condition (0.0006) (Table 5-17). The relative contribution of each characteristic to the first component of decomposition analysis is shown below in Figure 5-4.

Figure 5-4. Contribution of difference due to characteristics variable means to observed difference in cumulative fertility between child immigrant women and third-generation women in Alberta



The second component of contribution to differences in slopes shows that child immigrant women have 0.4157 fewer children than third-generation women in Alberta. This is due to differences in the slopes of age at first marriage (-0.6018), employment duration (-0.2152), and perceived financial condition (-0.1526). However, these differences are narrowed by the contribution of slope differences in age (0.3481) and education (0.2058). Given that the second component reflect the behavioural aspect, the total difference in cumulative fertility due to differences in slopes (-0.4157) indicates that if child immigrant women were to receive the slopes of the standard group (third-generation women), their cumulative fertility would increase by 0.4157 (Table 5-17).

The higher cumulative fertility of child immigrant women (0.5738) than third-generation women in Alberta due to difference in intercepts (third component) suggests that child immigrant women do not experience any disruption effect on their fertility (Table 5-17). The higher fertility of child immigrant women in Alberta independent of the first two components can be attributed to the adoption of the pronatalist norms and values of their immigrant parents.

The decomposition analysis of observed difference in cumulative fertility between child immigrant women and second-generation women in Alberta is presented in Table 5-18. These results are also similar to that of third-generation women in Alberta. In addition, the decomposition analyses of cumulative fertility of child immigrant women as compared to both second- and third-generation women in Canada based on the 2006 GSS demonstrate similar findings to that of the 2010 Alberta Fertility Survey (Tables 5-47 and 5-48).

These findings that reveal non-significant differences in progression to parity-specific fertility and in cumulative fertility between child immigrant women and the native-born women are congruent with other studies in Canada (Adserà, Ferrer, Sigle-Rushton, & Wilson, 2012; Adserà & Ferrer, 2013; Woldemicael & Beaujot, 2012). Adserà et al. (2012) examined the fertility patters of child immigrant women in Canada, the United Kingdom, and France. For Canada, the authors used data from the confidential files of Canadian censuses of

population (20 percent sample) for the years 1991, 1996, 2001, and 2006. Their reported patterns are consistent with the *adaptation hypothesis,* which predicts that the fertility of child immigrant women will either converge with or become higher than that of the native-born population because of the longer exposure to the norms and values of the host country. More specifically, the authors found that women who migrated at the youngest ages were more likely to have fertility rates similar to those of native-born women. This was particularly true for Canada where fertility differentials between child immigrant women and native-born women were found to be smaller and to vary less by country of origin as compared to those of the United Kingdom and France. In addition to the effect of exposure to the host society, the authors attributed the convergence of immigrant fertility to the immigration policy in Canada, which is highly selective in favour of higher education. They argued that highly educated immigrants "may have already internalized low fertility norms prior to immigration" (Adserà et al., 2012:183).

Furthermore, Adserà and Ferrer (2013) examined the determinants of fertility among child immigrant women in Canada using data from the Canadian censuses (from 1991 to 2006). They confirmed that child immigrant women (who migrated below age 18) do not experience the disruption effect of migration on their fertility, and increasing age at migration was associated with increasing fertility (measured in terms of number of children in the household) in relation to native-born women. The authors noted that proficiency in official languages,

education, and country of origin were the strongest predictors of fertility among child immigrant women.

Part C: Adult Immigrant Women

Adult immigrant women would be expected to experience socioeconomic and cultural integration differently from child immigrant women because of the shorter duration of their residence in the host country. I hypothesized that adult immigrant women would have lower risks of having first, second, and third births and lower cumulative fertility than third- or second-generation women. In addition, I anticipated that the indirect effect of adult immigrant status on cumulative fertility mediated through age at first marriage, education, employment duration, and perceived financial condition would be negative (*disruption hypothesis*).

5.9 Sample Characteristics of Adult Immigrant Women

Adult immigrant women have a slightly higher mean age than third-generation women in Alberta (Tables 5-1 and 5-2). Consistent with the expectation in Figure 3-2, adult immigrant women have a higher mean age at first marriage, a higher rate of post-secondary education, and longer duration of employment at the time of first, second, and third births than do third-generation women. Adult immigrant women have poorer perceived financial conditions than third-generation women at the time of each birth (Tables 5-1 and 5-2). The higher mean age, higher age at first marriage, higher educational attainment, longer employment duration, and poorer financial condition of adult immigrant women also hold in comparison with second-generation women in Alberta (Tables 5-1

and 5-2). Most of the sample characteristics by generation status are similar in Canada to those in the Alberta findings. The exception is employment status. Adult immigrant women in Canada have lower employment rates than second- and third-generation women (Tables 5-31 and 5-32).

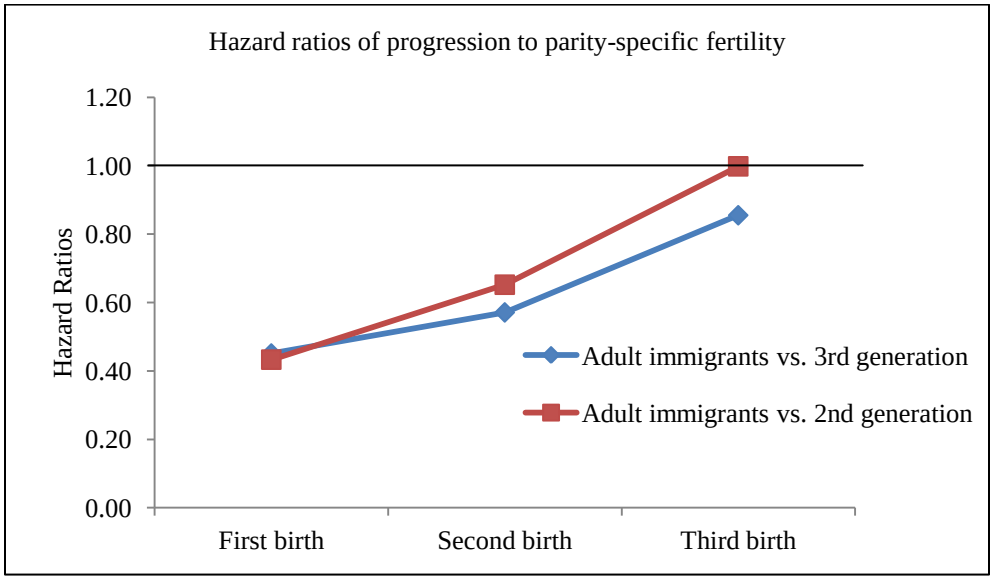
5.10 Transition to Parity-specific Fertility

The average time to first, second, and third births is longer for adult immigrant women than for third-generation women in Alberta (Tables 5-1 and 5-2). The Kaplan-Meier survival estimates show that adult immigrant women take significantly more time to have their first and second births than do third-generation women. However, the estimates reveal no significant difference between adult immigrant women and third-generation women in Alberta in terms of their rates of having third births (Appendices 5-9 to 5-11).

The Cox regression estimates of transition to first, second, and third births between adult immigrant women and third-generation women in Alberta shown in Table 5-19 are consistent with the KM survival estimates even after adjusting for the sociodemographic characteristics. Table 5-19 shows that adult immigrant women have a lower risk of having first and second births (54.9% and 42.9% respectively) than third-generation women. However, there is no significant difference in transition to third birth between them after controlling for the sociodemographic covariates. The hazard ratios of progression to parity-specific

fertility between adult immigrant women and second- or third-generation women in Alberta are presented in Figure 5-5, shown below.

Figure 5-5. Hazard ratios of progression to parity-specific fertility for adult immigrant women as compared to second- and third-generation women in Alberta[19]



The lower risks of having first and second births, and the non-significant difference in progression to third birth, also hold for adult immigrant women when they are compared with second-generation women in Alberta (Table 5-20). These results for adult immigrant women are analogous to those for both second- and third-generation women in Canada based on the 2006 GSS (Tables 5-49 and 5-50). These findings of parity-specific fertility suggest that adult immigrants

[19] The hazard ratios of progression to third birth among adult immigrant women in relation to third-generation women are not statistically significant.

experience the disruption effects of migration; however, they tend to overcome the disruption effect in the long run in terms of progression to higher order parities.

5.11 Cumulative Fertility

On average, adult immigrant women have fewer children ever born (1.542) than do third-generation women (1.845) in Alberta (Tables 5-1 and 5-2). OLS regression estimates of the effect of adult immigrant status on age at first marriage, education, employment duration, perceived financial condition, and fertility are shown in Table 5-21. Using the basic model of cumulative fertility (Model 5 in Table 5-21) reveals that adult immigrant women have lower cumulative fertility than third-generation women in Alberta. This is further confirmed even after adjusting for sociodemographic characteristics (Model 6 in Table 5-21). Consistent with the expectations, the effects of adult immigrant status mediated through education, age at first marriage, and income are negative, indicating their lower cumulative fertility due to the indirect effects (Table 5-22).

Both the direct and indirect effects of adult immigrant status on women's lower cumulative fertility are similar to those of second-generation women in Alberta (Tables 5-23 and 5-24). Findings for adult immigrant women in Canada based on the 2006 GSS are in consonance with those based on the 2010 AFS (Tables 5-51 to 5-54). Thus, the disruption effect of migration for adult immigrant

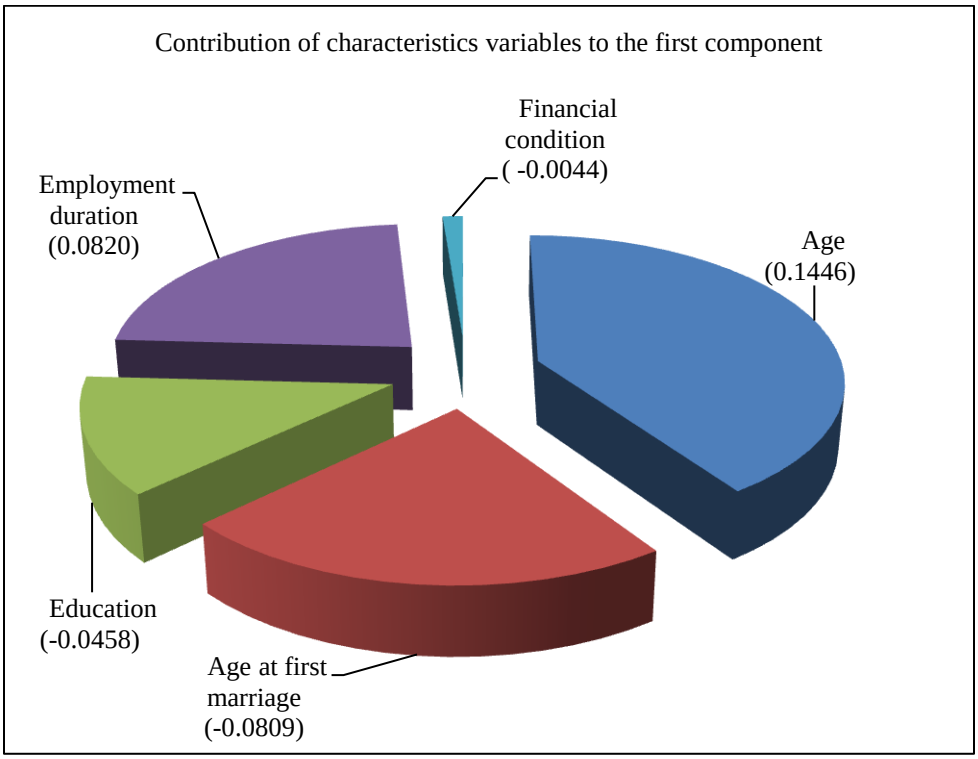
women in Alberta and Canada is evident in their lower progression to first and second births as well as in the fewer children ever born.

5.12 Decomposition Analysis

The decomposition of observed differences in cumulative fertility between adult immigrant women and third-generation women in Alberta is presented in Table 5-25. The observed difference in cumulative fertility (that of adult immigrant women minus that of third-generation women) is -0.3025, suggesting that adult immigrant women have lower cumulative fertility than third-generation women in Alberta. The difference in cumulative fertility is separated into three components: characteristics (0.0954), slopes (0.5511), and intercepts (-0.9490).

The relative contributions of each characteristics variable (the first component) show that adult immigrant women have lower cumulative fertility due to differences in age at first marriage (-0.0809), education (-0.0458), and perceived financial condition (-0.0044). The net positive value of the characteristics effects combined (0.0954) is largely due to the contribution of differences in mean age between adult immigrant women and third-generation women (Table 5-25). The contribution of each characteristic to the first component of decomposition analysis is presented in Figure 5-6 below.

Figure 5-6. Contribution of difference due to characteristics variable means to observed difference in cumulative fertility between adult immigrant women and third-generation women in Alberta



The second component (contribution of differences due to slopes) shows that adult immigrant women have lower cumulative fertility than third-generation women in Alberta because of their slope differences in age at first marriage (-0.4406) and perceived financial condition (-0.0495). However, the contribution to the differences in slopes of age (0.6238), education (0.0929), and employment duration (0.3245) leads to the net positive effect on cumulative fertility (0.5511) based on the second component (Table 5-25).

The third component, the contribution of differences due to intercepts, reveals that adult immigrant women have 0.9490 fewer children than third-generation women, independent of the first two components (Table 5-25). This implies that adult immigrant women also experience the disruption effect of migration on their fertility because of unobserved factors such as lower proficiency in official languages (Adesra & Ferrer, 2013) and a lower level of cultural integration into the mainstream society (Woldemicael & Beaujot, 2012).

The decomposition analysis of the contribution of characteristics to the differences in cumulative fertility between adult immigrant women and second-generation women in Alberta reveals findings similar to those of third-generation women (Table 5-26). Furthermore, the decomposition analyses of observed differences in cumulative fertility between adult immigrant women and second- or third-generation women in Canada based on the 2006 General Social Survey follows a direction similar to that of the 2010 Alberta Fertility Survey (Tables 5-55 and 5-56).

In general, the findings based on the Cox regression estimates, the OLS regression estimates, and the decomposition analysis support our third hypothesis that adult immigrant women have lower progression to parity-specific fertility and lower cumulative fertility than do both second- and third-generation women. These findings are consistent with studies conducted by Abbasi-Shavazi and McDonald (2000), Bean and Swicegood (1982), Bean et al. (1984), Carlson

(1985), Ford (1990), Kahn (1994), Mussino and Raalte (2012), and Ram and George (1990). However, the lower levels of fertility among adult immigrant women in Alberta and Canada are in contrast to results from research conducted by Woldemicael and Beaujot (2012). Using data from the 2002 Ethnic Diversity Survey, the authors reported that trends in fertility among child immigrants (migrated below age 15) and adult immigrants (migrated at age 15 or above) in Canada converged with those of the Canadian-born . It should be noted that the authors used *number of children in the household* as the measure of cumulative fertility because the dataset did not include information on respondents' number of children ever born. In addition, there were differences in control variables. For example, they included age, acculturation, visible minority status, education, and marital status as control variables.

Part D: Second-Generation Women

The third research question in this study inquires into the extent to which the fertility of second-generation women differs from that of third-generation women in Alberta and Canada. I hypothesized that second-generation women would have a lower hazard of having first, second, and third births, and lower cumulative fertility than third-generation women. Moreover, I anticipated that the indirect effects of second-generation status on cumulative fertility mediated through education, age at first marriage, employment duration, and perceived financial condition would be negative (*socioeconomic insecurity hypothesis*).

5.13 Sample Characteristics of Second-Generation Women

Tables 5-1 and 5-2 demonstrate that second-generation women have a somewhat higher mean age than third-generation women in Alberta. Consistent with the expectations, second-generation women have higher age at first marriage, and higher rate of post-secondary education than do third-generation women. They also have longer employment duration than third-generation women at the time of first birth. However, they have shorter employment duration than third-generation women at the time of second and third births. Overall, second-generation women have better perceived financial conditions at the time of each birth than do third-generation women in Alberta (Tables 5-1 and 5-2). The comparisons between these sample characteristics of second- and third-generation

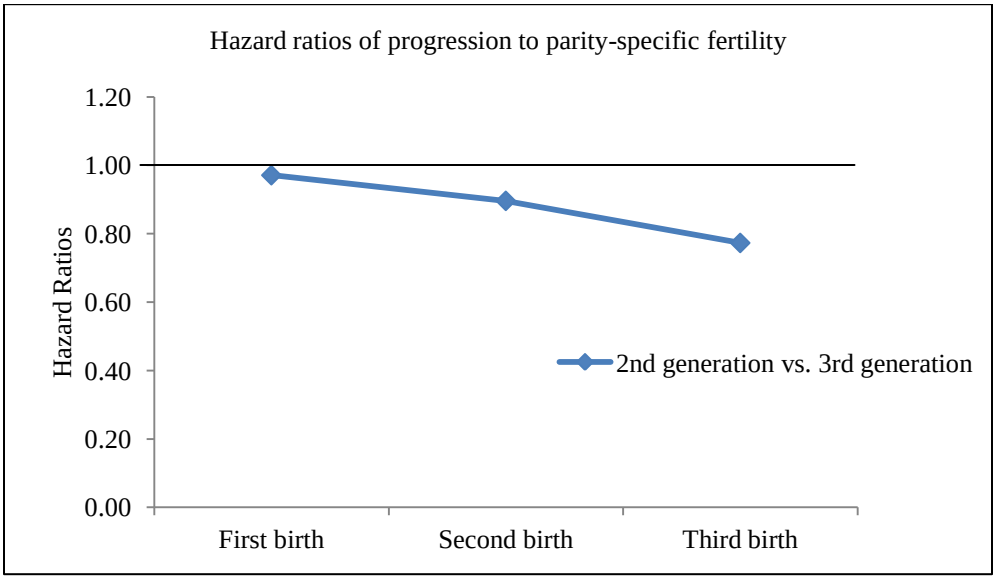
women hold for Canada as well, when examined in light of the 2006 GSS (Table 5-31).

5.14 Transition to Parity-specific Fertility

There is no substantial difference in time to first, second, and third births (in years) between second-generation women and third-generation women in Alberta with one exception: time to first birth (Table 5-1). The average time to first birth from age 15 is higher among second-generation women (12.28 years) than among third-generation women (11.35 years). KM survival estimates show that the difference in time to first birth is statistically significant. However, there is no significant difference in KM survival estimates for time to second and third births between second-generation women and third-generation women in Alberta (Appendices 5-21 to 5-23).

Table 5-27 presents the Cox regression estimates of transition to first, second, and third births between second-generation women and third-generation women in Alberta. I find that there is no significant difference in the hazards of having first, second, and third births between them when the sociodemographic characteristics of age, age at first marriage, education, employment duration, and self-perceived financial condition are taken into account in the analysis. The hazard ratios of progression to parity-specific fertility between second-generation women and third-generation women are presented in Figure 5-7 below.

Figure 5-7. Hazard ratios of progression to parity-specific fertility for second-generation women compared to third-generation women in Alberta[20]



Consistent with the findings based on the 2010 Alberta Fertility Survey, the Cox regression estimates show that there is no significant difference in the hazards of having first, second, and third births between second-generation women and third-generation women in Canada, based on the 2006 GSS (Table 5-57).

5.15 Cumulative Fertility

On average, second-generation women have fewer children ever born (1.674) than do third-generation women (1.845) in Alberta (Table 5-1). OLS regression estimates of the effects of second generation status on education, age at

[20] The differences in progression to first, second, and third births between second-generation women and third-generation women are not statistically significant.

first marriage, employment duration, self-perceived financial condition, and fertility are presented in Table 5-28. Using the basic model of cumulative fertility indicates that second-generation women have lower cumulative fertility than third-generation women (Model 5 in Table 5-28). However, the difference is no longer statistically significant when age, age at first marriage, education, employment duration, and self-perceived financial condition are adjusted for (Model 6 in Table 5-28). This result suggests that the differences in cumulative fertility between second-generation women and third-generation women in Alberta are due to differences in their sociodemographic characteristics.

However, the indirect effects of second generation status on cumulative fertility in Alberta mediated through education, age at first marriage, and employment duration are negative (Table 5-29). The findings regarding the direct and indirect effects of second generation status on cumulative fertility in Canada based on the 2006 GSS are also similar to those of the 2010 AFS (Tables 5-58 and 5-59).

It is evident based on both the 2010 AFS and the 2006 GSS that the direct effect of generation status on cumulative fertility is not statistically significant. Therefore, there is no evidence of "socioeconomic insecurity" among second-generation women when sociodemographic covariates are taken into account. However, looking at the direction of indirect effects of second-generation status on cumulative fertility (which are negative) we can see that there is partial

evidence of socioeconomic insecurity among second-generation women in both Alberta and Canada. Application of the decomposition analysis will enable us to measure the contribution of characteristics variables to the differences in cumulative fertility between second-generation women and third-generation women.

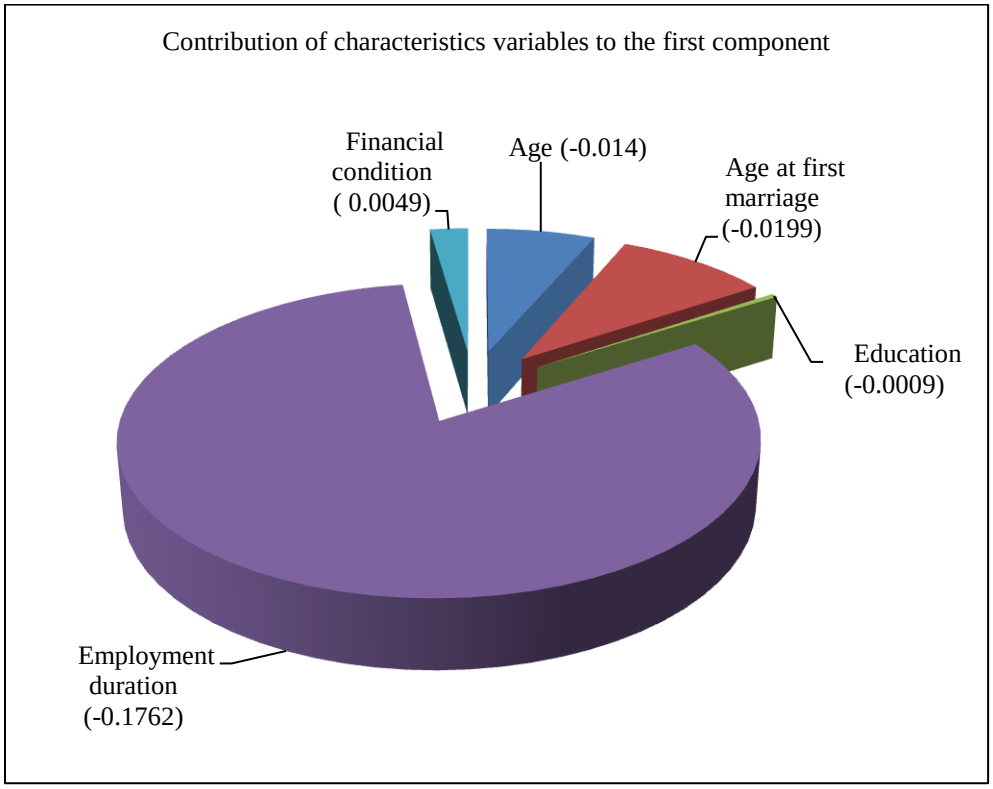
5.16 Decomposition Analysis

The decomposition analysis of cumulative fertility between second-generation women and third-generation women in Alberta is presented in Table 5-30. The observed difference in cumulative fertility (that of second generation minus that of third generation) is -0.1701, which indicates that second-generation women have 0.1701 fewer children than third-generation women. This difference is decomposed into three components. The contribution of difference due to characteristics variable means is -0.2061; the contribution due to differences in slopes is 1.3947; and the contribution due to difference in intercepts is -1.3587.

The first component of the decomposition analysis shows that the largest contribution to the differences in due to characteristics variable means comes from employment duration (-0.1762) followed by age at first marriage (-0.0199), age (-0.0140), and education (-0.0009). However, the difference in mean income reduces the differences in cumulative fertility for second-generation women in Alberta to some extent (0.0049) (Table 5-30). The contribution of difference due to characteristics variable means to observed difference in cumulative fertility

between second-generation women and third-generation women in Alberta is displayed in Figure 5-8 below.

Figure 5-8. Contribution of difference due to characteristics variable means to observed difference in cumulative fertility between second-generation women and third-generation women in Alberta



The second component of the decomposition analysis illustrates that second-generation women in Alberta have lower cumulative fertility due to differences in the slopes of age at first marriage (-0.0013), education (-0.0163), and employment duration (-0.1776). However, these differences are offset by contribution due to differences in the slopes of age (1.5575) and perceived

financial condition (0.0324). Thus, the net effect of differences due to slopes is positive (1.3947) (Table 5-30).

Finally, the third component, contribution due to differences in intercepts, reveals that second-generation women have -1.3587 fewer children than do third-generation women in Alberta (Table 5-30). This implies that second-generation women have lower cumulative fertility because of unobserved factors such as psychological insecurity, which can arise from the state of being caught between two worlds: one of their immigrant parents and the other of the host society (Goldscheider & Uhlenberg, 1969; Trovato, 1981). Goldscheider and Uhlenberg (1969) argued that psychological insecurity would motivate the second generation not only to delay marriage but also to have fewer children.

The decomposition analysis of cumulative fertility between second-generation women and third-generation women in Canada based on the 2006 General Social Survey also illustrates findings similar to that of the 2010 Alberta Fertility Survey (Table 5-60).

Overall, I find that there is no significant difference in progression to parity-specific fertility and cumulative fertility between second-generation women and third-generation women in Alberta and Canada net of the sociodemographic characteristics. However, the decomposition analysis shows that the cumulative fertility of second-generation women is partly depressed due to age at first marriage, education, and employment duration. Therefore, Hypothesis 4 (lower

cumulative fertility due to socioeconomic insecurity) is partly supported. This finding is consistent with previous research conducted by Woldemicael and Beaujot (2012) showing that members of the second generation have lower current fertility (children under 2 in the household) and lower cumulative fertility (total number of children in the household) than do third-generation women. However, when the sociodemographic characteristics of visible minority status, acculturation, maternal age, education, and marital status are taken into account, the differences are no longer statistically significant although the second generation maintains having lower fertility. The authors argue that "a significant part of the fertility variations across the generation groups is explained by other sociodemographic and ethnic/cultural factors" (Woldemicael & Beaujot, 2012: 333).

The next chapter focuses on discussion and conclusion of the findings.

CHAPTER SIX

Discussion and Conclusion

Immigrant fertility is affected by age at immigration as well as a host of sociodemographic factors. To obtain a comprehensive understanding of fertility levels among immigrant generations, we need to examine both the short-term and long-term effects of immigration on fertility. In addition, it is worthwhile to investigate the fertility of at least two generations in order to assess the extent to which immigrants and their second-generation descendants adapt to reproductive norms and values of the host society, or the extent to which sociodemographic conditions in the host society affect their fertility in relation to that of the native-born population.

This study examines the fertility differentials of immigrant generations both in the short term (by looking at parity-specific fertility from the first birth to the third) and over the long term (by examining cumulative fertility). This is achieved through the application of a two-generation approach (i.e., examining fertility of both first-generation immigrant women and second-generation women) utilizing data from the 2010 Alberta Fertility Survey and the 2006 General Social Survey. I examine parity-specific fertility by employing Cox regression estimates, and cumulative fertility by applying OLS regression estimates. In addition, the relative contributions of sociodemographic characteristics to observed differences in cumulative fertility are reported by employing decomposition analysis.

This study arrives at several important findings. First, first-generation immigrant women in general and adult immigrant women in particular have lower progression to first and second births and lower cumulative fertility than third-generation women in Alberta and Canada.[21] These findings support the *disruption hypothesis,* which suggests that immigrant fertility is depressed because of factors associated with migration such as moving to a new country, finding a new home, and getting established socially and economically. The results of this study indicate that first-generation immigrant women have lower fertility than second- or third-generation women because of four factors: (a) first-generation immigrant women have higher educational attainment, which contributes to their lower fertility; (b) immigration leads to higher age at marriage, and higher age at marriage leads to lower fertility for first-generation immigrant women; (c) the poorer perceived financial condition or lower income of first-generation immigrants discourages them from having a larger number of children because they may not be able to invest enough into producing higher quality children; and (d) other factors associated with migration such as the challenges of getting established socially and economically into the host country also depress immigrants' fertility. This last aspect -- couples' desire to establish themselves socially and economically -- motivates them to postpone childbearing, which eventually results in lower fertility because in most cases they cannot recuperate the births lost due to the postponement.

[21] Nearly all of the results are identical for second-generation women except for the progression to second birth in Alberta, which shows no significant difference.

A second important finding is that there is no significant difference in parity-specific fertility and cumulative fertility between child immigrant women and native-born women (in both the second and third generations) in Alberta and Canada.[22] These results provide evidence in support of the *adaptation hypothesis* indicating that the fertility of child immigrant women converges with that of the native-born population because their younger age at immigration facilitates greater socioeconomic and cultural integration into the host society. Woldemicael and Beaujot (2012) argue that "if a woman is exposed to new norms before childbearing begins or early in the childbearing period, she is more likely to adjust her family size goals downward and be least influenced by norms at the place of origin" (p. 338). A preliminary analysis based on the basic model appears to support this claim, suggesting that child immigrant women have lower fertility than native-born population (both second- and third-generation women). However, when sociodemographic characteristics are taken into account, the difference is no longer statistically significant. This implies that it is not the age at immigration but the sociodemographic characteristics that explain the differences in fertility (both parity-specific and cumulative) between child immigrant women and native-born women.

Third, in contrast to expectations, there is no significant difference in progression to first, second, and third births as well as in cumulative fertility between second-generation women and third-generation women in Alberta and

[22] The only exception is for the progression to third birth in Alberta which is, in fact, higher than second- and third-generation women.

Canada net of sociodemographic characteristics. Both the progression to parity-specific fertility and cumulative fertility suggest that there is no evidence of socioeconomic insecurity for second-generation women in Alberta and Canada. A strong economy with better employment opportunities, and a job market with demands for people with skills and high education, in Alberta and Canada might motivate the second generation not to become too concerned about future uncertainties and consequently not to depress their fertility. Another contributing factor to the non-significant difference in progression to parity-specific fertility and cumulative fertility might be the diversity of second-generation women in Canada. After the change in Canadian immigration policy in 1962, an increasing number of immigrants came to Canada from countries that were characterised by high fertility, rather than from European countries, where fertility was already low. Many second-generation descendants of these immigrants from high-fertility countries adopted the reproductive norms and values of their immigrant parents, which essentially leads to convergence of their fertility with that of the third generation.

In this study, I did not find a higher progression to lower-order births among immigrant women – a finding which would have lent support to the *interrelation of events hypothesis.* Although a large number of studies conducted in Europe have found evidence in support of this hypothesis, there is little evidence to support this hypothesis in the context of North America. It might be the case that the distance between origin and destination of immigrants is an

important factor here. Most of the migrations to Europe are shorter than those to North America, and those migrating a shorter distance have a higher propensity of having births because of other events that take place simultaneously with migration such as union formation and reuniting with partners (Andersson, 2004; Milewski, 2010; Schmid & Kohls, 2009).

The *socialization hypothesis* has been used in the literature to examine the fertility behaviour of immigrants in the host society. Its underlying assumption is that immigrants' fertility will remain at the same level in the host country as that of their country of origin. The higher cumulative fertility of first-generation immigrant women in Alberta and Canada due to group effect independent of the first two components of decomposition analysis provides partial support for the *socialization hypothesis.* Nevertheless, it was not possible to test the hypothesis explicitly in this study because it requires conducting an analysis of fertility differentials by immigrants' country of origin as well as their baseline norms and values prior to immigration. Research indicates substantial variations in the socialization of reproductive norms and values across countries (Andersson, 2004). For example, an immigrant from Saudi Arabia and an immigrant from the UK might have different socialization experiences in terms of fertility intentions. Because of the small sample size, it was difficult to conduct a country-specific analysis of immigrant fertility in this study. Therefore, it would be worthwhile to test the *socialization hypothesis* by conducting country-specific analysis of immigrant fertility differentials in future research.

In this study, I could not test the *selection hypothesis* for first-generation immigrant women in Alberta and Canada because of a lack of required information on immigrants' country of origin. The selection hypothesis assumes that immigrants' fertility would be similar to that of the native-born population in the host society because immigrants are a select group, and are therefore different from the rest of the population in the place of origin in terms of education, employment, and fertility intention. However, it should be noted that in order to test the selection hypothesis rigorously, "one would need to compare immigrant characteristics at the time of migration (before being exposed to the destination) with those of the non-migrating population" (Kahn, 1988:113). None of the 2010 AFS and the 2006 GSS contains the required information based on respondents' country of origin.

Are there substantial differences in the outcomes between the two surveys used in this study? The findings with respect to progression to parity-specific fertility and cumulative fertility based on the 2010 Alberta Fertility Survey and the 2006 General Social Survey are identical except for those related to progression to third birth among child immigrant women in Alberta. This suggests that child immigrant women may feel secure about their future financial condition, which motivates them to have higher-order births quickly. It also indicates that they adopt the fertility norms and values of their immigrant parents to a great extent (Adsera & Ferrer, 2013). Overall, the huge consistency in results between the two surveys implies that the findings are robust, and that there are not

many variations in the effect of immigration on fertility between Alberta and Canada as a whole.

Furthermore, I conducted a sensitivity analysis to assess the robustness of Cox regression and OLS regression estimates. This is particularly important for the 2010 Alberta Fertility Survey, in which the non-response rate is relatively higher than that of the 2006 General Social Survey. I checked results of both the datasets with and without imputed values for missing data. In both cases, the results were identical. This suggests that the missing data are completely at random (MCAR), and that the results are therefore not biased due to multiple imputation of missing values. Another way of conducting sensitivity analysis is to apply a different analytical approach to examining the same research questions (Miller, 2005). I applied Weibull regression estimates to investigate the progression to parity-specific fertility and Poisson regression estimates to examine the cumulative fertility of immigrant generations in Alberta and Canada. In all cases, I found results similar to those of Cox regression estimates for progression to parity-specific fertility and OLS regression estimates for cumulative fertility. A summary of the sensitivity analysis is presented in Appendix 6-1.

Finally, using sampling weights may at times either inflate or deflate the sample size, which can lead to biased estimates; one might, for example, overestimate or underestimate the effect of independent variables on the dependent variable of interest (Singer & Willet, 2003). In this study, I used

normalized weights to avoid the problem of overestimating or underestimating while correctly representing the population from which the samples were drawn. Applying the normalized weights, I found that the sample size used to calculate the standard errors for statistical tests is equivalent to the unweighted number of cases in this study. Therefore, the findings of this study neither underestimate nor overestimate the effect of generation status on immigrants' fertility in Alberta and Canada.

6.1 Policy Implications of the Study

From a practical point of view, this research has a multitude of policy implications. Having a better understanding of the fertility behaviour of immigrants allows us to better estimate the potential impact of immigration on population growth. Belanger and Gilbert (2002) argue that "from a purely demographic standpoint, a better knowledge of different groups' fertility behaviour can also be used to develop scenarios for the future course of fertility in laying the groundwork for population projections" (p. 128). In addition, clear insights into immigrant fertility behaviour also help the government and other agencies to determine the levels of immigration that are required to maintain population growth in the long term and to slow the trends of population aging. Furthermore, the findings of this study contribute to reliable forecasting of future population levels, which can facilitate efficient management of government services and programs such as healthcare, education, and transport.

Low fertility has a wide range of social, demographic, and economic consequences (Billari & Kohler, 2004; Caldwell, Caldwell, & McDonald, 2002). Canada is one of the developed countries with a below-replacement level of fertility, and immigration is the major contributor to its population growth (Trovato, 2010). Canada urgently needs to adopt policies aimed at raising fertility to avoid the long-term consequences of low fertility on its economy and society. Therefore, the fact that there is lower fertility among married immigrant women in Alberta and Canada should generate particular interest among policymakers in devising strategies to assist immigrants in having more children. This study may help policy makers to select the target groups for intervention programs designed to raise fertility in Canada.

6.2 Limitations of the Study

Earlier research shows that historically there are substantial variations in the pattern of assimilation across different groups of immigrants based on their country/region of origin (Bean, Swicegood, & Berg, 2000). Therefore, it is important to extend the analysis of immigrant fertility disaggregated by immigrants' country/region of origin. However, because of the smaller sample size in each sub-group, it was not possible to carry out such analysis using the 2010 Alberta Fertility Survey. The 2006 GSS has a relatively large sample size, but the dataset does not contain information on respondents' country of birth. The dataset only provides information on whether the respondents were born within or

outside of Canada. Therefore, it was not possible to examine immigrant fertility based on their country/region of origin.

Another limitation of this research is that the period of immigration was not included in the analysis due to the limited sample size. In their study, Mussino and Raalte (2012) noticed substantial variations in transition to first birth by period of immigration among immigrant women in Italy and Russia. Therefore, future research should also focus on the transition to parity-specific fertility and cumulative fertility by period of immigration. This is particularly important because some immigrants might experience economic recession at the time of their migration, while others might not. Thus, a separate analysis by period of immigration would help to explore the extent to which fertility differs according to these periods.

The analysis of this study is restricted to respondents who are married; those who are in a non-marital cohabiting union are therefore excluded from the analysis. There have been profound changes in the union formation in recent years, and cohabitation has become a norm of union formation along with marriage (Perelli-Harris et al., 2010; Surkyn & Lesthaeghe, 2004; Sobotka, 2008; Wu, 2000). Therefore, any study on fertility should include both categories of union formation (i.e., married and in cohabitation). However, because of the small sample of respondents who were in cohabitation in the 2010 AFS and the 2006

GSS, I could not carry out separate analyses for respondents who were in cohabitation and those who were never married.

In addition to non-marital cohabiting union, never married/single women were excluded from the analysis. Although there is an increasing trend of having children out of wedlock in recent years, the propensity of this trend is much lower among immigrants than the Canadian born because of their divergent attitudes towards marriage and reproductive norms and values. Therefore, including never married/single women might exaggerate the disruption effects of migration on the fertility of immigrants.

Return migrants (those who migrated to Canada and then left after a few years) were also not included in the analysis because neither of the two datasets contains information on them. Therefore, the findings of this study are not generalizable to these sub-groups of immigrants. This raises the question of the extent to which return migrants are different in terms of fertility behaviour than those who stay. However, because of scarce evidence on this aspect in previous research it is difficult to speculate about their fertility behaviour. It is worthwhile to focus on the fertility behaviour of return migrants in future research.

Despite these limitations, this study makes an original contribution to the literature on immigrant fertility differentials in Alberta and Canada by applying existing theories as well as generating new explanations of the differential fertility

patterns among immigrants. The application of a two-generational approach in this study provides better insight into the extent to which fertility norms and values of the first-generation immigrants are transferred to the second generation. A separate analysis based on age at immigration also reinforces the idea that there are substantial variations in fertility within immigrants, and that any population projection should therefore take into account the fertility rates among immigrant sub-groups. Finally, the application of decomposition analysis clearly shows that immigrant fertility is disrupted due to differences in sociodemographic characteristics between immigrants and the native-born population. Therefore, proper initiatives should be taken to encourage immigrants in Canada not to postpone union formation and thus have more children in order to reduce the effects of low fertility. Facilitating quicker integration of immigrants into the mainstream society in terms of occupational and income attainment will exert a positive impact on other determinants of fertility (e.g., age at first marriage), which should contribute to achieving the desired rate of fertility in Canada.

6.3 Recommendations for Future Research

There are some important areas related to immigrant fertility differentials that are worthwhile to investigate in future research. Most of the earlier research has examined immigrants' assimilation either in terms of socioeconomic attainment or of fertility behaviour in the host society. However, limited attention has been given to the impact of cultural integration on the fertility differentials of immigrants in the host country. In their study, Woldemicael and Beaujot (2012)

examined the impact of integration (measured in terms of marginalization, separation, assimilation, and integration) on the fertility of immigrant generations. They found that a lower level of integration (marginalization and separation) is associated with a smaller number of children. Therefore, extending the analysis of this dissertation by including integration-related variables in order to examine parity-specific fertility by generation status would better enable us to understand the causal mechanisms of immigrant fertility differentials.

Another potential extension of this research would be to examine fertility differentials among members of the second generation across their ethnic origin. Because of changes in Canadian immigration policies since 1962 (facilitating entry of immigrants to Canada irrespective of their race, religion, and national origin), the range of source countries of immigrants to Canada has expanded such that in the 2011 National Household Survey, members of the immigrant population reported close to 200 countries as their places of birth (Statistics Canada, 2013a). Thus, the ethnic origins of second-generation descendants in Canada have become so diversified that it is not possible to get a comprehensive understanding of their fertility dynamics without conducting a separate analysis based on ethnic origins. Earlier research in Canada has documented significant ethnic variations in fertility due to their differences in attitude towards reproductive norms and values, use of contraception, and abortion (Beaujot, 1975; Chui & Trovato, 1990; Woldemicael & Beaujot, 2012). Therefore, future research should focus on this aspect of fertility differentials among the second generation.

Prior research shows that there are significant variations in fertility between recent immigrants and long-term immigrants (Ford, 1990; Ng & Nault, 1997; Stephen & Bean, 1992). Studying the fertility of recent immigrant women would provide better insights into the disruption effects of migration on fertility, while examining fertility of long-term immigrant women would help us to understand the extent to which immigrants adopt the fertility behaviour of the host society. Therefore, in future research separate analysis should be conducted based on immigrants' duration of residence in Canada.

There are several limitations of conducting research using cross-sectional data due to lack of complete information on respondents over time. Therefore, an ideal research design to investigate immigrant fertility would be to collect longitudinal data on immigrants. Such longitudinal study design should include a wide range of information on immigrants because of the multi-dimensional nature of immigrant fertility such as social, economic, biological, and cultural factors. Collecting data in several waves on immigrants would also facilitate investigating cohorts of immigrants from the time they arrive to Canada to some long time after. Thus, it is possible to examine how immigrants change culturally, structurally, and in their fertility.

Finally, we need a larger sample of women that have completed their childbearing years to examine the impact of migration on fertility of immigrants (i.e., age 49+). This will provide better estimates of the extent to which immigrant

fertility is disrupted due to migration and the extent to which they adopt fertility norms and values of the host society. One limitation of including younger age groups in the analysis is that they did not complete their childbearing and may still have further potential of having children. As a result, including them in the analysis might exaggerate the disruption effect of immigration on their fertility.

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Tables

Table 3-1. Specification of hypotheses in relation to theories pertaining to fertility of first generation immigrants in the context of OLS regression analysis

Generation status (Third generation as reference)	Effects of generation status on fertility	Expected results regarding cumulative fertility	Theory supported given the predicted results
First-generation immigrant women	Direct effect	Lower	Disruption
	Effects via:		
	• Education	Lower	Disruption
	• Age at first marriage	Lower	Disruption
	• Employment	Lower	Disruption
	• Income	Lower	Disruption
	• Education * age at first marriage	Lower	Disruption
	• Education * employment	Lower	Disruption
	• Education * income	Lower	Disruption
	• Employment * income	Lower	Disruption
Child immigrant women	Direct effect	No significant difference	Adaptation
	Effects via:		
	• Education	No significant difference	Adaptation
	• Age at first marriage	No significant difference	Adaptation
	• Employment	No significant difference	Adaptation
	• Income	No significant difference	Adaptation
	• Education * age at first marriage	No significant difference	Adaptation
	• Education * employment	No significant difference	Adaptation
	• Education * income	No significant difference	Adaptation
	• Employment * income	No significant difference	Adaptation
Adult immigrant women	Direct effect	Lower	Disruption
	Effects via:		
	• Education	Lower	Disruption
	• Age at first marriage	Lower	Disruption
	• Employment	Lower	Disruption

	• Income	Lower	Disruption
	• Education * age at first marriage	Lower	Disruption
	• Education * employment	Lower	Disruption
	• Education * income	Lower	Disruption
	• Employment * income	Lower	Disruption

Notes: (1) It should be mentioned that an indirect effect in path analysis is not entirely identical to an interaction effect in OLS regression. However, there is a close similarity between them, since indirect effects in path analysis are calculated by multiplying coefficients together.

(2) This specification of theories also applies in relation to second-generation women.

Table 3-2. Specification of hypotheses in relation to theories pertaining to fertility of second-generation women in the context of OLS regression analysis

Generation status (Third generation as reference)	Effects of generation status on fertility	Expected results regarding cumulative fertility	Theory supported given the predicted results
Second- generation women	Direct effect	Lower	Socioeconomic insecurity
	Effects via:		
	• Education	Lower	Socioeconomic insecurity
	• Age at first marriage	Lower	Socioeconomic insecurity
	• Employment	Lower	Socioeconomic insecurity
	• Income	Lower	Socioeconomic insecurity
	• Education * age at first marriage	Lower	Socioeconomic insecurity
	• Education * employment	Lower	Socioeconomic insecurity
	• Education * income	Lower	Socioeconomic insecurity
	• Employment * income	Lower	Socioeconomic insecurity

Note: Alternatively, if there is no significant difference in cumulative fertility between second-generation women and third-generation women, the results will support the adaptation theory.

Table 3-3. Specification of hypotheses in relation to theories pertaining to fertility of first-generation women in the context of Cox regression analysis

Generation status (Third generation as reference)	Direct effect of generation status controlling for all covariates	Expected results regarding transition to parity-specific fertility	Theory supported given the results
First-generation immigrant women	Time to first birth from age 15	Lower hazard	Disruption
	Time to second birth from the first	Lower hazard	Disruption
	Time to third birth from the second	Lower hazard	Disruption
Child immigrant women	Time to first birth from age 15	No significant difference	Adaptation
	Time to second birth from the first	No significant difference	Adaptation
	Time to third birth from the second	No significant difference	Adaptation
Adult immigrant women	Time to first birth from age 15	Lower hazard	Disruption
	Time to second birth from the first	Lower hazard	Disruption
	Time to third birth from the second	Lower hazard	Disruption

Note: This specification of theories also applies in relation to second-generation women.

Table 3-4. Specification of hypotheses in relation to theories pertaining to fertility of second-generation women in the context of Cox regression analysis

Generation status (Third generation as reference)	Direct effect of generation status controlling for all covariates	Expected results regarding transition to parity-specific fertility	Theory supported given the results
Second-generation women	Time to first birth from age 15	Lower hazard	Socioeconomic insecurity
	Time to second birth from the first	Lower hazard	Socioeconomic insecurity
	Time to third birth from the second	Lower hazard	Socioeconomic insecurity

Note: Alternatively, if there is no significant difference in cumulative fertility between second-generation women and third-generation women, the results will support the adaptation theory.

Table 5-1. Sample characteristics: First-generation immigrant women, second-generation women, and third-generation women in Alberta

	First-generation immigrant women		Second-generation women		Third-generation women	
Variables	N (%)	Mean (Std. Dev.)	N (%)	Mean (Std. Dev.)	N (%)	Mean (Std. Dev.)
Parity-specific fertility (in years)						
Time to first birth from age 15	111 (77.62)	12.505 (5.244)	111 (75.51)	12.275 (5.329)	446 (85.77)	11.348 (5.212)
Time to second birth from first	76 (68.47)	3.565 (2.656)	88 (79.28)	3.074 (1.731)	345 (77.35)	3.075 (2.094)
Time to third birth from second	28 (36.84)	3.462 (2.230)	42 (47.73)	3.242 (2.235)	125 (36.23)	3.288 (2.345)
Number of children ever born	143 (100.00)	1.465 (1.259)	147 (100.00)	1.674 (1.354)	520 (100.00)	1.845 (1.203)
Age	143 (100.00)	35.402 (8.282)	147 (100.00)	36.875 (8.209)	520 (100.00)	36.463 (7.711)
Age at first marriage (in years)	143 (100.00)	27.765 (5.766)	147 (100.00)	27.072 (5.822)	520 (100.00)	26.013 (5.467)
Education						
Less than post-secondary	20 (13.99)		24 (16.33)		103 (19.81)	
Post-secondary	123 (86.01)		123 (83.67)		417 (80.19)	
Employment duration						
First birth (in years)	111 (77.62)	7.568 (4.857)	111 (75.51)	8.464 (5.218)	446 (85.77)	6.976 (4.917)
Second births (in years)	76 (68.47)	2.383 (2.619)	88 (79.28)	2.096 (1.778)	345 (77.35)	2.119 (2.041)
Third births (in years)	28 (36.84)	2.356 (2.221)	42 (47.73)	2.124 (2.285)	125 (36.23)	2.231 (2.146)
Perceived financial condition during first birth						
Poor	20 (18.02)		19 (17.12)		57 (12.78))	
Fair	28 (25.23)		26 (23.42)		112 (25.11)	
Good	44 (39.64)		42 (37.84)		188 (42.15)	
Very good	19 (17.12)		24 (21.62)		89 (19.96)	
Perceived financial condition during 2nd birth						
Poor	12 (15.79)		5 (5.68)		23 (6.67)	
Fair	18 (23.68)		21 (23.86)		67 (19.42)	
Good	35 (46.05)		38 (43.18)		169 (48.99)	
Very good	11 (14.47)		24 (27.27)		86 (24.93)	
Perceived financial condition during third birth						
Poor	4 (14.29)		4 (9.52)		10 (8.00)	
Fair	6 (21.43)		5 (11.90)		18 (14.40)	
Good	13 (46.43)		18 (42.86)		63 (50.40)	
Very good	5 (17.86)		15 (35.71)		34 (27.20)	
N	143 (100.00)		147 (100.00)		520 (100.00)	

Source: The 2010 Alberta Fertility Survey

Table 5-2. Sample characteristics: Child immigrant women and adult immigrant women in Alberta

Variables	First-generation immigrant women					
	Child immigrant women			Adult immigrant women		
	N	(%)	Mean (Std. Dev.)	N	(%)	Mean (Std. Dev.)
Parity-specific fertility (in years)						
Time to first birth from age 15	28	(68.69)	11.601 (5.922)	83	(81.37)	12.826 (4.983)
Time to second birth from first	20	(71.43)	2.676 (1.310)	56	(67.37)	3.895 (2.949)
Time to third birth from second	12	(60.00)	2.354 (1.123)	16	(28.57)	4.411 (2.522)
Number of children ever born	41	(100.00)	1.317 (1.501)	102	(100.00)	1.542 (1.119)
Age	41	(100.00)	31.438 (9.931)	102	(100.00)	37.429 (6.500)
Age at first marriage (in years)	41	(100.00)	27.956 (6.932)	102	(100.00)	27.677 (5.113)
Education						
Less than post-secondary	6	(14.63)		14	(13.73)	
Post-secondary	35	(85.37)		88	(86.27)	
Employment duration						
First birth (in years)	28	(68.69)	6.977 (5.349)	83	(81.37)	7.067 (4.602)
Second births (in years)	20	(71.43)	1.769 (1.454)	56	(67.37)	2.610 (2.915)
Third births (in years)	12	(60.00)	1.352 (1.139)	16	(28.57)	3.217 (2.573)
Perceived financial condition during first birth						
Poor	5	(17.86)		15	(18.07)	
Fair	9	(32.14)		19	(22.89)	
Good	8	(28.57)		36	(43.37)	
Very good	6	(21.43)		13	(15.66)	
Perceived financial condition during 2nd birth						
Poor	5	(25.00)		12	(15.79)	
Fair	5	(25.00)		18	(23.68)	
Good	7	(35.00)		35	(46.05)	
Very good	3	(15.00)		11	(14.47)	
Perceived financial condition during third birth						
Poor	3	(25.00)		4	(14.29)	
Fair	2	(16.67)		6	(21.43)	
Good	6	(50.00)		13	(46.43)	
Very good	1	(8.33)		5	(17.86)	
N	41	(100.00)		102	(100.00)	

Source: The 2010 Alberta Fertility Survey

Table 5-3. Cox regression estimates of parity-specific fertility between first-generation immigrant women and third-generation women in Alberta

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
First generation	0.539 (-4.13)***	0.662 (-2.40)**	1.183 (0.76)
Third generation (ref)			
Age	0.791 (-3.38)***	1.068 (0.64)	0.968 (-2.16)**
Age squared	1.003 (3.31)***	0.999 (-0.52)	1.002 (2.40)**
Age at first marriage	0.918 (-.16)***	0.935 (-2.19)**	0.971 (-2.47)**
Education			
Less than post-secondary	1.801 (3.89)***	0.859 (-2.92)***	1.382 (1.45)
Post-secondary (ref)			
Employment duration	0.841 (-13.02)***	0.536 (-11.85)***	0.281 (-15.32)***
Perceived financial condition at time of birth	0.867 (-2.46)**	1.107 (1.27)	1.037 (0.35)
Subjects	663	557	420
Failures	557	421	153
F (df)	41.31***(7, 656)	26.52***(7, 550)	35.45***(7, 413)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-4. Cox regression estimates of parity-specific fertility between first-generation immigrant women and second-generation women in Alberta

	Cox regression models (Hazard Ratios)		
Variables	First birth	Second birth	Third birth
Generation status			
First generation	0.544 (-3.57)***	0.749 (-1.50)	1.589 (1.75)
Second generation (ref)			
Age	1.056 (0.44)	1.029 (0.17)	0.619 (-2.79)**
Age squared	0.999 (-0.29)	0.999 (-0.12)	1.002 (2.02)**
Age at first marriage	0.886 (-5.11)***	0.965 (-2.38)**	1.019 (1.03)
Education			
Less than post-secondary	1.699 (2.16)**	1.132 (0.61)	1.254 (0.86)
Post-secondary (ref)			
Employment duration	0.848 (-11.28)***	0.553 (-10.37)***	0.256 (-6.61)***
Perceived financial condition at time of birth	0.771 (-3.16)***	0.929 (-0.71)	1.082 (0.41)
Subjects	290	219	162
Failures	220	162	70
F (df)	25.43*** (7, 283)	20.41*** (7, 212)	8.22*** (7, 157)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
* *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-5. Ordinary Least Squares (OLS) estimates of the effect of migration on number of children among first-generation immigrant women and third-generation women in Alberta

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment duration	Model 4 Financial condition	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
First generation	-0.086 (-2.34)*	1.721 (2.91)**	-1.819 (-3.24)**	-0.095 (-1.11)	-0.379 (-2.93)**	-0.335 (-3.23)**
Third generation (ref)						
Age	-0.047 (-2.01)*	0.082 (0.22)				0.298 (6.50)**
Age squared	0.001 (2.11)*	0.011 (0.23)				-0.003 (-5.18)**
Age at first marriage						-0.027 (-3.12)**
Education						
Less than post-secondary		-2.432 (-4.40)**	-2.581 (-4.81)**	0.367 (3.72)**		0.213 (1.76)
Post-secondary (ref)						
Employment duration				-0.041 (-7.40)**		-0.075 (-10.84)**
Perceived financial condition						0.116 (2.48)*
Constant	1.021 (2.37)*	21.913 (3.39)**	8.567 (28.66)**	1.525 (22.32)**	1.844 (33.79)**	-3.310 (-3.90)**
R squared	0.017	0.101	0.042	0.111	0.016	0.325
F (df)	3.27* (3, 660)	18.05**(4, 659)	14.33**(2, 261)	27.72**(3, 660)	8.61** (1, 662)	43.65**(7, 656)
N	663	663	663	663	663	663

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-6. OLS regression estimates of the direct and indirect effects of selected variables on fertility among first-generation immigrant women and third-generation women in Alberta

Variables	Direct effects	Indirect effects
Generation status		
First-generation immigrant women	-0.3350	
Third-generation women (ref)		
Age	0.2980	
Age squared	-0.0030	
Age at first marriage	-0.0270	
Education		
Less than post-secondary	0.2130	
Post-secondary (ref)		
Employment duration	-0.0750	
Perceived financial condition	0.1160	
Generation status via education		-0.0183
Generation status via age at first marriage		-0.0465
Generation status via employment		0.1364
Generation status via financial condition		-0.0110
Generation status via education via employment		-0.0166
Generation status via education via perceived financial condition		-0.0037
Generation status via education via age at marriage		-0.0056
Generation status via employment via perceived financial condition		0.0087

Source: The 2010 Alberta Fertility Survey

Table 5-7. OLS regression estimates of the effect of migration on number of children among first-generation immigrant women and second-generation women in Alberta

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment duration	Model 4 Perceived financial condition	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
First generation	-0.038 (-0.81)	0.812 (1.20)	-3.347 (-4.90)**	0.197 (1.70)	-0.209 (-1.24)	-0.304 (-2.27)**
Second generation (ref)						
Age	-0.014 (-0.58)	-1.210 (-2.76)**				0.349 (5.72)**
Age squared	0.001 (0.61)	0.018 (3.01)**				-0.003 (-4.36)
Age at first marriage						-0.031 (-2.34)*
Education						
Less than post-secondary		-1.445 (-1.36)	-1.755 (-1.91)	-0.166 (-0.95)		0.269 (1.37)
Post-secondary (ref)						
Employment duration				0.037 (4.21)**		-0.077 (-7.76)**
Perceived financial condition						-0.151 (-2.38)*
Constant	0.406 (0.91)	45.395 (5.96)**	9.982 (19.40)**	1.367 (10.15)**	1.674(13.80)**	-4.001 (-3.42)**
R squared	0.005	0.077	0.084	0.065	0.006	0.411
F (df)	0.38 (3, 287)	3.90**(4, 286)	12.50**(2, 288)	6.52**(3, 287)	1.53 (1, 289)	38.22**(7, 283)
N	290	290	290	290	290	290

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-8. OLS regression estimates of the direct and indirect effects of selected variables on fertility among first-generation immigrant women and second-generation women in Alberta

Variables	Direct effects	Indirect effects
Generation status		
First-generation immigrant women	-0.3040	
Second-generation women (ref)		
Age	0.3490	
Age squared	-0.0030	
Age at first marriage	-0.0310	
Education		
Less than post-secondary	0.2690	
Post-secondary (ref)		
Employment duration	-0.0770	
Perceived financial condition	-0.1510	
Generation status via education		-0.0102
Generation status via age at first marriage		-0.0252
Generation status via employment		0.2577
Generation status via financial condition		-0.0297
Generation status via education via employment		-0.0051
Generation status via education via perceived financial condition		-0.0010
Generation status via education via age at marriage		-0.0017
Generation status via employment via perceived financial condition		0.0187

Source: The 2010 Alberta Fertility Survey

Table 5-9. Decomposition of the differences in cumulative fertility between first-generation immigrant women and third-generation women in Alberta

Cumulative fertility	Coefficient	z
Differential		
First generation	1.4659	17.35***
Third generation	1.8446	40.42***
Difference	-0.3786	-3.94***
Differences in means		
Age	-0.1597	-3.82***
Age squared	0.0739	2.07**
Age at first marriage	-0.0911	-3.02***
Education	-0.0530	-1.89*
Employment duration	0.0908	3.70***
Perceived financial condition	-0.0075	-1.34
Total	-0.1466	-2.84***
Differences in slopes		
Age	-0.4847	-0.51
Age squared	0.2972	0.49
Age at first marriage	-0.4865	-1.62
Education	0.1125	1.40
Employment duration	0.2142	1.55
Perceived financial condition	0.0213	0.15
Total	-0.3260	-1.89*
Difference in intercepts	0.0940	0.17
Total difference (means + slopes + intercepts)	[(-0.1466) + (-0.3260) + (0.0940)] = -0.3786	

*p <0.10, * *p <0.05, ** *p <0.01

Source: The 2010 Alberta Fertility Survey

Table 5-10. Decomposition of the differences in cumulative fertility between first-generation immigrant women and second-generation women in Alberta

Cumulative fertility	Coefficient	z
Differential		
First generation	1.4659	17.58***
Second generation	1.6745	19.94***
Difference	-0.2086	-1.76*
Differences in means		
Age	-0.2356	-4.22***
Age squared	0.1463	2.33**
Age at first marriage	-0.0356	-3.02***
Education	-0.0252	-1.86*
Employment duration	0.1835	3.73***
Perceived financial condition	-0.0130	-1.79*
Total	0.0203	0.37
Differences in slopes		
Age	-3.1877	-2.53**
Age squared	1.5592	1.93*
Age at first marriage	-0.4675	-1.31
Education	0.1084	1.48
Employment duration	0.4911	2.41**
Perceived financial condition	-0.1337	-0.61
Total	-1.6302	
Difference in intercepts	1.4013	-1.63
Total difference (means + slopes + intercepts)	[(0.0203) + (-1.6302) + (1.4013) = -0.2086	

*p <0.10, * *p <0.05, ** *p <0.01; Source: The 2010 Alberta Fertility Survey

Table 5-11. Cox regression estimates of parity-specific fertility between child immigrant women and third generation women in Alberta

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Child immigrants	0.976 (-0.13)	1.106 (0.52)	1.828 (1.76)*
Third generation (ref)			
Age	0.786 (-3.28)***	1.149 (1.23)	0.926 (-2.13)**
Age squared	1.003 (3.23)***	0.998 (-1.15)	1.003 (2.15)**
Age at first marriage	0.931 (-4.89)***	0.946 (-2.17)**	0.954 (-2.30)**
Education			
Less than post-secondary	1.749 (3.45)***	0.817 (-2.02)**	1.530 (1.65)
Post-secondary (ref)			
Employment duration	0.826 (-11.32)***	0.496 (-9.03)***	0.283 (-14.10)***
Perceived financial condition at time of birth	0.836 (-2.80)***	1.155 (1.69)*	1.086 (0.68)
Subjects	561	469	361
Failures	474	362	137
F (df)	31.33***(7, 554)	18.12***(7, 462)	30.97***(7, 354)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-12. Cox regression estimates of parity-specific fertility between child immigrant women and second generation women in Alberta

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Child immigrants	1.095 (0.40)	1.265 (1.07)	2.293 (3.10)***
Second generation (ref)			
Age	1.165 (1.00)	1.348 (1.63)	0.697 (-1.55)
Age squared	0.998 (-0.89)	0.996 (-1.61)	1.005 (1.66)
Age at first marriage	0.924 (-3.24)***	0.964 (-3.08)***	1.032 (1.80)*
Education			
Less than post-secondary	1.737 (2.31)**	1.158 (0.60)	1.470 (1.18)
Post-secondary (ref)			
Employment duration	0.783 (-11.81)***	0.441 (-7.32)***	0.229 (-5.47)***
Perceived financial condition at time of birth	0.618 (-4.24)***	0.855 (-2.37)**	1.474 (2.00)**
Subjects	188	138	108
Failures	139	108	54
F (df)	25.15***(7, 181)	13.44***(7, 131)	7.35***(7, 101)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-13. OLS regression estimates of the effect of migration on number of children among child immigrant women and third-generation women in Alberta

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment duration	Model 4 Perceived financial condition	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Child immigrants	-0.124 (-1.81)*	2.525 (1.99)*	-1.216 (-1.10)	-0.066 (-0.42)	-0.528 (-2.02)*	-0.010 (-0.06)
Third generation (ref)						
Age	-0.054 (-2.05)*	0.121 (0.34)				0.331 (6.36)**
Age squared	-0.054 (-2.05)**	0.006 (0.13)				-0.004 (-5.19)**
Age at first marriage						-0.026 (-2.70)**
Education						
Less than post-secondary		-2.803 (-4.94)**	-2.769 (-5.01)**	0.372 (3.57)**		0.176 (1.37)
Post-secondary (ref)						
Employment duration				-0.045 (-7.46)**		-0.082 (-10.79)**
Perceived financial condition						0.111 (2.19)*
Constant	1.140 (2.39)*	21.29 (3.39)**	8.608**(28.47)	1.559** (21.44)	1.845 (33.78)**	-3.896 (-4.09)**
R squared	0.015	0.107	0.037	0.131	0.014	0.342
F (df)	2.05**(3, 558)	15.06**(4, 557)	12.88**(2, 559)	28.98**(3, 558)	4.09** (1, 560)	39.27**(7, 554)
N	561	561	561	561	561	561

Notes:
t –statistics in parentheses
*p <0.05, **p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-14. OLS regression estimates of the direct and indirect effects of selected variables on fertility among child immigrant women and third-generation women in Alberta

Variables	Direct effects	Indirect effects
Generation status		
Child immigrant women	-0.0100	
Third-generation women (ref)		
Age	0.3310	
Age squared	-0.0040	
Age at first marriage	-0.0260	
Education		
Less than post-secondary	0.1760	
Post-secondary (ref)		
Employment duration	-0.0820	
Perceived financial condition	0.1110	
Generation status via education		-0.0218
Generation status via age at first marriage		-0.0657
Generation status via employment		0.0997
Generation status via financial condition		-0.0073
Generation status via education via employment		-0.0282
Generation status via education via perceived financial condition		-0.0051
Generation status via education via age at marriage		-0.0090
Generation status via employment via perceived financial condition		0.0061

Source: The 2010 Alberta Fertility Survey

Table 5-15. OLS regression estimates of the effect of migration on number of children among child immigrant women and second-generation women in Alberta

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment duration	Model 4 Perceived financial condition	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Child immigrants	-0.055 (-0.73)	0.269 (0.22)	-2.472 (-2.35)**	0.172 (0.96)	-0.358 (-1.26)	0.149 (0.77)
Second generation (ref)						
Age	-0.012 (-0.40)	-1.610 (-3.31)**				0.456 (6.46)**
Age squared	0.001 (0.35)	0.024 (3.50)**				-0.005 (-5.10)**
Age at first marriage						-0.023 (-1.57)
Education						
Less than post-secondary		-2.430 (1.99)*	-2.085 (-2.05)**	-0.139 (-0.62)		0.186 (0.83)
Post-secondary (ref)						
Employment duration				0.049 (4.56)**		-0.099 (-8.48)**
Perceived financial condition						-0.155 (-2.11)**
Constant	0.409 (0.77)	52.544(6.20)**	4.67 (2, 186)**	1.243 (8.02)**	1.674 (13.78)**	-6.031 (-4.43)**
R squared	0.005	0.115	0.051	0.107	0.012	0.513
F (df)	0.19 (3, 185)	4.27**(4, 184)	4.67**(2, 186)	7.97**(3, 185)	1.60 (1, 187)	37.02**(7, 181)
N	188	188	188	188	188	188

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-16. OLS regression estimates of the direct and indirect effects of selected variables on fertility among child immigrant women and second-generation women in Alberta

Variables	Direct effects	Indirect effects
Generation status		
Child immigrant women	0.1490	
Second-generation women (ref)		
Age	0.4560	
Age squared	-0.0050	
Age at first marriage	-0.0230	
Education		
Less than post-secondary	0.1860	
Post-secondary (ref)		
Employment duration	-0.0990	
Perceived financial condition	-0.1550	
Generation status via education		-0.0102
Generation status via age at first marriage		-0.0062
Generation status via employment		0.2447
Generation status via financial condition		-0.0267
Generation status via education via employment		-0.0114
Generation status via education via perceived financial condition		-0.0012
Generation status via education via age at marriage		-0.0031
Generation status via employment via perceived financial condition		0.0188

Source: The 2010 Alberta Fertility Survey

Table 5-17. Decomposition of the differences in cumulative fertility between child immigrant women and third-generation women in Alberta

Cumulative fertility	Coefficient	z
Differential		
Child immigrants	1.3170	8.66***
Third generation	1.8446	40.42***
Difference	-0.5276	-3.32***
Differences in means		
Age	-0.8790	-2.76***
Age squared	0.2867	1.15
Age at first marriage	-0.1162	-1.52
Education	-0.0870	-1.64
Employment duration	0.1092	3.69***
Perceived financial condition	0.0006	0.06
Total	-0.6857	-7.85***
Differences in slopes		
Age	-0.0344	0.03
Age squared	0.3825	0.44
Age at first marriage	-0.6018	-1.23
Education	0.2058	1.40
Employment duration	-0.2152	-0.87
Perceived financial condition	-0.1526	-0.61
Total	-0.4157	1.29
Difference in intercepts	0.5738	0.75
Total difference (means + slopes + intercepts)	[(-0.6857) + (-0.4157) + 0.5738] = -0.5276	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-18. Decomposition of the differences in cumulative fertility between child immigrant women and second-generation women in Alberta

Cumulative fertility	Coefficient	z
Differential		
Child immigrants	1.3170	9.07***
Second generation	1.6745	19.94***
Difference	-0.3575	-2.13**
Differences in means		
Age	-1.0695	-2.76***
Age squared	0.4596	1.37
Age at first marriage	-0.0477	-1.41
Education	-0.0332	-1.27
Employment status	0.2545	3.23***
Perceived financial condition	-0.0092	-1.17
Total	-0.4455	-4.80***
Differences in slopes		
Age	-2.4947	-1.47
Age squared	1.4189	1.23
Age at first marriage	-0.5032	-0.98
Education	0.1468	1.16
Employment duration	0.1075	0.34
Perceived financial condition	-0.2115	-0.63
Total	-1.5326	
Difference in intercepts	1.6242	0.40
Total difference (means + slopes + intercepts)	[(-0.4455) + (-1.5326) + (1.6242)] = -0.3575	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-19. Cox regression estimates of parity-specific fertility between adult immigrant women and third-generation women in Alberta

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Adult immigrants	0.451 (-4.54)***	0.571 (-2.54)**	0.855 (-0.59)
Third generation (ref)			
Age	0.779 (-3.37)***	1.087 (0.77)	0.924 (-2.32)**
Age squared	1.003 (3.28)***	0.999 (-0.65)	1.003 (2.13)**
Age at first marriage	0.924 (-5.43)***	0.936 (-2.29)**	0.964 (-1.71)*
Education			
Less than post-secondary	1.809 (3.83)***	0.860 (-2.91)***	1.350 (1.28)
Post-secondary (ref)			
Employment duration	0.838 (-12.53)***	0.538 (-11.40)***	0.288 (-14.31)***
Perceived financial condition at time of birth	0.869 (-2.40)**	1.125 (1.44)	1.042 (0.37)
Subjects	622	524	397
Failures	529	398	140
F (df)	40.19***(7, 615)	25.26***(7, 517)	31.66***(7, 390)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-20. Cox regression estimates of parity-specific fertility between adult immigrant women vs. second-generation women in Alberta

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Adult immigrants	0.433 (-4.10)***	0.652 (-2.91)***	0.998 (-0.01)
Second generation (ref)			
Age	1.141 (0.87)	1.125 (0.68)	0.958 (-2.11)**
Age squared	0.998 (-0.76)	0.998 (-0.63)	1.002 (2.29)**
Age at first marriage	0.893 (-4.30)***	0.968 (-2.02)**	0.938 (-2.04)**
Education			
Less than post-secondary	1.786 (2.21)**	1.138 (0.67)	1.129 (0.43)
Post-secondary (ref)			
Employment duration	0.841 (-10.57)***	0.566 (-10.03)***	0.302 (-5.50)***
Perceived financial condition at time of birth	0.774 (-2.98)***	0.952 (-0.45)	1.173 (0.77)
Subjects	249	192	144
Failures	192	144	58
F (df)	23.28***(7, 242)	19.84***(7, 185)	6.13**(7, 137)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-21. OLS regression estimates of the effect of migration on number of children among adult immigrant women and third-generation women in Alberta

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment duration	Model 4 Perceived financial condition	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Adult immigrants	-0.066 (-1.68)	1.068 (1.85)	-2.154 (-3.69)**	-0.112	-0.302 (-2.38)*	-0.504 (-4.46)**
Third generation (ref)						
Age	-0.071 (-2.38)*	1.052 (3.68)**				0.307 (5.15)**
Age squared	0.001 (2.48)*	-0.011 (-2.81)**				-0.003 (-4.26)**
Age at first marriage						-0.023 (-2.36)*
Education						
Less than post-secondary		-2.314 (-4.32)**	-2.807 (-5.18)**	0.339 (3.29)**		0.182 (1.50)
Post-secondary (ref)						
Employment duration				-0.039 (-6.79)**		-0.078 (-10.62)**
Perceived financial condition						0.109 (2.26)*
Constant	1.438 (2.63)**	4.112 (0.86)	8.616 (28.66)**	1.520 (21.43)**	1.845 (33.79)**	-3.546 (-3.31)**
R squared	0.023	0.151	0.049	0.102	0.008	0.297
F (df)	3.58**(3, 619)	41.41**(4, 618)	16.63**(2, 620)	22.95**(3, 619)	5.67** (1, 621)	33.40**(7, 615)
N	622	622	622	622	622	622

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-22. OLS regression estimates of the direct and indirect effects of selected variables on fertility among adult immigrant women and third-generation women in Alberta

Variables	Direct effects	Indirect effects
Generation status	-0.5040	
Adult immigrant women		
Third-generation women (ref)		
Age	0.3070	
Age squared	-0.0030	
Age at first marriage	-0.0230	
Education	0.1820	
Less than post-secondary		
Post-secondary (ref)		
Employment duration	-0.0780	
Perceived financial condition	0.1090	
Generation status via education		-0.0120
Generation status via age at first marriage		-0.0246
Generation status via employment		0.1680
Generation status via financial condition		-0.0122
Generation status via education via employment		-0.0145
Generation status via education via perceived financial condition		-0.0024
Generation status via education via age at marriage		-0.0035
Generation status via employment via perceived financial condition		0.0092

Source: The 2010 Alberta Fertility Survey

Table 5-23. OLS regression estimates of the effect of migration on number of children among adult immigrant women and second-generation women in Alberta

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment duration	Model 4 Perceived financial condition	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Adult immigrants	-0.025 (-0.54)	0.519 (0.73)	-3.686 (-5.24)**	0.218 (1.75)	-0.132 (-0.79)	-0.585 (-3.94)**
Second generation (ref)						
Age	-0.043 (-1.01)	-0.088 (-0.13)				0.509 (5.58)**
Age squared	0.001 (1.06)	0.004 (0.44)				-0.006 (-4.68)**
Age at first marriage						-0.026 (-2.70)**
Education						
Less than post-secondary		-1.501 (-1.40)	-2.320 (-2.43)**	-0.047 (-0.24)		0.185 (0.98)
Post-secondary (ref)						
Employment duration				0.033 (3.30)**		-0.083 (-6.89)**
Perceived financial condition						-0.089 (-1.25)
Constant	0.907 (1.15)	24.761(2.05)*	10.082 (19.37)**	1.384 (9.43)**	1.674 (13.79)**	-7.092 (-4.18)**
R squared	0.011	0.095	0.109	0.048	0.003	0.391
F (df)	0.64 (3, 246)	4.62**(4, 245)	14.19**(2, 247)	3.75** (3, 246)	0.63 (1, 248)	29.26**(7, 242)
N	249	249	249	249	249	249

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-24. OLS regression estimates of the direct and indirect effects of selected variables on fertility among adult immigrant women and second-generation women in Alberta

Variables	Direct effects	Indirect effects
Generation status		
Adult immigrant women	-0.5850	
Second-generation women (R)		
Age	0.5090	
Age squared	-0.0060	
Age at first marriage	-0.0260	
Education		
Less than post-secondary	0.1850	
Post-secondary		
Employment duration	-0.0830	
Perceived financial condition	-0.0890	
Generation status via education		-0.0046
Generation status via age at first marriage		-0.0135
Generation status via employment		0.3059
Generation status via financial condition		-0.0194
Generation status via education via employment		-0.0048
Generation status via education via perceived financial condition		-0.0001
Generation status via education via age at marriage		-0.0010
Generation status via employment via perceived financial condition		0.0011

Source: The 2010 Alberta Fertility Survey

Table 5-25. Decomposition of the differences in cumulative fertility between adult immigrant women and third-generation women in Alberta

Cumulative fertility	Coefficient	z
Differential		
Adult immigrants	1.5421	15.62***
Third generation	1.8446	40.42***
Difference	-0.3025	-2.78***
Differences in means		
Age	0.2451	3.31***
Age squared	-0.1005	-2.47***
Age at first marriage	-0.0809	-2.23**
Education	-0.0458	-1.50
Employment duration	0.0820	1.97**
Perceived financial condition	-0.0044	-0.59
Total	0.0954	1.10
Differences in slopes		
Age	1.4201	0.92
Age squared	-0.7963	-0.86
Age at first marriage	-0.4406	-1.22
Education	0.0929	1.07
Employment duration	0.3245	1.76*
Perceived financial condition	-0.0495	-0.30
Total	0.5511	
Difference in intercepts	-0.9490	-2.60***
Total difference (means + slopes + intercepts)	[(0.0954) + 0.5511 + (-0.9490)] = -0.3025	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-26. Decomposition of the differences in cumulative fertility between adult immigrant women and second-generation women in Alberta

Cumulative fertility	Coefficient	z
Differential		
Adult immigrants	1.5421	15.59***
Second generation	1.6745	19.94***
Difference	-0.1324	-1.02
Differences in means		
Age	0.1417	3.34***
Age squared	0.0205	2.50**
Age at first marriage	-0.0291	-2.21**
Education	-0.0227	-1.52
Employment status	0.1538	1.98**
Perceived financial condition	-0.0037	-0.33
Total	0.2605	2.48**
Differences in slopes		
Age	-1.3849	-0.78
Age squared	0.4943	0.45
Age at first marriage	-0.4318	-1.06
Education	0.0962	1.24
Employment duration	0.6186	2.44**
Perceived financial condition	0.0749	0.30
Total	-0.5327	0.14
Difference in intercepts	0.1398	-2.19**
Total difference (means + slopes + intercepts	[(0.2605) + (-0.5327) + (0.1398)] = -0.1324	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-27. Cox regression estimates of parity-specific fertility between second-generation women and third-generation women in Alberta

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Second generation	0.971 (-0.26)	0.896 (-0.69)	0.773 (-1.26)
Third generation (ref)			
Age	0.809 (-2.92)***	1.172 (1.50)	0.927 (-2.09)**
Age squared	1.002(2.84)***	0.998 (-1.43)	1.004 (2.19)**
Age at first marriage	0.941 (-4.35)***	0.949 (-2.51)**	0.937 (-2.46)**
Education			
Less than post-secondary	1.670 (3.31)***	0.853 (-2.91)***	1.154 (0.64)
Post-secondary (ref)			
Employment duration	0.825 (-12.32)***	0.515 (-10.07)***	0.305 (-12.23)***
Perceived financial condition at time of birth	0.769 (-4.42)***	0.982 (-0.23)	1.038 (0.36)
Subjects	667	556	442
Failures	557	442	169
F (df)	37.29***(7, 660)	17.41***(7, 549)	26.10***(7, 435)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-28. OLS regression estimates of the effect of migration on number of children among second-generation women vs. third-generation women in Alberta

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment duration	Model 4 Perceived financial condition	Model 5 Fertility (basic model)	Model 5 Fertility (full model)
Generation status						
Second generation	-0.042 (-1.04)	0.890 (1.83)	1.568 (2.93)**	-0.144 (-1.57)	-0.170 (-2.28)*	-0.002 (-0.08)
Third generation (ref)						
Age	-0.066 (-2.38)*	0.774 (2.63)**				0.352 (6.16)**
Age squared	0.001 (2.47)*	-0.008 (-1.83)				-0.003 (-5.11)**
Age at first marriage						-0.020 (-2.14)*
Education						
Less than post-secondary		-2.538 (-4.94)**	-2.903 (-5.83)**	-0.221 (-2.12)*		0.081 (0.69)
Post-secondary (ref)						
Employment duration				0.045 (8.41)**		-0.088 (-12.53)**
Perceived financial condition						-0.101 (-2.17)*
Constant	1.353 (2.66)**	8.853 (1.75)	8.615 (29.27)**	1.393 (19.55)**	1.845 (33.79)**	-4.122 (-3.97)**
R squared	0.017	0.149	0.051	0.121	0.013	0.336
F (df)	2.54**(3, 664)	35.76**(4, 663)	21.77**(2, 665)	29.58**(3, 664)	10.64** (1, 666)	45.87**(7, 660)
N	667	667	667	667	667	667

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2010 Alberta Fertility Survey

Table 5-29. OLS regression estimates of the direct and indirect effects of selected variables on fertility among second-generation women vs. third-generation women in Alberta

Variables	Direct effects	Indirect effects
Generation status		
Second-generation women	-0.0020	
Third-generation women (ref)		
Age	0.3520	
Age squared	-0.0030	
Age at first marriage	-0.0200	
Education		
Less than post-secondary	0.0810	
Post-secondary		
Employment duration	-0.0880	
Perceived financial condition	-0.1010	
Generation status via education		-0.0034
Generation status via age at first marriage		-0.0178
Generation status via employment		-0.1380
Generation status via financial condition		0.0145
Generation status via education via employment		-0.0107
Generation status via education via perceived financial condition		-0.0009
Generation status via education via age at marriage		-0.0021
Generation status via employment via perceived financial condition		-0.0071

Source: The 2010 Alberta Fertility Survey

Table 5-30. Decomposition of the differences in cumulative fertility between second-generation women vs. third-generation women in Alberta

Cumulative fertility	Coefficient	z
Differential		
Second generation	1.6745	19.96***
Third generation	1.8446	40.37***
Difference	-0.1701	-1.78*
Differences in means		
Age	0.1367	6.18***
Age squared	-0.1507	-4.52***
Age at first marriage	-0.0199	-0.99
Education	-0.0009	-0.11
Employment duration	-0.1762	-7.07***
Perceived financial condition	0.0049	0.93
Total	-0.2061	-7.81***
Differences in slopes		
Age	2.8861	2.46**
Age squared	-1.3286	-1.95*
Age at first marriage	-0.0013	-0.01
Education	-0.0163	-0.29
Employment duration	-0.1776	-1.31
Perceived financial condition	0.0324	0.17
Total	1.3947	
Difference in intercepts	-1.3587	0.35
Total difference (means + slopes + intercepts)	[(-0.2061) + (1.3947) + (-1.3587)] = -0.1701	

*p <0.10, * *p <0.05, ** *p <0.01

Source: The 2010 Alberta Fertility Survey

Table 5-31. Sample characteristics: First-generation immigrant women, second-generation women, and third-generation women in Canada

Variables	First-generation immigrant women			Second-generation women			Third-generation women		
	N	(%)	Mean (Std. Dev)	N	(%)	Mean (Std. Dev)	N	(%)	Mean (Std. Dev)
Parity-specific fertility (in years)									
Time to first birth from age 15	356	(72.95)	13.815 (5.436)	403	(77.20)	12.260 (4.748)	1811	(79.40)	10.645 (4.984)
Time to second birth from first	220	(61.80)	3.161 (1.935)	300	(74.44)	3.233 (2.154)	1344	(74.21)	3.169 (2.189)
Time to third birth from second	84	(38.18)	4.079 (2.934)	91	(30.33)	2.753 (2.138)	463	(34.45)	3.249 (2.529)
Number of children ever born	488	(100.00)	1.503 (1.217)	522	(100.00)	1.702 (1.139)	2281	(100.00)	1.810 (1.178)
Age (in years)	488	(100.00)	37.428 (7.009)	522	(100.00)	38.538 (7.025)	2281	(100.00)	38.933 (7.241)
Age at first marriage(in years)	488	(100.00)	26.247 (5.281)	522	(100.00)	25.509 (4.445)	2281	(100.00)	24.706 (4.703)
Education									
Less than post-secondary	80	(16.39)		83	(15.90)		504	(22.10)	
Post-secondary	408	(83.61)		439	(84.10)		1777	(77.90)	
Employment status									
Employed	306	(62.70)		358	(68.58)		1596	(69.97)	
Not employed	182	(37.30)		164	(31.42)		685	(30.03)	
Income									
Low	364	(74.59)		328	(62.84)		1596	(69.97)	
High	124	(25.41)		194	(37.16)		685	(30.03)	
N	488	(100.00)		522	(100.00)		2281	(100.00)	

Source: The 2006 General Social Survey

Table 5-32. Sample characteristics: Child immigrant women and adult immigrant women in Canada

Variables	First-generation immigrant women							
	Child immigrant women				Adult immigrant women			
	N	(%)	Mean	(Std. Dev)	N	(%)	Mean	(Std. Dev)
Parity-specific fertility (in years)								
Time to first birth from age 15	137	(78.29)	12.539	(5.298)	219	(69.97)	14.574	(5.385)
Time to second birth from first	93	(67.88)	3.110	(1.788)	127	(57.99)	3.194	(2.033)
Time to third birth from second	39	(41.94)	4.157	(2.860)	45	(35.43)	4.022	(3.016)
Number of children ever born	175	(100.00)	1.668	(1.251)	313	(100.00)	1.415	(1.191)
Age (years)	175	(100.00)	37.782	(6.988)	313	(100.00)	37.240	(7.023)
Age at first marriage(years)	175	(100.00)	25.662	(4.986)	313	(100.00)	26.559	(5.412)
Education								
Less than post-secondary	26	(14.86)			54	(17.25)		
Post-secondary	149	(85.14)			259	(82.75)		
Employment status								
Employed	123	(70.29)			183	(58.47)		
Not employed	52	(29.71)			130	(41.53)		
Income								
Low	115	(65.71)			249	(79.55)		
High	60	(34.29)			64	(20.45)		
N	175	(100.00)			313	(100.00)		

Source: The 2006 General Social Survey

Table 5-33. Cox regression estimates of parity-specific fertility between first-generation immigrant women and third-generation women in Canada

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
First generation	0.709 (-5.42)***	0.849 (-2.11)**	1.138 (0.97)
Third generation (ref)			
Age	1.052 (1.10)	0.943 (-1.03)	0.795 (-2.20)**
Age squared	0.999 (-1.26)	1.001 (0.97)	1.002 (20.8)**
Age at first marriage	0.887 (-14.62)***	0.974 (-3.83)***	0.977 (-1.78)*
Education			
Less than post-secondary	1.274 (3.04)***	0.834 (-2.75)***	0.996 (-0.03)
Post-secondary (ref)			
Employment status			
Employed	0.871 (-2.21)**	0.829 (-2.98)***	0.674 (-3.47)***
Not employed (ref)			
Income			
High income	0.789 (-3.79)***	0.975 (-0.36)	0.789 (-1.66)
Low income (ref)			
Subjects	2769	2091	1547
Failures	2167	1564	518
F (df)	45.35***(7, 2762)	5.06***(7, 2084)	5.91***(7, 1540)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
**p <0.05, * **p <0.01
Source: The 2006 General Social Survey

Table 5-34. Cox regression estimates of parity-specific fertility between first-generation immigrant women and second-generation women in Canada

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
First generation	0.750 (-3.26)***	0.811 (-2.17)**	1.112 (0.59)
Second generation (ref)			
Age	1.023 (0.29)	1.070 (0.69)	0.696 (-1.97)**
Age squared	0.999 (-0.48)	0.999 (-0.69)	1.004 (1.78)*
Age at first union	0.876 (-11.44)***	0.975 (-2.46)**	0.986 (-0.70)
Education			
Less than post-secondary	1.460 (2.71)***	0.706 (-2.87)***	1.080 (0.37)
Post-secondary (ref)			
Employment status			
Employed	0.743 (-1.73)*	0.550 (-5.55)***	0.519 (-3.44)***
Not employed (ref)			
Income			
High income	0.892 (-1.05)*	0.945 (-0.47)	1.238 (0.98)
Low income (ref)			
Subjects	1010	743	511
Failures	759	515	165
F (df)	29.60***(7, 1003)	7.37***(7, 736)	4.42***(7, 504)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*$p<0.10$, **p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-35. OLS regression estimates of the effect of migration on number of children among first-generation immigrant women and third-generation women in Canada

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment status	Model 4 Income	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
First generation	-0.055 (-2.57)**	1.394 (5.21)**	-0.091 (-3.34)**	-0.050 (-2.21)*	-0.307 (-4.46)**	-0.189 (-3.23)**
Third generation (ref)						
Age	-0.040 (-2.75)**	1.221 (10.02)**				0.398 (11.98)**
Age squared	0.001 (3.16)**	-0.015 (-9.02)**				-0.005 (-10.01)**
Age at first marriage						-0.067 (-13.13)**
Education						
Less than post-secondary		-2.254 (-8.92)**	-0.080 (-3.07)**	-0.202 (-10.67)**		0.113 (1.62)
Post-secondary (ref)						
Employment status						
Employed				0.293 (17.60)**		-0.424 (-7.87)**
Not employed (ref)						
Income						
High income						-0.190 (-3.46)**
Low income (ref)						
Constant	0.827 (3.12)**	1.976 (0.95)	0.718 (57.54)**	0.142 (10.24)**	1.809 (60.18)**	-4.487 (-7.96)**
R squared	0.021	0.092	0.101	0.135	0.011	0.240
F (df)	12.42**(3, 2766)	79.11**(4, 2765)	9.87**(2, 2767)	156.20**(3, 2766)	19.84** (1, 2768)	117.39**(7, 2762)
N	2769	2769	2769	2769	2769	2769

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2006 General Social Survey

Table 5-36. OLS regression estimates of the direct and indirect effects of selected variables on fertility among first-generation immigrant women and third-generation women in Canada

Variables	Direct effects	Indirect effects
Generation status		
First-generation immigrant women	-0.18900	
Third-generation women (ref)		
Age	0.39800	
Age squared	-0.00500	
Age at first marriage	-0.06700	
Education		
Less than post-secondary	0.11300	
Post-secondary (ref)		
Employment status		
Employed	-0.42400	
Not employed (ref)		
Income		
High income	-0.19000	
Low income (ref)		
Generation status via education		-0.00622
Generation status via age at first marriage		-0.09340
Generation status via employment		0.03858
Generation status via income		0.00950
Generation status via education via employment		-0.00187
Generation status via education via income		-0.00074
Generation status via education via age at marriage		-0.00831
Generation status via employment via income		0.00507

Source: The 2006 General Social Survey

Table 5-37. OLS regression estimates of the effect of migration on number of children among first-generation immigrant women and second-generation women in Canada

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment status	Model 4 Income	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
First generation	0.007 (0.28)	0.835 (2.63)**	-0.067 (-2.00)**	-0.107 (-3.67)**	-0.198 (-2.38)*	-0.128 (-2.18)**
Second generation (ref)						
Age	-0.025 (-1.19)	1.569 (7.88)**				0.471 (9.99)**
Age squared	0.001 (1.35)	-0.019 (-6.97)**				-0.005 (-8.35)**
Age at first marriage						-0.080 (-10.90)**
Education						
Less than post-secondary		-2.730 (-6.48)**	-0.104 (-2.22)*	-0.205 (-6.76)**		0.252 (2.31)*
Post-secondary (ref)						
Employment status						
Employed				0.319 (12.08)**		-0.587 (-7.49)**
Not employed (ref)						
Income						
High income						-0.075 (-0.99)
Low income (ref)						
Constant	0.544 (1.41)	-4.551 (-1.33)	0.698 (29.74)**	0.183 (7.40)**	1.702 (30.34)**	-5.636 (-6.89)**
R squared	0.007	0.115	0.011	0.164	0.017	0.323
F (df)	1.49**(3, 1007)	45.43**(4, 1006)	4.57**(2, 1008)	77.24**(3, 1007)	5.66**(1, 1009)	73.46**(7, 1003)
N	1010	1010	1010	1010	1010	1010

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2006 General Social Survey

Table 5-38. OLS regression estimates of the direct and indirect effects of selected variables on fertility among first-generation immigrant women and second-generation women in Canada

Variables	Direct effects	Indirect effects
Generation status		
First-generation immigrant women	-0.1280	
Second-generation women (ref)		
Age	0.4710	
Age squared	-0.0050	
Age at first marriage	-0.0800	
Education	0.2520	
Less than post-secondary		
Post-secondary (ref)		
Employment status		
Employed	-0.5870	
Not employed (ref)		
Income		
High income	-0.0750	
Low income (ref)		
Generation status via education		0.0018
Generation status via age at first marriage		-0.0668
Generation status via employment		0.0393
Generation status via income		0.0080
Generation status via education via employment		0.0004
Generation status via education via income		0.0001
Generation status via education via age at marriage		0.0015
Generation status via employment via income		0.0016

Source: The 2006 General Social Survey

Table 5-39. Decomposition of the differences in cumulative fertility between first-generation immigrant women and third-generation women in Canada

Cumulative fertility	Coefficient	z
Differential		
First generation	1.5030	31.01***
Third generation	1.8095	68.02***
Difference	-0.3065	-5.55***
Differences in means		
Age	-0.3817	-7.55***
Age squared	0.2987	4.99***
Age at first union	-0.1356	-9.28***
Education	-0.0306	-2.75***
Employment status	0.0469	5.23***
Income	0.0046	0.68
Total	-0.1976	-7.93***
Differences in slopes		
Age	0.6149	0.76
Age squared	-0.0778	-0.15
Age at first union	-0.3899	-2.35**
Education	0.0951	2.26**
Employment status	-0.1192	-1.39
Income	0.0441	1.16
Total	0.1672	
Difference in intercepts	-0.2761	-1.62
Total difference (means + slopes + intercepts)	[-0.1976 + 0.1672 + (-0.2761)] = -0.3065	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-40. Decomposition of the differences in cumulative fertility between first generation immigrant women and second third-generation women in Canada

Cumulative fertility	Coefficient	z
Differential		
First generation	1.5030	31.01***
Second generation	1.7016	37.32***
Difference	-0.1986	-2.98***
Differences in means		
Age	-0.2814	-7.55***
Age squared	0.2078	4.99***
Age at first union	-0.0650	-9.28***
Education	0.0013	2.75***
Employment status	0.0370	5.23***
Income	0.0096	0.68
Total	-0.0907	-4.79***
Differences in slopes		
Age	-0.7644	-0.81
Age squared	0.6644	1.11
Age at first union	-0.2203	-0.93
Education	0.0674	1.93*
Employment status	0.0533	0.49
Income	0.0062	0.11
Total	-0.1934	0.19
Difference in intercepts	0.0855	-1.50
Total difference (means + slopes + intercepts)	[(-0.0907) + (-0.1934) + 0.0855] = -0.1986	

*p <0.10, * *p <0.05, ** *p <0.01

Source: The 2006 General Social Survey

Table 5-41. Cox regression estimates of parity-specific fertility between child immigrant women and third-generation women in Canada

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Child immigrants	0.934 (-0.80)	0.879 (-1.11)	1.142 (0.71)
Third generation (ref)			
Age	1.063 (1.29)	0.925 (-1.30)	0.820 (-1.80)*
Age squared	0.999 (-1.45)	1.001 (1.23)	1.002 (1.67)*
Age at first union	0.886 (-12.98)***	0.974 (-3.56)***	0.982 (-1.34)
Education			
Less than post-secondary	1.282 (2.99)***	0.805 (-3.13)***	0.971 (-0.24)
Post-secondary (ref)			
Employment status			
Employed	0.885 (-1.87)*	0.862 (-2.25)**	0.651 (-3.58)***
Not employed (ref)			
Income			
High income	0.738 (-4.81)***	0.983 (-0.24)	0.767 (-1.79)*
Low income (ref)			
Subjects	2456	1882	1424
Failures	1948	1437	502
F (df)	34.53***(7, 2449)	4.41***(7, 1875)	5.61***(7, 1717)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-42. Cox regression estimates of parity-specific fertility between child immigrant women and second-generation women in Canada

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Child immigrants	1.029 (0.24)	0.852 (-1.22)	1.105 (0.47)
Second generation (ref)			
Age	1.059 (0.65)	1.076 (0.61)	0.707 (-1.65)*
Age squared	0.998 (-0.85)	0.999 (-0.63)	1.004 (1.37)
Age at first union	0.870 (-9.13)***	0.976 (-1.94)*	0.996 (-0.15)
Education			
Less than post-secondary	1.503 (2.42)**	0.575 (-3.80)***	1.001 (0.01)
Post-secondary (ref)			
Employment status			
Employed	0.892 (-1.06)	0.516 (-5.37)***	0.427 (-3.86)***
Not employed (ref)			
Income			
High income	0.747 (-2.44)**	0.976 (-0.19)	1.260 (0.98)
Low income (ref)			
Subjects	697	534	388
Failures	540	393	130
F (df)	15.81***(7, 690)	6.98***(7, 527)	4.92***(7, 381)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-43. OLS regression estimates of the effect of migration on number of children among child immigrant women and third-generation women in Canada

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment status	Model 4 Income	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Child immigrants	-0.938 (-3.27)**	0.664 (1.66)	-0.003 (-0.09)	0.002 (0.05)	-0.142 (-2.31)*	-0.038 (-0.04)
Third generation (ref)						
Age	-0.040 (-2.59)**	1.282 (10.20)**				0.387 (10.87)**
Age squared	0.001 (3.00)**	-0.016 (-9.50)**				-0.004 (-9.12)**
Age at first marriage						-0.061 (-10.61)**
Education						
Less than post-secondary		-2.092 (-7.86)**	-0.073 (-2.67)**	-0.200 (-9.46)**		0.060 (0.81)
Post-secondary (ref)						
Employment status						
Employed				0.300 (16.53)**		-0.434 (-7.29)**
Not employed (ref)						
Income						
High income						-0.231 (-3.94)**
Low income (ref)						
Constant	0.820 (2.89)***	1.629 (0.76)	0.717 (57.03)**	0.135 (9.39)	1.809 (60.17)**	-4.354 (-7.24)**
R squared	0.023	0.076	0.004	0.129	0.0112	0.219
F (df)	13.54**(3, 2453)	60.35**(4, 2452)	3.57**(2, 2454)	133.23**(3, 2453)	6.73** (1, 2455)	91.37**(7, 2449)
N	2456	2456	2456	2456	2456	2456

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2006 General Social Survey

Table 5-44. OLS regression estimates of the direct and indirect effects of selected variables on fertility among child immigrant women and third-generation women in Canada

Variables	Direct effects	Indirect effects
Generation status		
Child immigrant women	-0.0380	
Third-generation women (ref)		
Age	0.3870	
Age squared	-0.0040	
Age at first marriage	-0.0610	
Education		
Less than post-secondary	0.0600	
Post-secondary (ref)		
Employment status		
Employed	-0.4340	
Not employed (ref)		
Income		
High income	-0.2310	
Low income (ref)		
Generation status via education		-0.0563
Generation status via age at first marriage		-0.0405
Generation status via employment		0.0013
Generation status via income		-0.0005
Generation status via education via employment		-0.0297
Generation status via education via income		-0.0433
Generation status via education via age at marriage		-0.1197
Generation status via employment via income		0.0002

Source: The 2006 General Social Survey

Table 5-45. OLS regression estimates of the effect of migration on number of children among child immigrant women and second-generation women in Canada

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment status	Model 4 Income	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Child immigrants	-0.031 (-0.98)	0.035 (0.08)	0.019 (0.43)	-0.058 (-1.34)	-0.134 (-2.29)*	0.024 (0.25)
Second generation (ref)						
Age	-0.019 (-0.77)	1.858 (8.53)**				0.461 (8.40)**
Age squared	0.001 (0.92)	-0.025 (-8.08)				-0.005 (-7.09)**
Age at first marriage						-0.068 (-7.00)**
Education						
Less than post-secondary		-2.534 (-5.15)	-0.091 (-1.61)	-0.198 (-4.61)**		0.131 (1.01)
Post-secondary (ref)						
Employment status						
Employed				0.356 (10.46)**		-0.709 (-7.10)**
Not employed (ref)						
Income						
High income						-0.138 (-1.55)
Low income (ref)						
Constant	0.425 (0.95)	-7.959 (-2.10)*	0.696 (29.19)**	0.156 (5.68)**	1.702 (30.34)**	-5.502 (-5.79)**
R squared	0.009	0.119	0.005	0.149	0.012	0.313
F (df)	1.41**(3, 694)	31.60**(4, 693)	1.40**(2, 695)	49.90**(3, 694)	7.08** (1, 696)	51.59**(7, 690)
N	697	697	697	697	697	697

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2006 General Social Survey

Table 5-46. OLS regression estimates of the direct and indirect effects of selected variables on fertility among child immigrant women and second-generation women in Canada

Variables	Direct effects	Indirect effects
Generation status		
Child immigrant women	0.0240	
Second-generation women (ref)		
Age	0.4610	
Age squared	-0.0050	
Age at first marriage	-0.0680	
Education		
Less than post-secondary	0.1310	
Post-secondary (ref)		
Employment status		
Employed	-0.7090	
Not employed (ref)		
Income		
High income	-0.1380	
Low income (ref)		
Generation status via education		-0.0041
Generation status via age at first marriage		-0.0024
Generation status via employment		-0.0135
Generation status via income		0.0080
Generation status via education via employment		-0.0020
Generation status via education via income		-0.0008
Generation status via education via age at marriage		-0.0053
Generation status via employment via income		-0.0009

Source: The 2006 General Social Survey

Table 5-47. Decomposition of the differences in cumulative fertility between child immigrant women and third-generation women in Canada

Cumulative fertility	Coefficient	**z**
Differential		
Child immigrants	1.6675	20.40***
Third generation	1.8096	68.02***
Difference	-0.1420	-1.65*
Differences in means		
Age	-0.2346	-3.85***
Age squared	0.1902	2.48**
Age at first union	-0.0530	-3.07***
Education	-0.0531	-1.67*
Employment status	-0.0041	-4.77***
Income	-0.0078	-1.91*
Total	-0.1623	-4.96***
Differences in slopes		
Age	-0.4200	-0.36
Age squared	0.3675	0.47
Age at first union	0.0904	0.32
Education	0.1075	1.49
Employment status	-0.4068	-2.76***
Income	-0.0298	-0.56
Total	-0.2912	
Difference in intercepts	0.3115	0.20
Total difference (means + slopes + intercepts)	[(-0.1623) + (-0.2912) + 0.3115] = -0.1420	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-48. Decomposition of the differences in Cumulative fertility between child immigrant women and second-generation women in Canada

Cumulative fertility	Coefficient	z
Differential		
Child immigrants	1.6675	20.40***
Second generation	1.7016	37.32***
Difference	-0.0341	-0.36
Differences in means		
Age	-0.1539	-3.85***
Age squared	0.1169	2.48**
Age at first union	-0.0085	-3.07***
Education	-0.0174	-1.67*
Employment status	-0.0215	-4.77***
Income	0.0140	1.91*
Total	-0.0705	-4.21***
Differences in slopes		
Age	-1.7797	-1.41
Age squared	1.0920	1.33
Age at first union	0.2863	0.85
Education	0.0760	1.41
Employment status	-0.2269	-1.42
Income	-0.0844	-1.15
Total	-0.6367	
Difference in intercept	0.6731	0.36
Total difference (means + slopes + intercepts)	[(-0.0750 + (-0.6367) + 0.6731] = -0.0341	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-49. Cox regression estimates of parity-specific fertility between adult immigrant women and third-generation women in Canada

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Adult immigrants	0.623 (-6.28)***	0.829 (-2.92)**	1.121 (0.67)
Third generation (ref)			
Age	1.046 (0.95)	0.940 (-1.07)	0.805 (-1.99)**
Age squared	0.999 (-1.10)	1.001 (0.98)	1.002 (1.89)*
Age at first union	0.887 (-14.06)***	0.976 (-3.53)***	0.977 (-1.74)*
Education			
Less than post-secondary	1.265 (2.90)***	0.853 (-2.35)**	0.989 (-0.09)
Post-secondary (ref)			
Employment status			
Employed	0.865 (-2.22)**	0.863 (-2.26)**	0.692 (-3.12)***
Not employed (ref)			
Income			
High income	0.795 (-3.52)***	0.966 (-0.48)	0.761 (-1.82)*
Low income (ref)			
Subjects	2564	1959	1456
Failures	2030	1471	508
F (df)	43.69***(7, 2587)	3.97***(7, 1952)	5.00***(7, 1449)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-50. Cox regression estimates of parity-specific fertility between adult immigrant women and second-generation women in Canada

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Adult immigrants	0.648 (-4.24)***	0.779 (-2.17)**	1.067 (0.30)
Second generation (ref)			
Age	1.004 (0.05)	1.074 (0.67)	0.691 (-1.65)*
Age squared	0.999 (-0.22)	0.999 (-0.69)	1.004 (1.50)
Age at first union	0.875 (-10.75)***	0.980 (-1.74)*	0.986 (-0.58)
Education			
Less than post-secondary	1.465 (2.60)***	0.751 (-2.19)**	1.065 (0.27)
Post-secondary (ref)			
Employment status			
Employed	0.827 (-1.68)*	0.572 (-4.55)***	0.523 (-3.00)***
Not employed (ref)			
Income			
High income	0.932 (-0.55)	0.898 (-0.81)	1.247 (0.88)
Low income (ref)			
Subjects	835	611	420
Failures	622	430	136
F (df)	28.75***(7, 828)	5.30***(7, 604)	3.00***(7, 413)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-51. OLS regression estimates of the effect of migration on number of children among adult immigrant women and third-generation women in Canada

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment status	Model 4 Income	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Adult immigrants	-0.033 (-1.24)	1.771 (5.42)**	-0.137 (-4.12)**	-0.077 (-3.08)**	-0.395 (-4.80)**	-0.274 (-3.88)**
Third generation (ref)						
Age	-0.041 (-2.67)**	1.181 (9.28)**				0.402 (11.54)**
Age squared	0.001 (3.09)**	-0.015 (-8.35)**				-0.005 (-9.69)**
Age at first marriage						-0.067 (-12.48)**
Education						
Less than post-secondary		-2.200 (-8.42)**	-0.080 (-2.99)**	-0.202 (-10.43)**		0.103 (1.44)
Post-secondary (ref)						
Employment status						
Employed				0.293 (17.19)**		-0.386 (-6.89)**
Not employed (ref)						
Income						
High income						-0.186 (-3.18)**
Low income (ref)						
Constant	0.834 (2.98)**	2.669 (1.23)	0.718 (57.28)**	0.141 (10.22)**	1.809 (60.18)**	-4.546
R squared	0.019	0.091	0.016	0.142	0.015	0.235
F (df)	10.80**(3, 2591)	70.89**(4, 2590)	12.65**(2, 2592)	152.91**(3, 2591)	23.05** (1, 2593)	105.07**(7, 2587)
N	2594	2594	2594	2594	2594	2594

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2006 General Social Survey

Table 5-52. OLS regression estimates of the direct and indirect effects of selected variables on fertility among adult immigrant women and third-generation women in Canada

Variables	Direct effects	Indirect effects
Generation status		
Adult immigrant women	-0.2740	
Third-generation women (ref)		
Age	0.4020	
Age squared	-0.0050	
Age at first marriage	-0.0670	
Education		
Less than post-secondary	0.1030	
Post-secondary (ref)		
Employment status		
Employed	-0.3860	
Not employed (ref)		
Income		
High income	-0.1860	
Low income (ref)		
Generation status via education		-0.0034
Generation status via age at first marriage		-0.1187
Generation status via employment		0.0529
Generation status via income		0.0143
Generation status via education via employment		-0.0010
Generation status via education via income		-0.0012
Generation status via education via age at marriage		-0.0049
Generation status via employment via income		0.0075

Source: The 2006 General Social Survey

Table 5-53. OLS regression estimates of the effect of migration on number of children among adult immigrant women and second-generation women in Canada

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment status	Model 4 Income	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Adult immigrants	0.028 (0.94)	1.238 (3.37)**	-0.113 (-2.92)**	-0.132 (-4.22)**	-0.286 (-3.02)**	-0.201 (-2.54)**
Second generation (ref)						
Age	-0.024 (-1.00)	1.567 (6.97)**				0.501 (9.66)**
Age squared	0.001 (1.18)	-0.019 (-6.14)**				-0.005 (-8.16)**
Age at first marriage						-0.083 (-10.12)**
Education						
Less than post-secondary		-2.654 (-5.72)**	-0.108 (-2.11)*	-0.204 (-6.38)**		0.235 (2.04)*
Post-secondary (ref)						
Employment status						
Employed				0.326 (11.44)**		-0.531 (-6.17)**
Not employed (ref)						
Income						
High income						-0.044 (-0.52)
Low income (ref)						
Constant	0.506 (1.16)	-4.747 (-1.22)	0.699 (29.53)**	0.178 (7.17)**	1.702 (30.34)**	-6.148 (-6.77)**
R squared	0.010	0.119	0.021	0.188	0.014	0.325
F (df)	1.84**(3, 832)	37.24**(4, 831)	6.75**(2, 833)	73.42**(3, 832)	9.12** (1, 834)	63.22**(7, 828)
N	835	835	835	835	835	835

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2006 General Social Survey

Table 5-54. OLS regression estimates of the direct and indirect effects of selected variables on fertility among adult immigrant women and second-generation women in Canada

Variables	Direct effects	Indirect effects
Generation status		
Adult immigrant women	-0.2010	
Second-generation women (ref)		
Age	0.5010	
Age squared	-0.0050	
Age at first marriage	-0.0830	
Education		
Less than post-secondary	0.2350	
Post-secondary (ref)		
Employment status		
Employed	-0.5310	
Not employed (ref)		
Income		
High income	-0.0440	
Low income (ref)		
Generation status via education		0.0066
Generation status via age at first marriage		-0.1028
Generation status via employment		0.0600
Generation status via income		0.0058
Generation status via education via employment		0.0016
Generation status via education via income		0.0003
Generation status via education via age at marriage		0.0062
Generation status via employment via income		0.0016

Source: The 2006 General Social Survey

Table 5-55. Decomposition of the differences in cumulative fertility between adult immigrants and third-generation women in Canada

Cumulative fertility	Coefficient	z
Differential		
Adult immigrants	1.4151	24.35***
Third generation	1.8096	68.02***
Difference	-0.3945	-6.17***
Differences in means		
Age	-0.4685	-6.57***
Age squared	0.3664	4.43***
Age at first union	-0.1847	-8.65***
Education	-0.0234	-2.64***
Employment status	0.0548	3.32***
Income	-0.0026	-0.17
Total	-0.2580	-6.75***
Differences in slopes		
Age	1.0910	1.13
Age squared	-0.3118	-0.50
Age at first union	-0.5612	-2.92***
Education	0.1035	2.23**
Employment status	-0.0223	-0.23
Income	0.0737	1.55
Total	0.3729	-1.28
Difference in intercepts	-0.5094	-1.59
Total difference (means + slopes + intercepts)	[(-0.2580) + 0.3729 + (-0.5094)] = -0.3945	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-56. Decomposition of the differences in cumulative fertility between adult immigrants and second-generation women in Canada

Cumulative fertility	Coefficient	z
Differential		
Adult immigrants	1.4151	24.35***
Second generation	1.7016	37.32***
Difference	-0.2865	-3.88***
Differences in means		
Age	-0.3592	-6.57***
Age squared	0.2660	4.43***
Age at first union	-0.1047	-8.65***
Education	0.0111	2.64***
Employment status	0.0473	3.32***
Income	-0.0043	-0.17
Total	-0.1437	-4.43***
Differences in slopes		
Age	-0.2974	-0.28
Age squared	0.4398	0.65
Age at first union	-0.4008	-1.56
Education	0.0733	1.95*
Employment status	0.1476	1.26
Income	0.0425	0.64
Total	0.0050	
Difference in intercepts	-0.1478	-1.65*
Total difference (means + slopes + intercepts)	[(-0.1437) + 0.0050 + (-0.1478)] = -0.2865	

*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-57. Cox regression estimates of parity-specific fertility between second-generation women and third-generation women in Canada

Variables	Cox regression models (Hazard Ratios)		
	First birth	Second birth	Third birth
Generation status			
Second generation	0.913 (-1.60)	1.005 (0.09)	0.971 (-0.21)
Third generation (ref)			
Age	1.054 (1.17)	0.947 (-0.96)	0.827 (-2.76)**
Age squared	0.999 (-1.33)	1.001 (0.87)	1.002 (2.57)**
Age at first union	0.882 (-14.58)***	0.978 (-3.30)***	0.941 (-2.19)**
Education			
Less than post-secondary	1.267 (3.03)***	0.788 (-3.70)***	0.964 (-0.30)
Post-secondary (ref)			
Employment status			
Employed	0.893 (-1.84)*	0.826 (-3.09)***	0.609 (-4.42)***
Not employed (ref)			
Income			
Low income	0.763 (-4.46)***	0.943 (-0.90)	0.824 (-1.40)
High income (ref)			
Subjects	2803	2141	1582
Failures	2214	1639	523
F (df)	42.64***(7, 2796)	5.23***(7, 2134)	6.64***(7, 1575)

Notes:
The dependent variable is the number of months to a birth from either the previous birth or age 15 (in the case of the first birth)
t –statistics in parentheses
*p <0.10, * *p <0.05, ** *p <0.01
Source: The 2006 General Social Survey

Table 5-58. OLS regression estimates of the effect of migration on number of children among second-generation women and third-generation women in Canada

Variables	Model 1: Education	Model 2: Age at first marriage	Model 3: Employment status	Model 4 Income	Model 5 Fertility (basic model)	Model 6 Fertility (full model)
Generation status						
Second generation	-0.066 (-3.14)**	0.590 (2.60)**	-0.024 (-0.95)	0.059 (2.50)**	-0.108 (-2.70)*	-0.049 (-0.92)
Third generation (ref)						
Age	-0.036 (-2.44)**	1.382 (11.68)**				0.417 (12.73)**
Age squared	0.001 (2.90)**	-0.018 (-11.00)**				-0.005 (-10.82)**
Age at first marriage						-0.064 (-11.56)**
Education						
Less than post-secondary		-0.012 (-8.09)**	-0.081(-3.12)**	-0.201 (-10.08)**		0.042 (0.62)
Post-secondary (ref)						
Employment status						
Employed				0.324 (19.20)**		-0.435 (-7.94)**
Not employed (ref)						
Income						
High income						-0.198 (-3.68)**
Low income (ref)						
Constant	0.733 (2.76)**	-0.009 (-0.08)	0.719 (57.68)**	0.119 (8.39)**	1.809 (60.18)**	-4.824 (-8.63)**
R squared	0.023	0.082	0.006	0.147	0.013	0.224
F (df)	14.78**(3, 2800)	74.68**(4, 2799)	5.15** (2, 2801)	176.54**(3, 2800)	9.88** (1, 2802)	110.16**(7, 2796)
N	2803	2803	2803	2803	2803	2803

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01
Source: The 2006 General Social Survey

Table 5-59. OLS regression estimates of the direct and indirect effects of selected variables on fertility among second-generation women and third-generation women in Canada

Variables	Direct effects	Indirect effects
Generation status		
Second-generation women	-0.0490	
Third-generation women (ref)		
Age	0.4170	
Age squared	-0.0050	
Age at first marriage	-0.0640	
Education		
Less than post-secondary	0.0420	
Post-secondary (ref)		
Employment status		
Employed	-0.4350	
Not employed (ref)		
Income		
High income	-0.1980	
Low income (ref)		
Generation status via education		-0.0028
Generation status via age at first marriage		-0.0378
Generation status via employment		0.0104
Generation status via income		-0.0117
Generation status via education via employment		-0.0023
Generation status via education via income		-0.0026
Generation status via education via age at marriage		-0.0001
Generation status via employment via income		0.0015

Source: The 2006 General Social Survey

Table 5-60. Decomposition of the differences in cumulative fertility between second-generation women and third-generation women in Canada

Cumulative fertility	Coefficient	z
Differential		
Second generation	1.7016	37.32***
Third generation	1.8096	68.02***
Difference	-0.1080	-2.05**
Differences in means		
Age	-0.1151	-9.17***
Age squared	0.1186	6.98***
Age at first union	-0.0592	-6.21***
Education	-0.0024	-0.23
Employment status	0.0114	5.29***
Income	-0.0062	-0.85
Total	-0.0528	-4.05***
Differences in slopes		
Age	1.3942	1.81*
Age squared	-0.7699	-1.55
Age at first union	-0.1811	-0.92
Education	-0.0019	-0.05
Employment status	-0.1739	-1.85*
Income	0.0390	1.04
Total	0.3064	
Difference in intercepts	-0.3616	-0.99
Total difference (means + slopes + intercepts)	[(-0.0528) + 0.3064 + (-0.3616)] = -0.1080	

*p <0.10, * *p <0.05, ** *p <0.01

Source: The 2006 General Social Survey

Appendices

Appendix 3-1a. Pearson's Correlation among study variables, the 2010 Alberta Fertility Survey

Variables	Age	Age squared	Age at first marriage	Duration in Canada	Age at immigration	Education	Employment duration
Age	1.000						
Age squared		1.000					
Age at first marriage	0.258	0.248	1.000				
Duration in Canada	0.253	0.270	-0.105	1.000			
Age at immigration	0.396	0.374	0.271	**-0.923**	1.000		
Education	0.051	0.030	0.162	-0.244	0.274	1.000	
Employment duration	0.594	0.492	0.210	0.159	0.096	0.062	1.000
Perceived financial condition	0.070	0.064	0.101	-0.264	0.161	0.178	0.340

Notes on measurement of variables:

Age (in years)

Age squared (in years)

Age at first marriage (in years)

Duration in Canada (years since immigration)

Age at immigration (in years)

Education (0= Less than post secondary, 1=Post secondary)

Employment duration (in years)

Perceived financial condition (0=Poor, 1=Fair, 2=Good, 3=very good)

Appendix 3-1b. Pearson's Correlation among study variables, the 2010 Alberta Fertility Survey

Variables	Cumulative fertility	Time to first birth from age 15	Time to second birth from first	Time to third birth from second	Mean	Standard deviation
Cumulative fertility	1.000				1.750	1.630
Time to first birth from age 15	-0.335	1.000			11.69	10.560
Time to second birth from first	-0.191	0.013	1.000		3.150	3.091
Time to third birth from second	-0.368	0.014	0.111	1.000	3.302	3.384
Age	0.418	0.242	0.323	0.558	35.720	8.573
Age squared	0.394	0.238	0.322	0.574	1349.57	596.309
Age at first marriage	-0.141	-0.055	-0.056	-0.198	26.674	5.590
Duration in Canada	0.159	0.285	-0.011	0.098	14.890	11.778
Age at immigration	0.095	-0.164	0.195	0.127	23.000	12.404
Education	-0.139	-0.041	-0.035	-0.117	0.197	0.398
Employment duration	-0.457	0.183	0.215	0.707	15.830	12.156
Perceived financial condition	-0.239	0.087	0.033	-0.123	1.979	1.152

Notes on measurement of variables:

Number of children (0, 1, 2, 3, ...)

Time to first birth from age 15 (in years)

Time to second birth from first (in years)

Time to third birth from second (in years)

Appendix 4-1. Descriptive statistics from the 2010 Alberta Fertility Survey and the 2006 General Social Survey (Alberta only)

Variables	2010 Alberta Fertility Survey	2006 General Social Survey[1]
Number of children ever born	1.75	1.63
Time to first birth from age 15 (years)†	11.69	10.56
Time to second birth from the first (years)	3.15	3.09
Time to third birth from the second (years)	3.30	3.38
Generation Status (%)		
First-generation immigrant women	17.65	19.09
Second-generation women	18.15	14.84
Third-generation women	64.20	66.07
First generation (%)		
Child immigrant women	28.67	25.97
Adult immigrant women	71.33	74.03
Age groups (%)		
18-24	13.23	9.32
25-29	16.72	14.13
30-34	13.24	19.21
35-39	18.46	17.62
40-44	18.61	19.70
45-49	19.74	20.02
Age at first marriage (years)	26.51	24.12
Education (%)		
Less than post-secondary	18.15	25.20
Post-secondary	81.85	74.80
N	810	428

† Derived from those respondents who had a first birth (i.e., censored cases are excluded). Similarly, time to second and third births is derived based on only those respondents who had second and third births respectively.

Note: [1] These descriptive statistics are derived from a group of respondents limited to those who were living in Alberta and were aged 18-49.

Appendix 4.2. OLS regression model for income (the 2006 General Social Survey)

Variables	Coefficients (t)
Generation status	
First generation	-0.485 (-4.24)***
Second generation	-0.008 (-0.08)
Third generation (ref)	
Age	0.522 (1.24)
Age squared	-0.001 (-1.66)*
Marital status	
Married/Div/Sep/Widowed	0.573 (-7.84)***
Cohabitation (ref)	
Education	
Less than post-secondary	-0.732 (-7.82)***
Post-secondary	
Employment status	
Employed	2.812 (26.57)***
Not employed	
Constant	7.789 (10.41)***
R-squared	0.3559
F (df)	109.97*** (7, 3284)
N	3,291

Appendix 4-3. Coding of variables

List of variables	The 2010 Alberta Fertility Survey	The 2006 General Social Survey
Independent variables		
First-generation immigrant women	Immigrant women who were born outside Canada	Immigrant women who were born outside Canada
Child immigrant women	Less than 13 years of age at migration	Less than or equal to 14 years of age at migration
Other immigrant women	Age at immigration is 13 or more	More than 14 years of age at migration
Second-generation women	Children of first generation immigrants who were born in Canada	Children of first generation immigrants who were born in Canada
Third-generation women	Born in Canada and both of their parents were born in Canada	Born in Canada and both of their parents were born in Canada
Dependent variables		
Time to first birth	Time to first birth from age 15 (in years)	Time to first birth from age 15 (in years)
Time to second birth	Time to second birth from the first (in years)	Time to second birth from the first (in years)
Time to third birth	Time to third birth from the second (in years)	Time to third birth from the second (in years)
Cumulative fertility	Number of children ever born	Number of children ever born
Control variables		
Age	Age of the respondents (in years)	Age of the respondents (in years)
Age at first marriage	Age at first marriage of the respondents (in years)	Age at first marriage of the respondents (in years)
Education	Less than post-secondary = 1 and Post-secondary = 0	Less than post-secondary = 1 and Post-secondary = 0
Employment duration	For first birth, employment duration between age 15 and timing of first birth (in years); For second birth, employment duration between timing of first birth and timing of second birth (in years); For third birth, employment duration between timing of second birth and timing of third birth (in years); and For cumulative fertility, total employment duration from age 15 to the birth of last child (in years)	Respondents employment status in past 12 months: Employed = 1 and Not employed = 0
Perceived financial condition	Respondents' perceived financial condition at the time of each birth: poor = 0, fair = 1, good = 2, and very good = 3	Annual income of the respondents: High income = 1 and Low income = 0

Appendix 5-1. Summary of results based on the 2010 Alberta Fertility Survey and the 2006 General Social Survey

Generation status	The 2010 Alberta Fertility Survey				The 2010 General Social Survey			
	First birth	Second birth	Third birth	Cumulative fertility	First birth	Second birth	Third birth	Cumulative fertility
First-generation immigrant women Third-generation women (reference)	Lower	Lower	No difference	Lower	Lower	Lower	No difference	Lower
Child immigrant women Third-generation women (reference)	No difference	No difference	***Higher***	No difference	No difference	No difference	***No difference***	No difference
Adult immigrant women Third-generation women (reference)	Lower	Lower	No difference	Lower	Lower	Lower	No difference	Lower
First-generation immigrant women Second-generation women(reference)	Lower	No difference	No difference	Lower	Lower	Lower	***No difference***	Lower
Child immigrant women Second-generation women (reference)	No difference	No difference	***Higher***	No difference	No difference	No difference	***No difference***	No difference
Adult immigrant women Second-generation women (reference)	Lower	Lower	No difference	Lower	Lower	Lower	No difference	Lower
Second-generation women Third-generation women (reference)	No difference	No difference	No difference	No difference	No difference	No difference	No difference	No difference

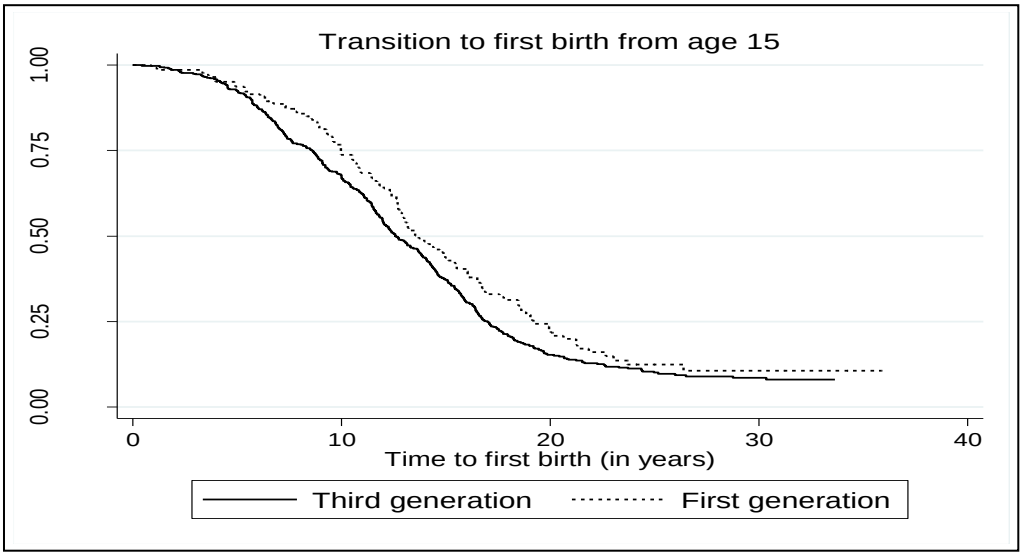
Appendix 5-2 . OLS regression estimates of the effect of control variables on cumulative fertility by generation status in Alberta and Canada

Variables	The 2010 Alberta Fertility Survey			The 2006 General Social Survey		
	1st generation vs. 3rd generation	1st generation vs. 2nd generation	2nd generation vs. 3rd generation	1st generation vs. 3rd generation	1st generation vs. 2nd generation	2nd generation vs. 3rd generation
Age	0.307 (6.68)**	0.341 (5.70)**	0.353 (6.19)**	0.396 (11.90)**	0.477 (10.17)**	0.416 (12.70)**
Age squared	-0.003)-5.34)**	-0.003 (-4.28)**	-0.004 (-5.13)**	-0.005 (-9.92)**	-0.005 (-8.53)**	-0.005 (-10.80)**
Age at first marriage	-0.032 (-3.63)**	-0.033 (-2.54)*	-0.020 (-2.14)**	-0.069 (-13.76)**	-0.080 (-11.02)**	-0.064 (-11.65)**
Education						
Less than post-secondary	0.238 (1.98)*	0.294 (1.54)	0.080 (0.69)	0.122 (1.75)	0.267 (3.42)**	0.044 (0.65)
Post-secondary (ref)						
Employment Duration /status	-0.071 (-10.27)**	-0.069 (-7.29)**	-0.088 (-12.54)**	-0.415 (-7.69)**	-0.576 (-7.40)**	-0.433 (-7.90)**
Perceived financial condition/income	0.123 (2.61)**	-0.168 (-2.60)**	-0.101 (-2.17)**	-0.180 (-3.26)**	-0.043 (-0.57)	-0.201 (-3.72)**
Constant	-3.473 (-4.09)**	-3.995 (-3.50)**	-4.123 (-3.99)**	-4.470 (-7.91)**	-6.106 (-7.27)**	-4.823 (-8.62)**
R squared	0.313	0.399	0.337	0.236	0.327	0.224
F (df)	47.65**(6, 657)	45.86**(6, 284)	53.50** (6, 661)	131.64** (6, 2763)	86.47** (6, 1004)	127.59**(6, 2797)
N	663	290	667	2769	1010	2803

Notes:
t –statistics in parentheses
*p <0.05, * *p <0.01

KM Graphs related to Part A: First-generation immigrant women

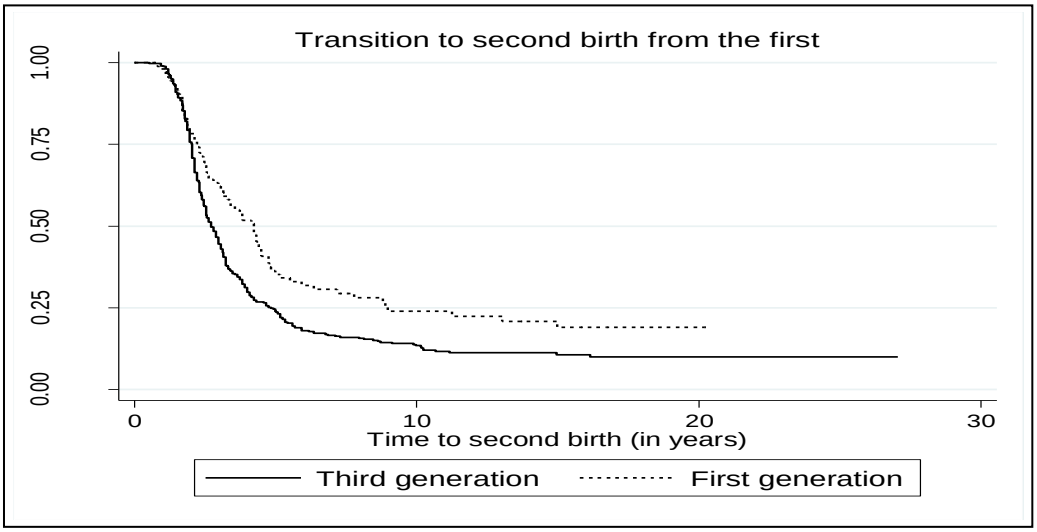
Appendix 5-3. Time to first birth from age 15: First generation vs. third generation in Alberta



Log-rank test: Chi2(1) =3.80 P-value = Pr>Chi2 =0.042

Source: The 2010 Alberta Fertility Survey

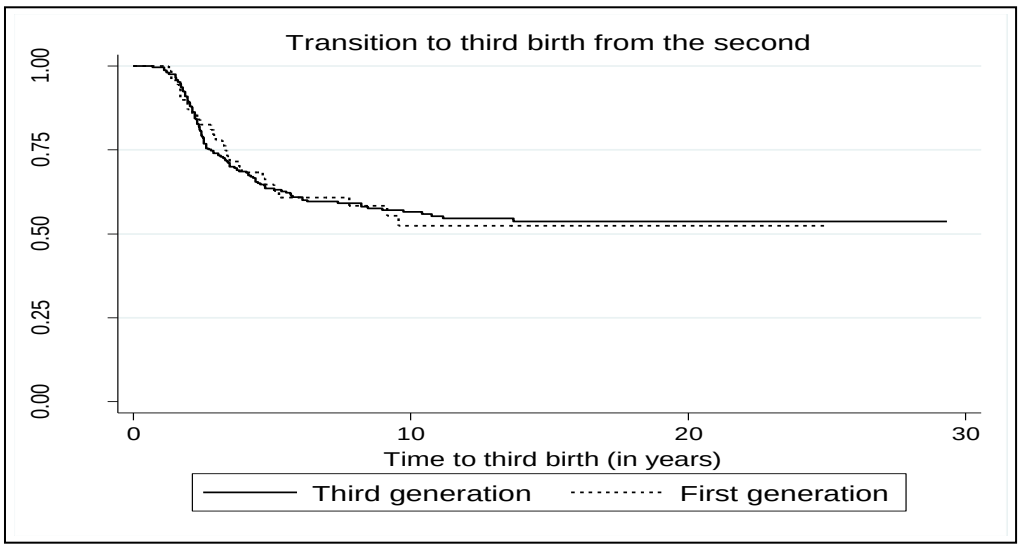
Appendix 5-4. Time to second birth from first birth: First generation vs. third generation in Alberta



Log-rank test: Chi2(1) = 9.61 P-value = Pr>Chi2 = 0.002

Source: The 2010 Alberta Fertility Survey

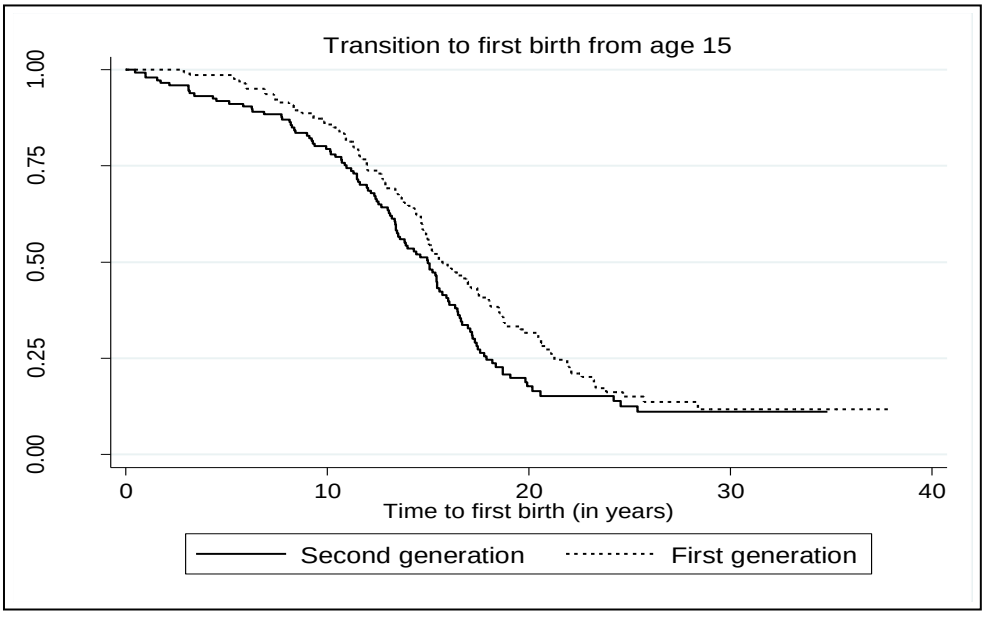
Appendix 5-5. Time to third birth from second birth: First generation vs. third generation in Alberta



Log-rank test: Chi2(1) =0.001 P-value = Pr>Chi2 = 0.989

Source: The 2010 Alberta Fertility Survey

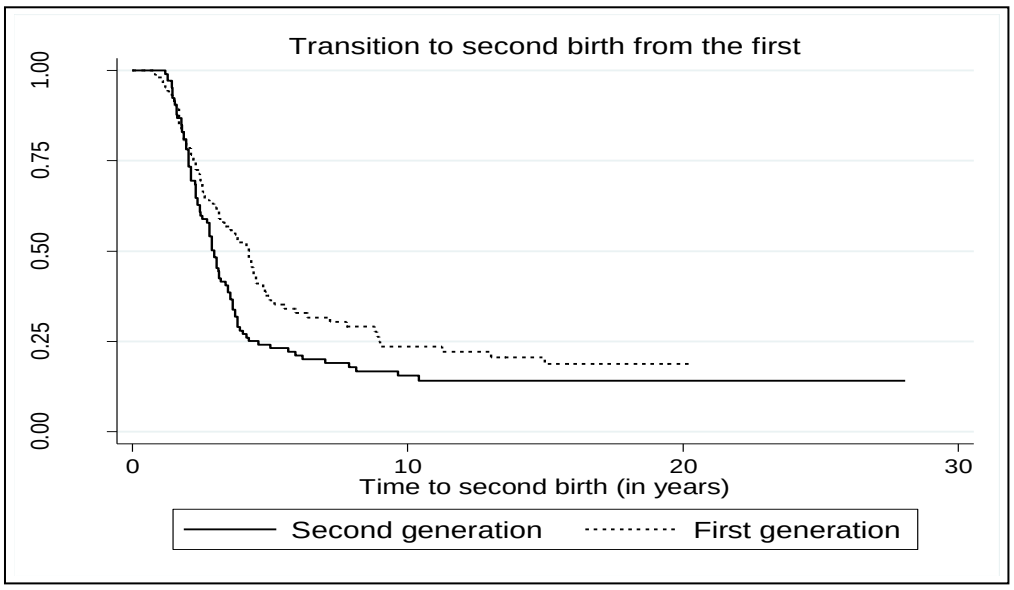
Appendix 5-6. Time to first birth from age 15: First generation vs. second generation in Alberta



Log-rank test: Chi2(1) =3.93 P-value = Pr>Chi2 = 0.045

Source: The 2010 Alberta Fertility Survey

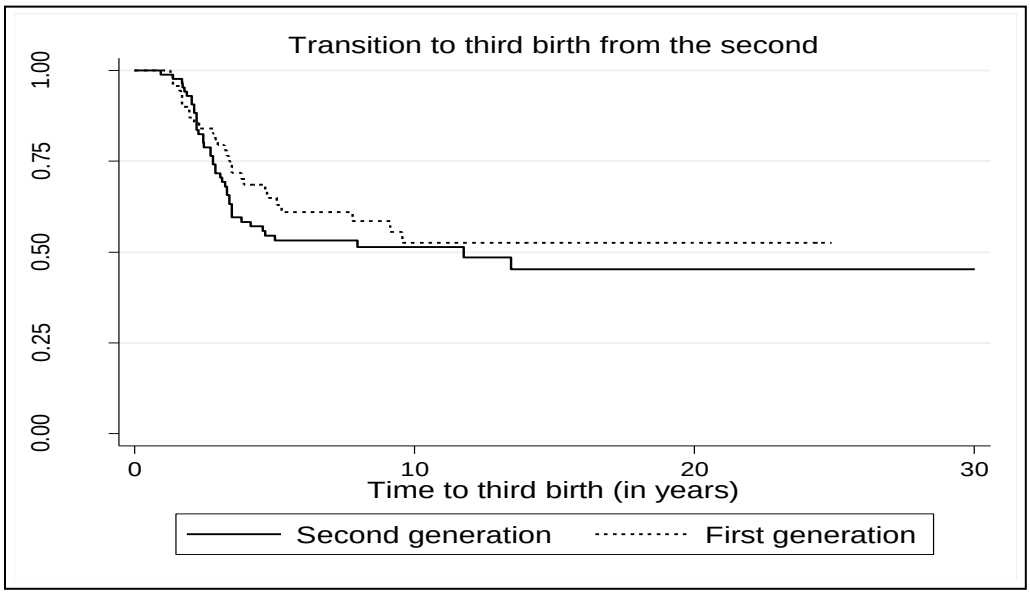
Appendix 5-7. Time to second birth from first birth: First generation vs. second generation in Alberta



Log-rank test: Chi2(1) =4.08 P-value = Pr>Chi2 = 0.043

Source: The 2010 Alberta Fertility Survey

Appendix 5-8. Time to third birth from second birth: First generation vs. second generation in Alberta

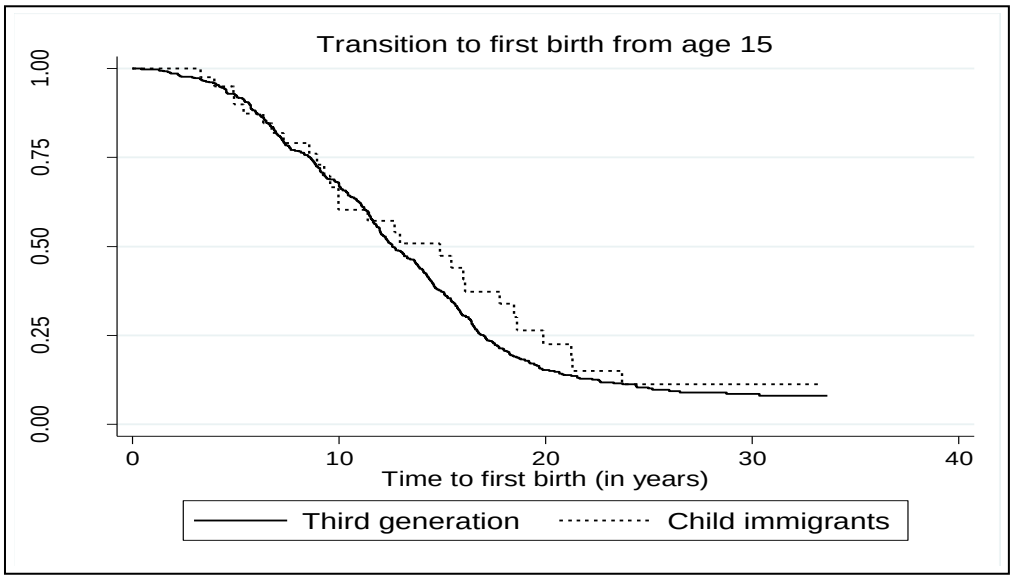


Log-rank test: Chi2(1) = 0.80 P-value = Pr>Chi2 = 0.371

Source: The 2010 Alberta Fertility Survey

KM Graphs related to Part B: Child immigrant women

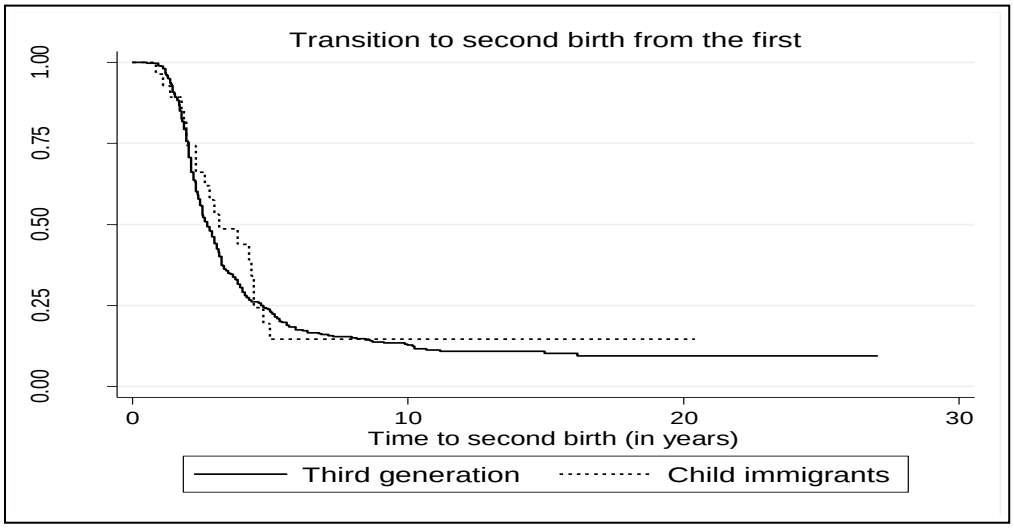
Appendix 5-9. Time to first birth from age 15: Child immigrants vs. third generation in Alberta



Log-rank test: Chi2(1) = 0.68 P-value = Pr>Chi2 = 0.408

Source: The 2010 Alberta Fertility Survey

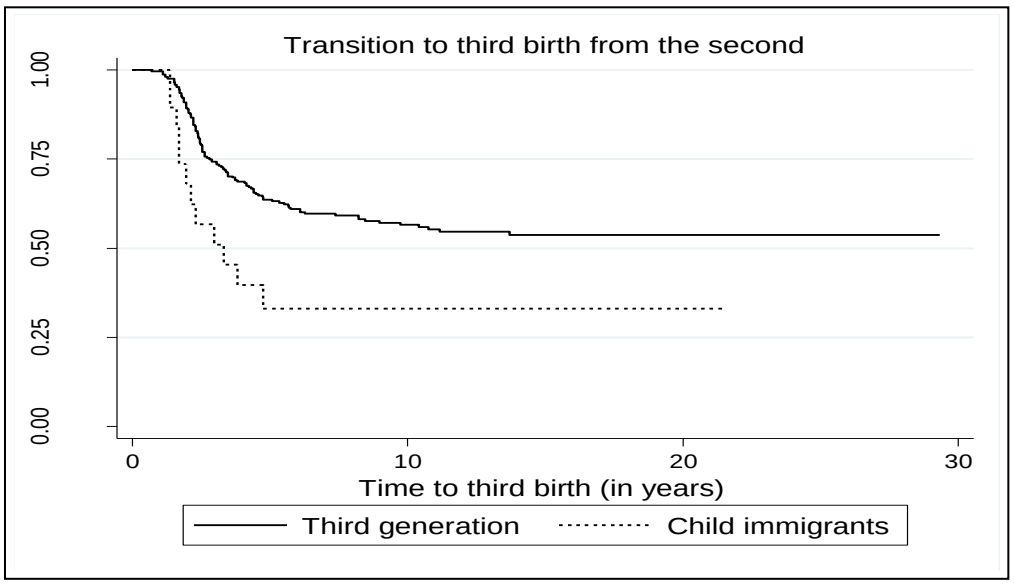
Appendix 5-10. Time to second birth from first birth: Child immigrants vs. third generation in Alberta



Log-rank test: Chi2(1) =0.60 P-value = Pr>Chi2 =0.439

Source: The 2010 Alberta Fertility Survey

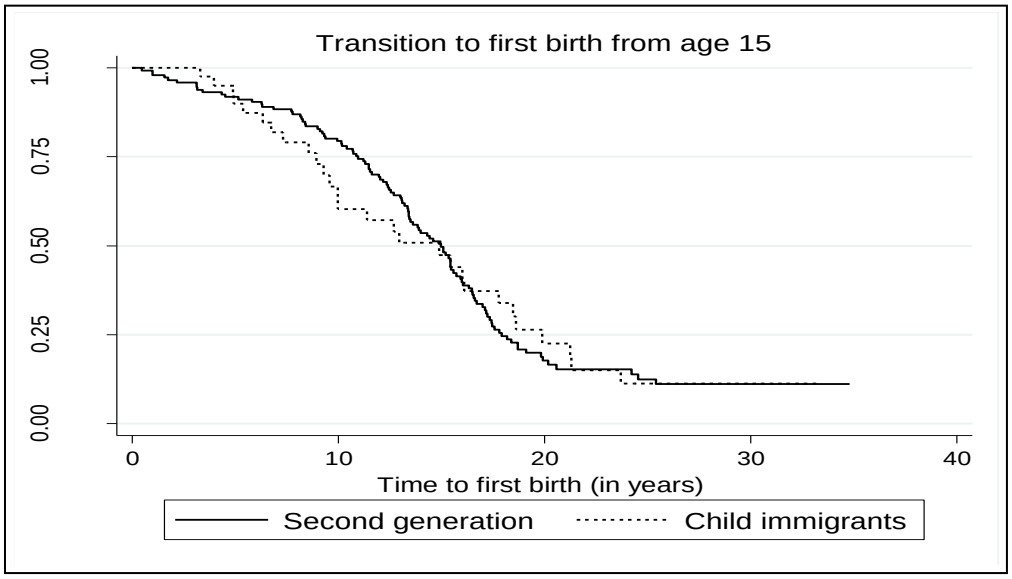
Appendix 5-11. Time to third birth from second birth: Child immigrants vs. third generation in Alberta



Log-rank test: Chi2(1) = 7.39 P-value = Pr>Chi2 =0.006

Source: The 2010 Alberta Fertility Survey

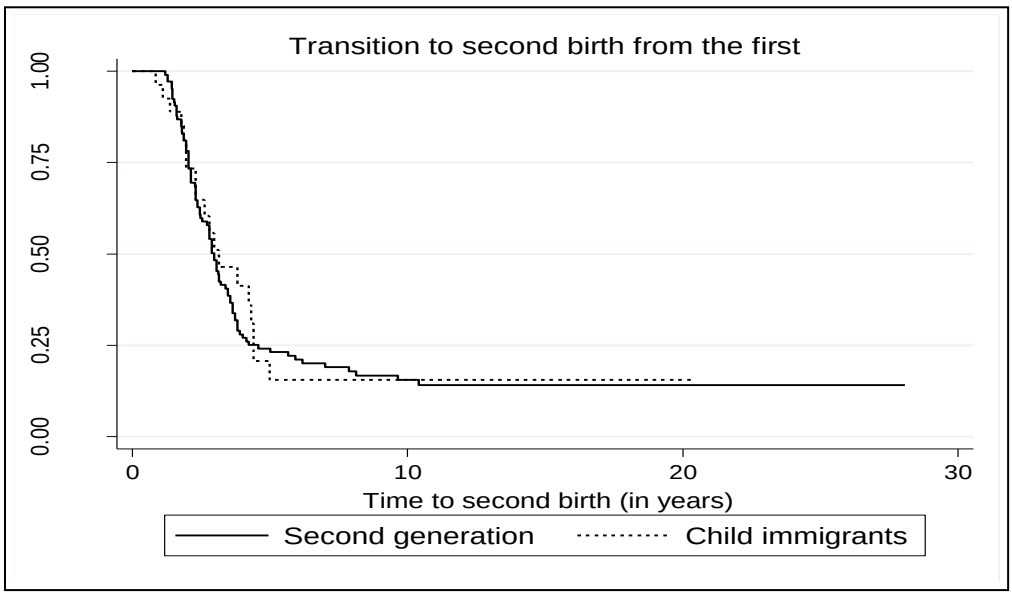
Appendix 5-12. Time to first birth from age 15: Child immigrants vs. second generation in Alberta



Log-rank test: Chi2(1) = 0.03 P-value = Pr>Chi2 = 0.868

Source: The 2010 Alberta Fertility Survey

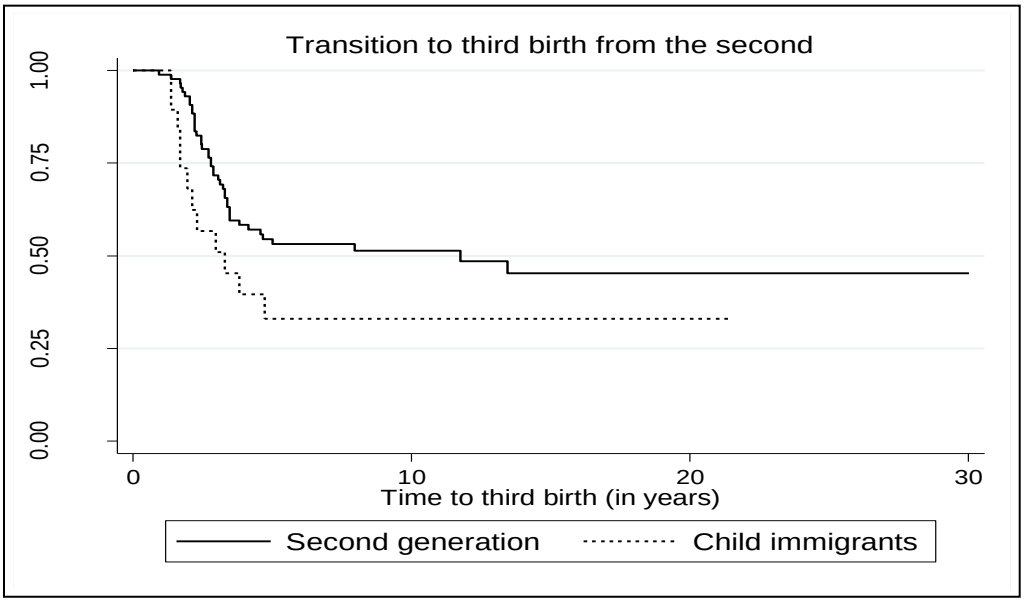
Appendix 5-13. Time to second birth from first birth: Child immigrants vs. second generation in Alberta



Log-rank test: Chi2(1) = 0.09 P-value = Pr>Chi2 = 0.765

Source: The 2010 Alberta Fertility Survey

Appendix 5-14. Time to third birth from second birth: Child immigrants vs. second generation in Alberta

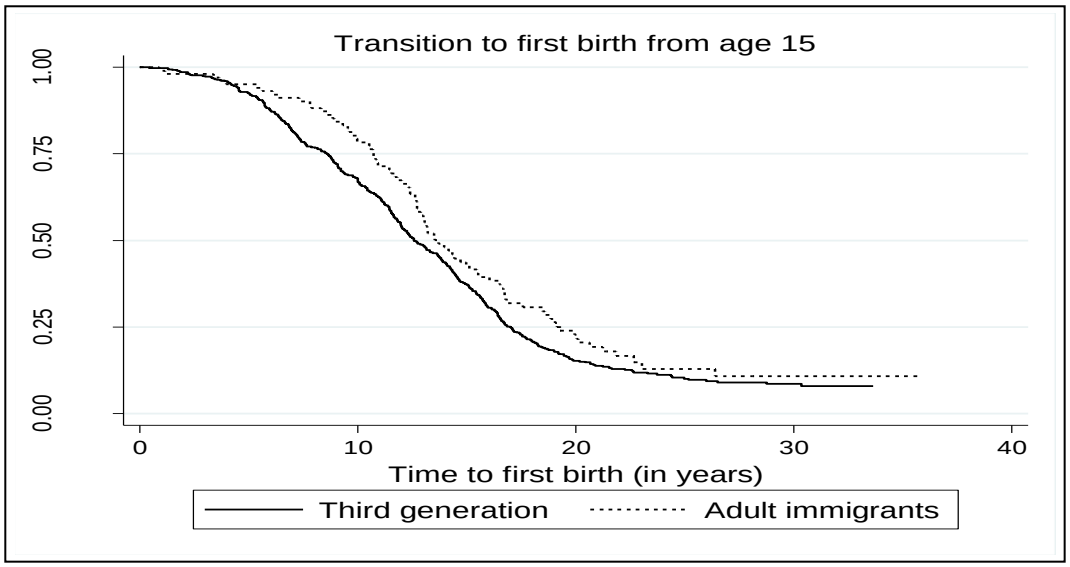


Log-rank test: Chi2(1) =3.45 P-value = Pr>Chi2 = 0.063

Source: The 2010 Alberta Fertility Survey

KM Graphs related to Part C: Adult immigrant women

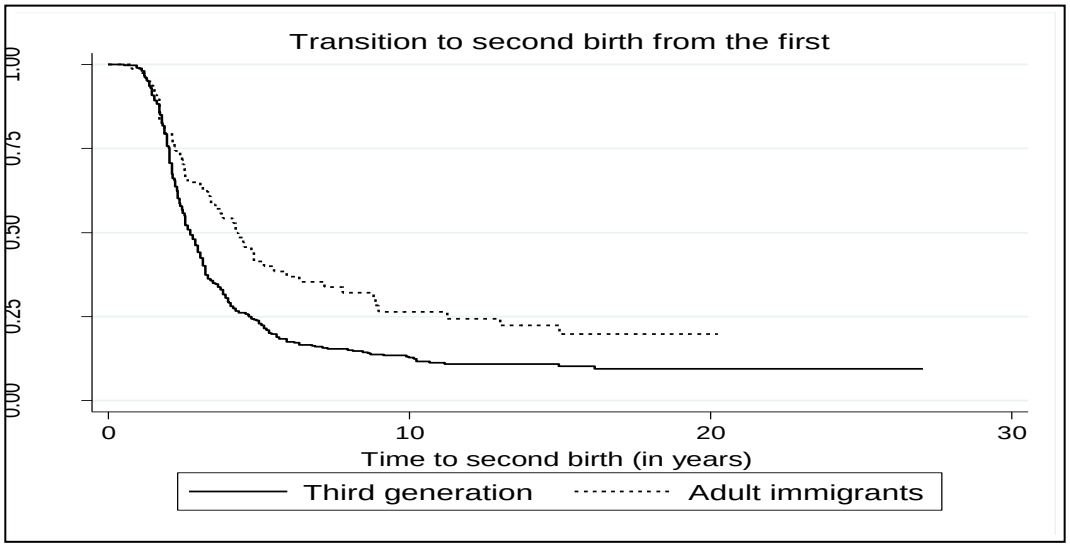
Appendix 5-15. Time to first birth from age 15: Adult immigrants vs. third generation in Alberta



Log-rank test: Chi2(1) = 3.44 P-value = Pr>Chi2 = 0.044

Source: The 2010 Alberta Fertility Survey

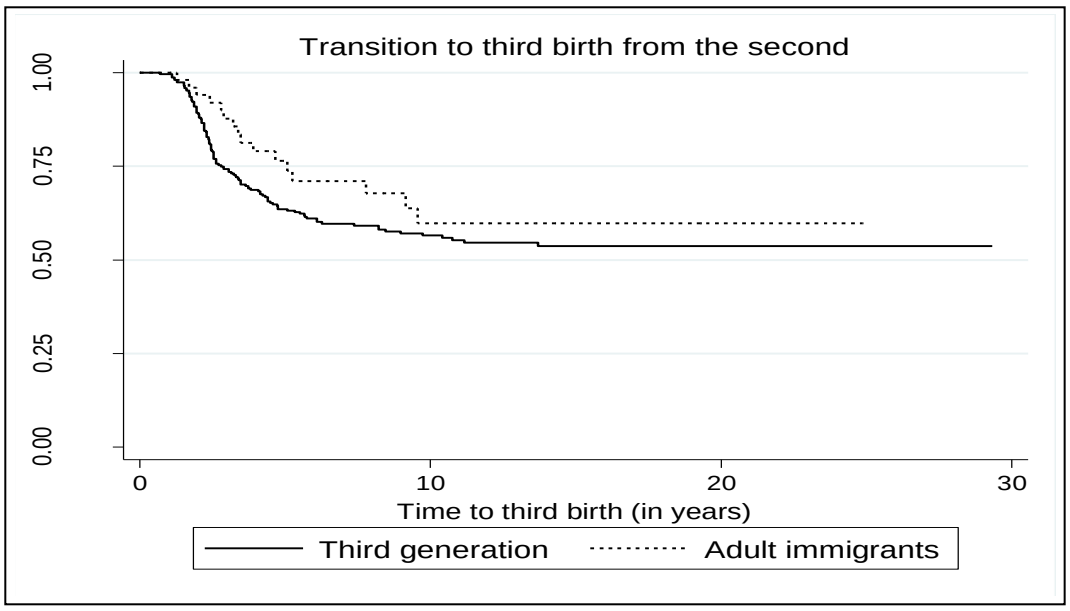
Appendix 5-16. Time to second birth from first birth: Adult immigrants vs. third generation in Alberta



Log-rank test: Chi2(1) =11.21 P-value = Pr>Chi2 = 0.008

Source: The 2010 Alberta Fertility Survey

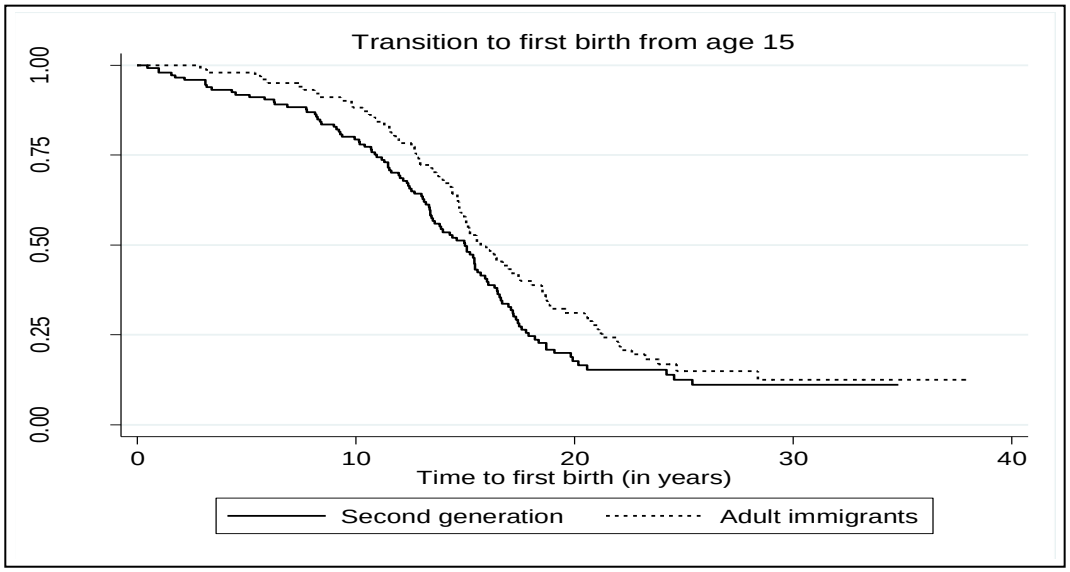
Appendix 5-17. Time to third birth from second birth: Adult immigrants vs. third generation in Alberta



Log-rank test: Chi2(1) =1.69 P-value = Pr>Chi2 = 0.193

Source: The 2010 Alberta Fertility Survey

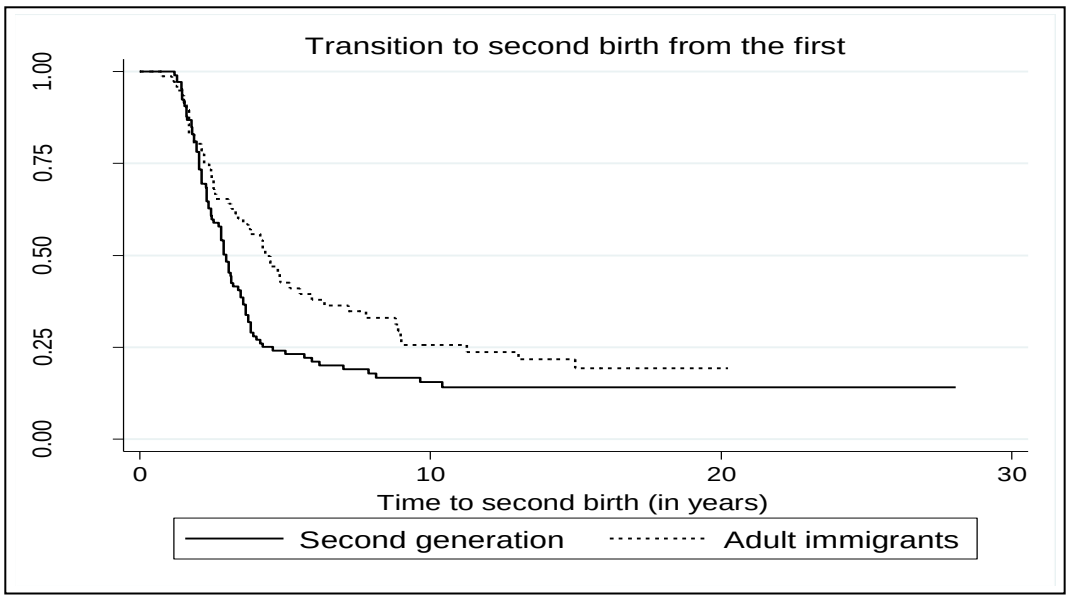
Appendix 5-18. Time to first birth from age 15: Adult immigrants vs. second generation in Alberta



Log-rank test: Chi2(1) =3.55 P-value = Pr>Chi2 = 0.047

Source: The 2010 Alberta Fertility Survey

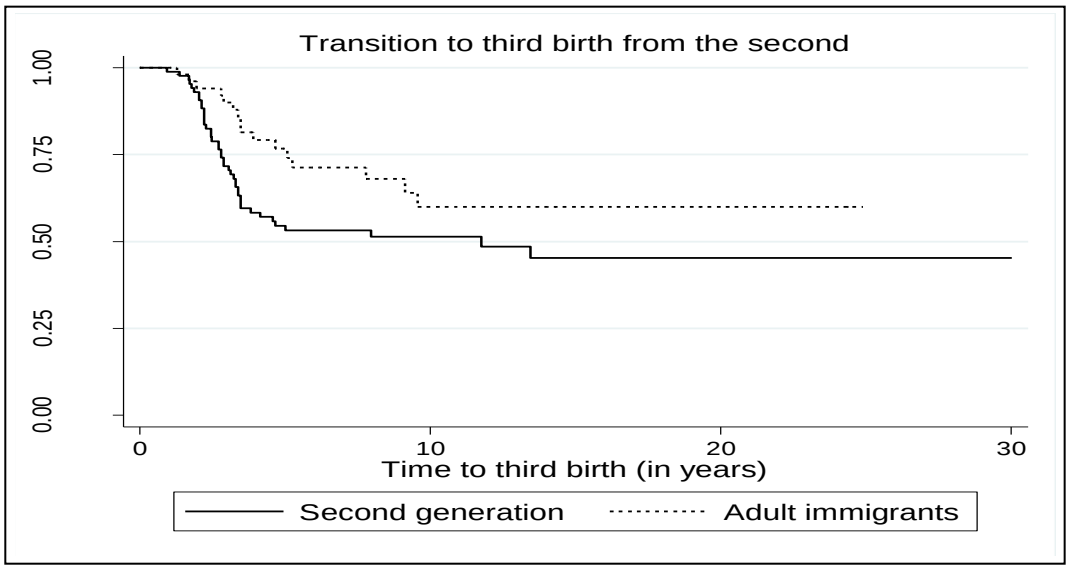
Appendix 5-19. Time to second birth from first birth: Adult immigrants vs. second generation in Alberta



Log-rank test: Chi2(1) = 5.17 P-value = Pr>Chi2 = 0.023

Source: The 2010 Alberta Fertility Survey

Appendix 5-20. Time to third birth from second birth: Adult immigrants vs. second generation in Alberta

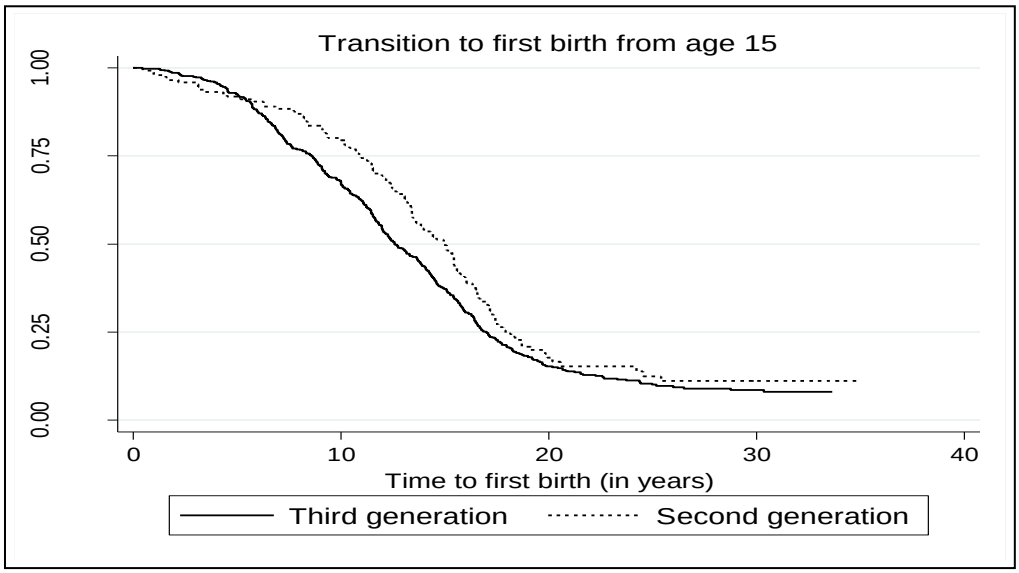


Log-rank test: Chi2(1) = 4.02 P-value = Pr>Chi2 = 0.045

Source: The 2010 Alberta Fertility Survey

KM Graphs related to Part D: Second-generation women

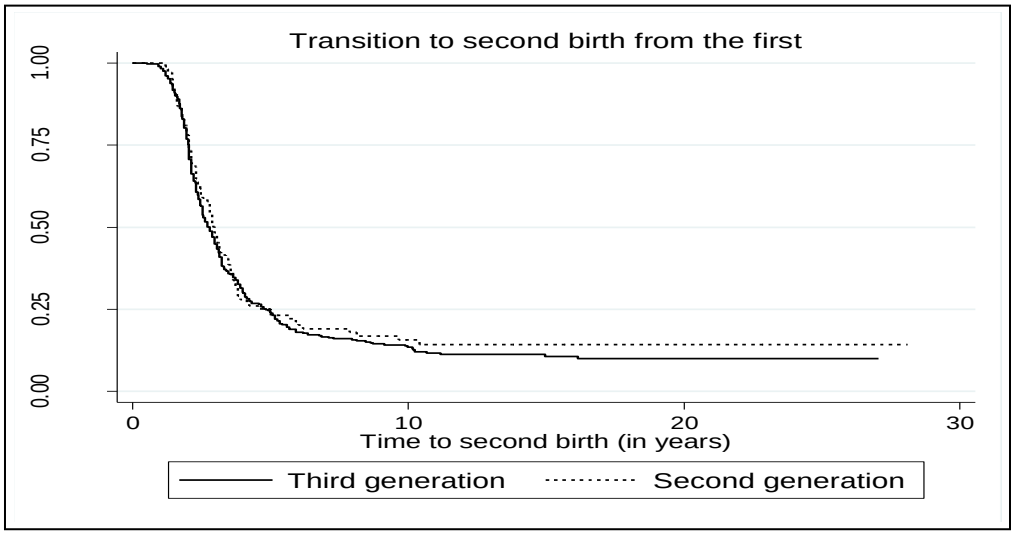
Appendix 5-21. Time to first birth from age 15: Second generation vs. third generation in Alberta



Log-rank test: Chi2(1) = 4.61 P-value = Pr>Chi2 = 0.031

Source: The 2010 Alberta Fertility Survey

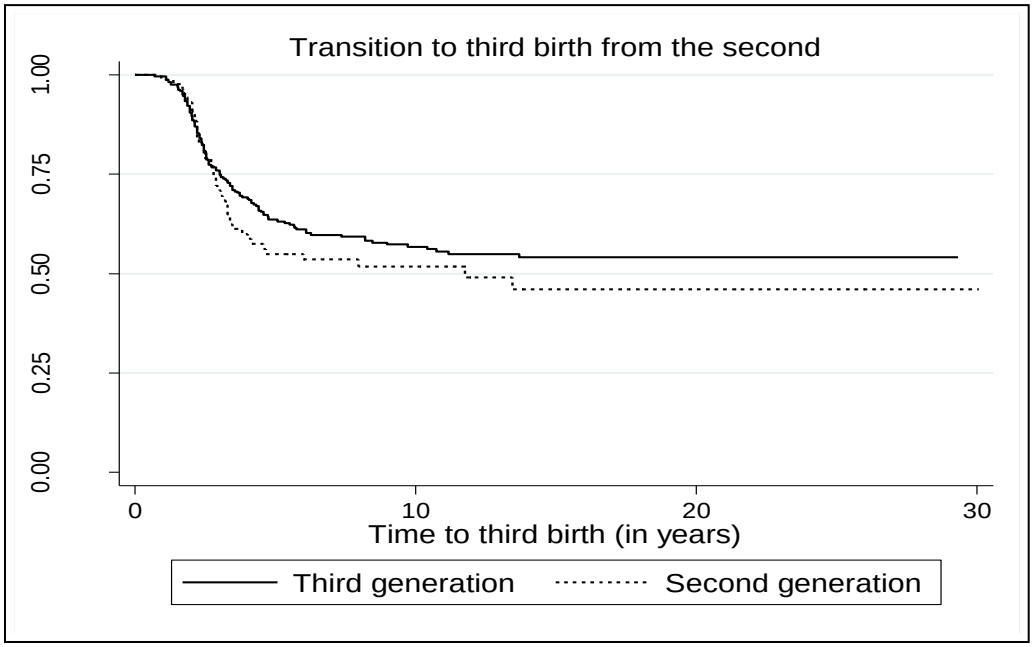
Appendix 5-22. Time to second birth from first birth: Second generation vs. third generation in Alberta



Log-rank test: Chi2(1) =0.48 P-value = Pr>Chi2 = 0.487

Source: The 2010 Alberta Fertility Survey

Appendix 5-23. Time to third birth from second birth: Second generation vs. third generation in Alberta

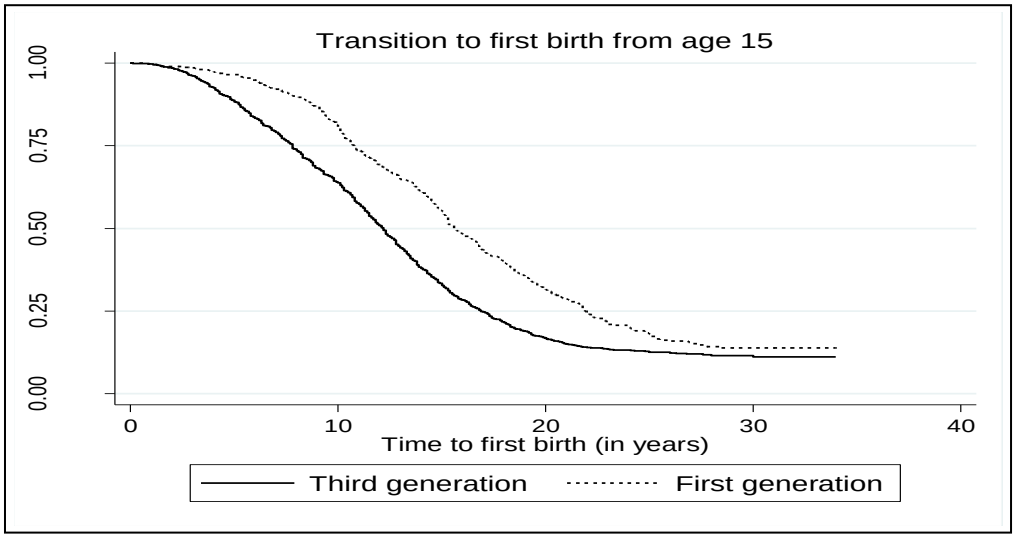


Log-rank test: Chi2(1) = 1.20 P-value = Pr>Chi2 = 0.273

Source: The 2010 Alberta Fertility Survey

KM Curves Based on the GSS 2006

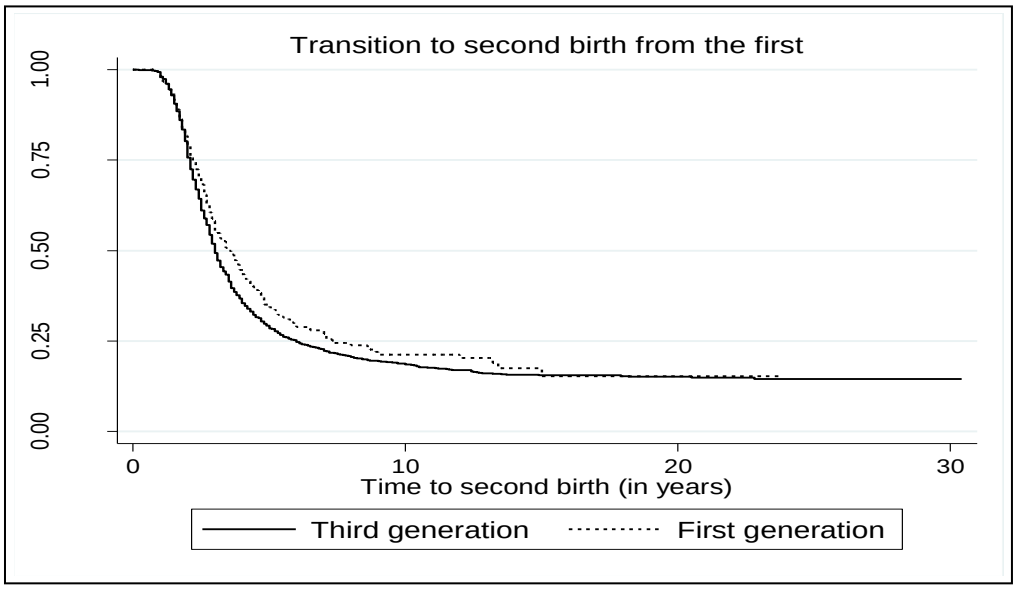
Appendix 5-24. Time to first birth from age 15: First generation vs. third generation in Canada



Log-rank test: Chi2(1) =53.88 P-value = Pr>Chi2 =0.000

Source: The 2006 General Social Survey

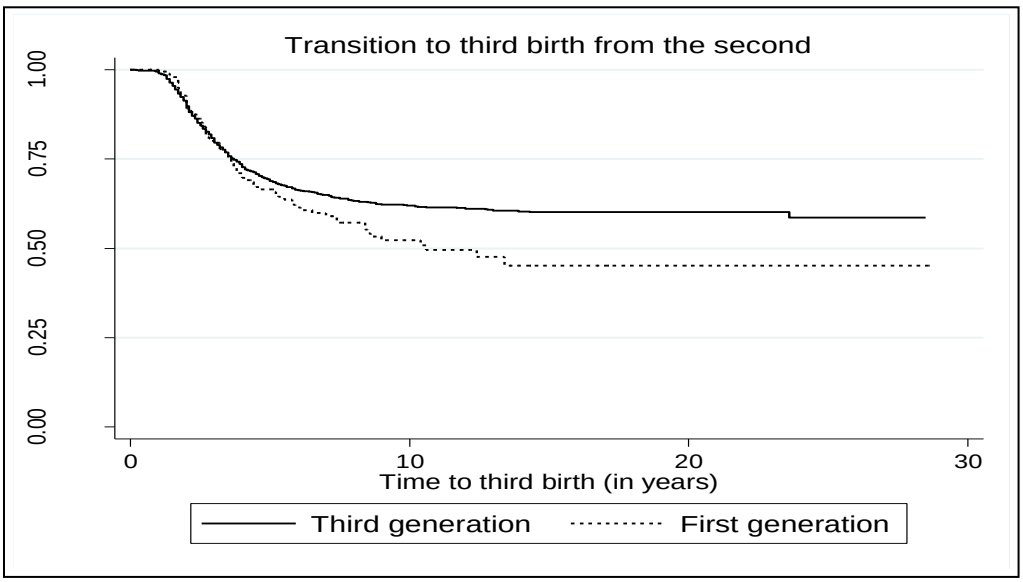
Appendix 5-25. Time to second birth from first birth: First generation vs. third generation in Canada



Log-rank test: Chi2(1) = 3.87 P-value = Pr>Chi2 = 0.049

Source: The 2006 General Social Survey

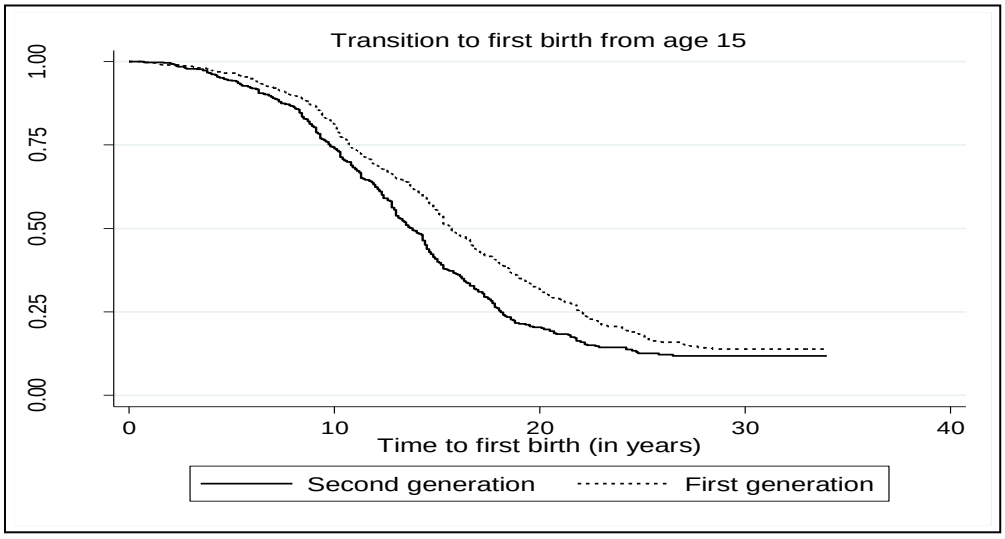
Appendix 5-26. Time to third birth from second birth: First generation vs. third generation in Canada



Log-rank test: Chi2(1) = 3.72 P-value = Pr>Chi2 = 0.054

Source: The 2006 General Social Survey

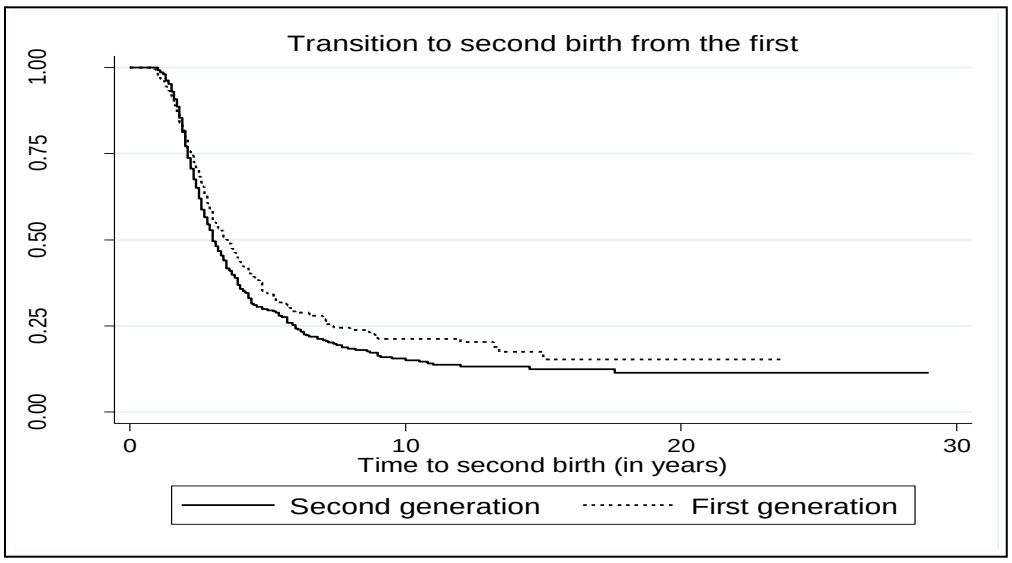
Appendix 5-27. Time to first birth from age 15: First generation vs. second generation in Canada



Log-rank test: Chi2(1) =14.34 P-value = Pr>Chi2 =0.000

Source: The 2006 General Social Survey

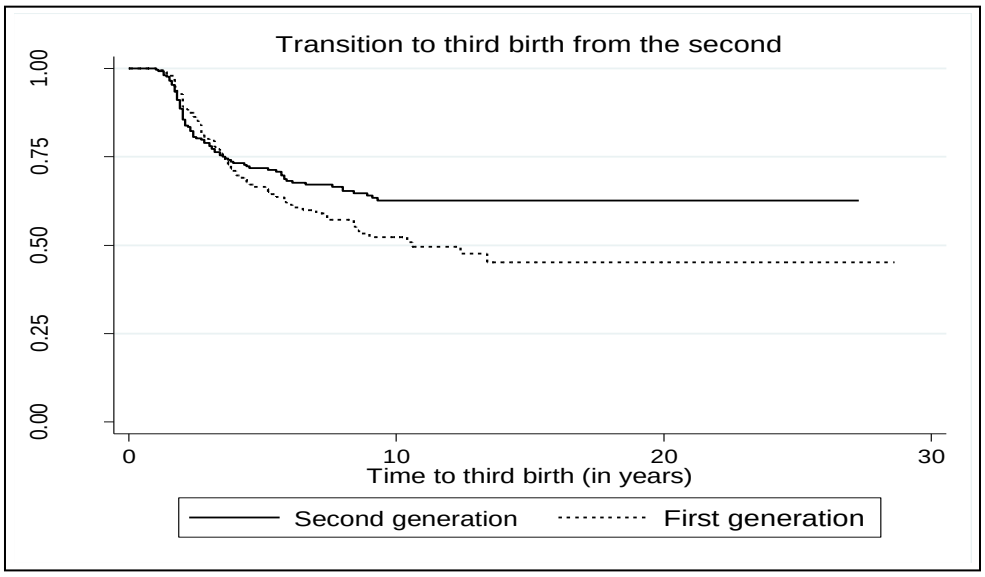
Appendix 5-28. Time to second birth from first birth: First generation vs. second generation in Canada



Log-rank test: Chi2(1) =3.47 P-value = Pr>Chi2 = 0.062

Source: The 2006 General Social Survey

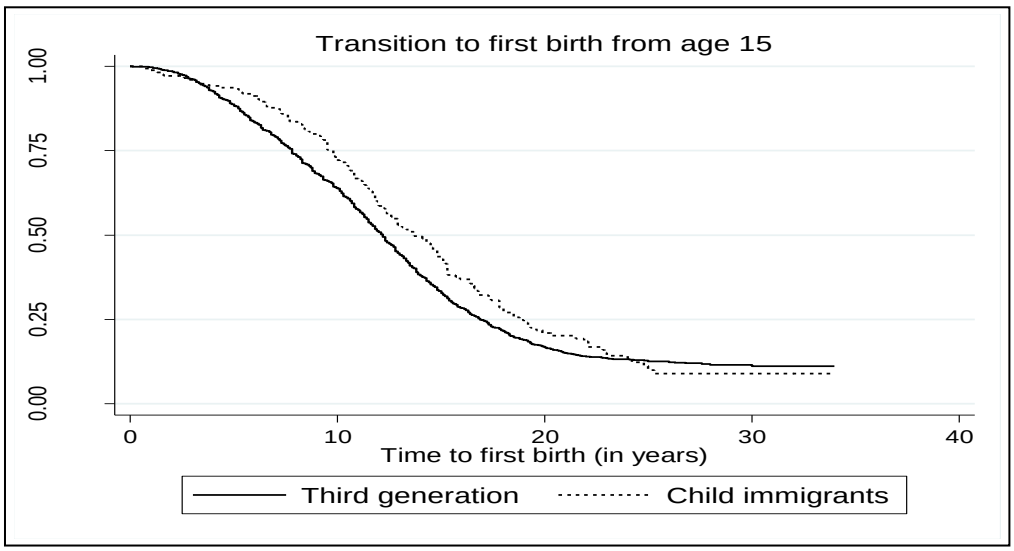
Appendix 5-29. Time to third birth from second birth: First generation vs. second generation in Canada



Log-rank test: Chi2(1) = 3.18 P-value = Pr>Chi2 = 0.074

Source: The 2006 General Social Survey

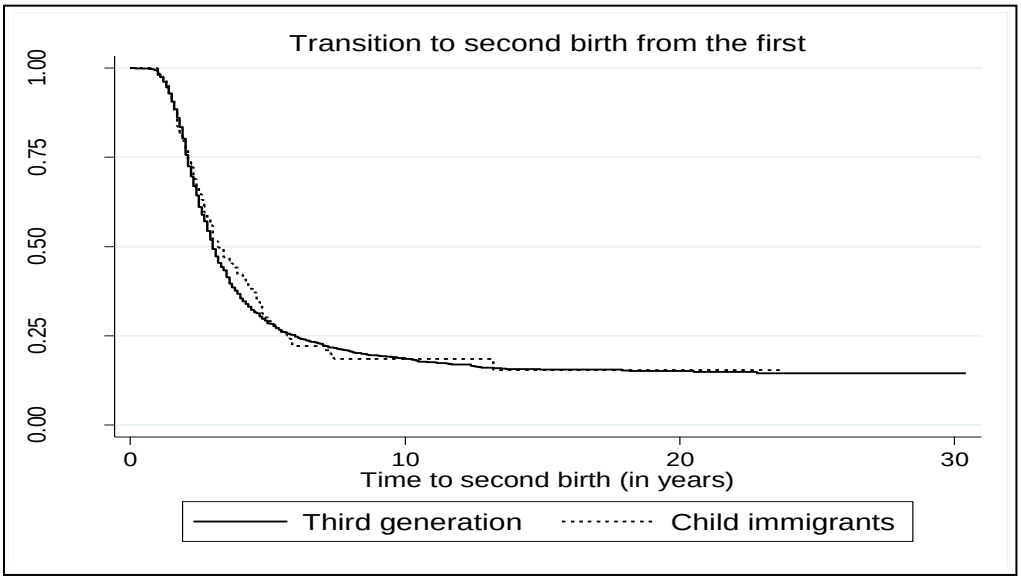
Appendix 5-30. Time to first birth from age 15: Child immigrants vs. third generation in Canada



Log-rank test: Chi2(1) = 3.49 P-value = Pr>Chi2 = 0.062

Source: The 2006 General Social Survey

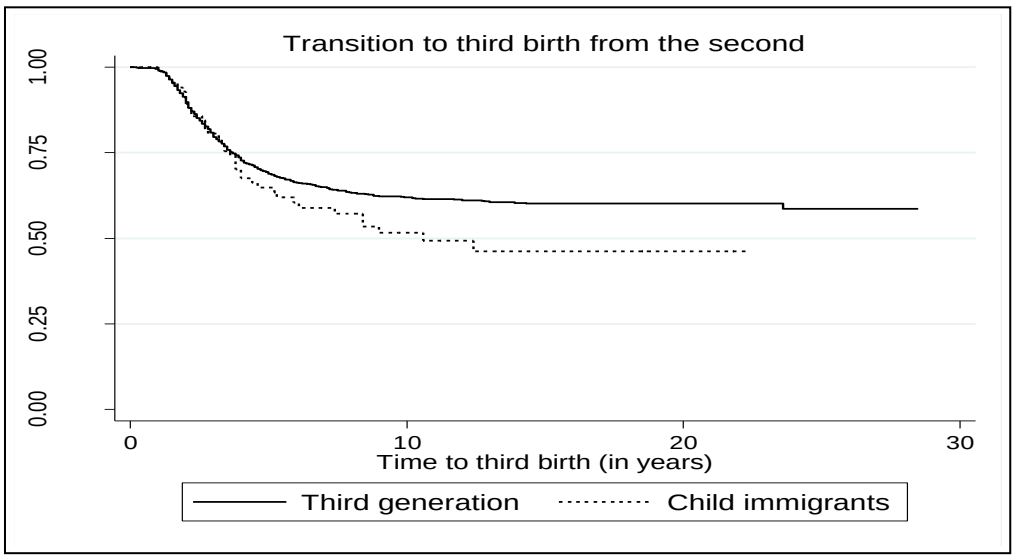
Appendix 5-31. Time to second birth from first birth: Child immigrants vs. third generation in Canada



Log-rank test: Chi2(1) = 0.21 P-value = Pr>Chi2 = 0.650

Source: The 2006 General Social Survey

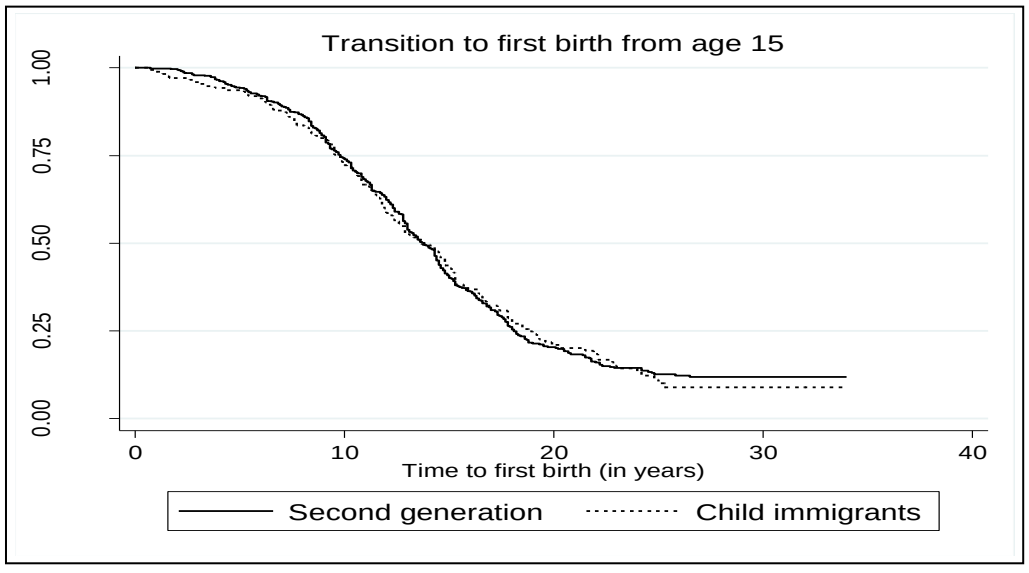
Appendix 5-32. Time to third birth from second birth: Child immigrants vs. third generation in Canada



Log-rank test: Chi2(1) = 2.58 P-value = Pr>Chi2 = 0.108

Source: The 2006 General Social Survey

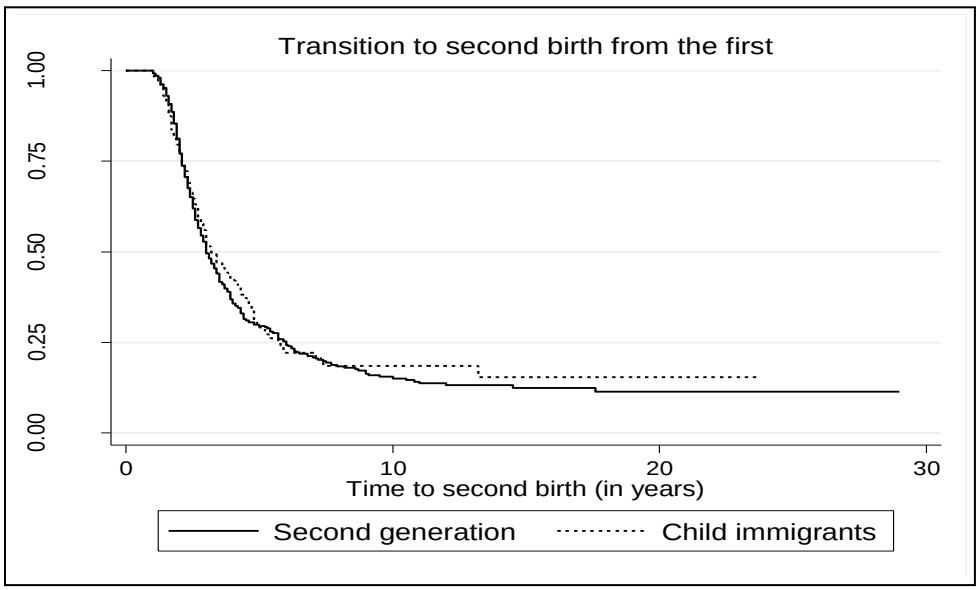
Appendix 5-33. Time to first birth from age 15: Child immigrants vs. second generation in Canada



Log-rank test: Chi2(1) =0.02 P-value = Pr>Chi2 = 0.899

Source: The 2006 General Social Survey

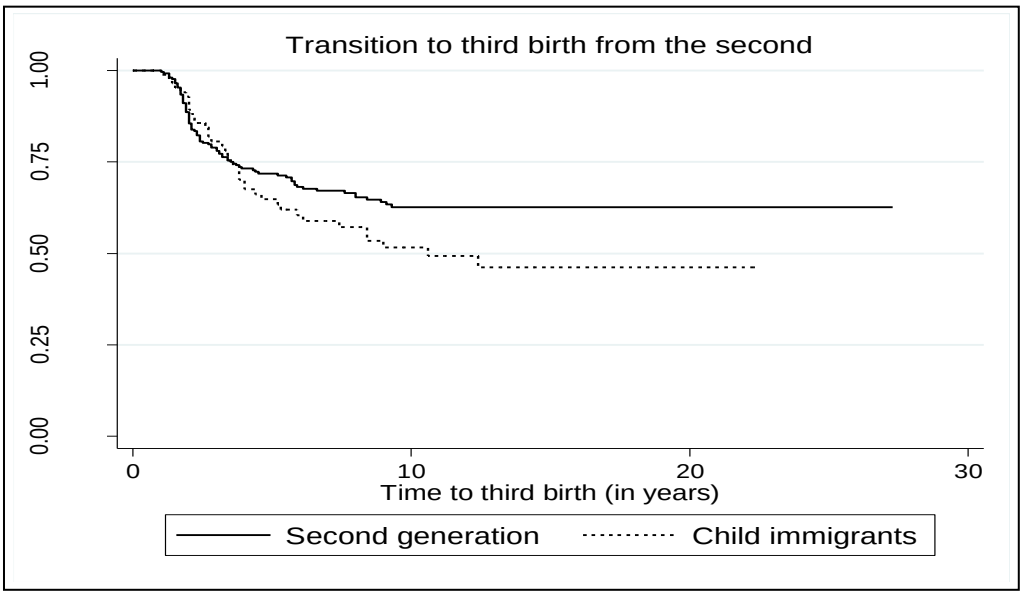
Appendix 5-34. Time to second birth from first birth: Child immigrants vs. second generation in Canada



Log-rank test: Chi2(1) = 0.32 P-value = Pr>Chi2 = 0.573

Source: The 2006 General Social Survey

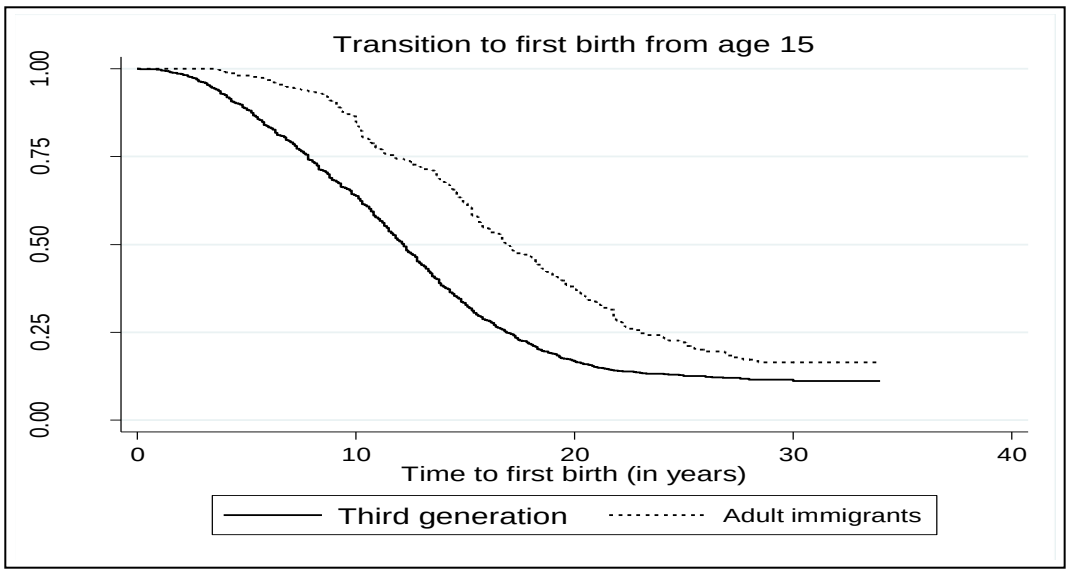
Appendix 5-35. Time to third birth from second birth: Child immigrants vs. second generation in Canada



Log-rank test: Chi2(1) =2.49 P-value = Pr>Chi2 = 0.114

Source: The 2006 General Social Survey

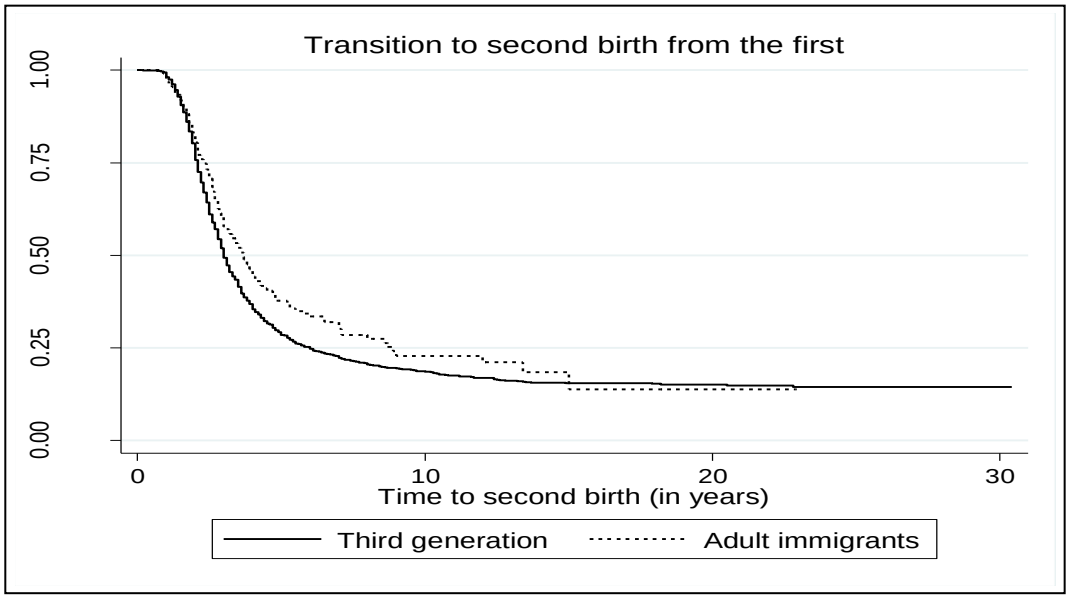
Appendix 5-36. Time to first birth from age 15: Adult immigrants vs. third generation in Canada



Log-rank test: Chi2(1) = 61.13 P-value = Pr>Chi2 = 0.000

Source: The 2006 General Social Survey

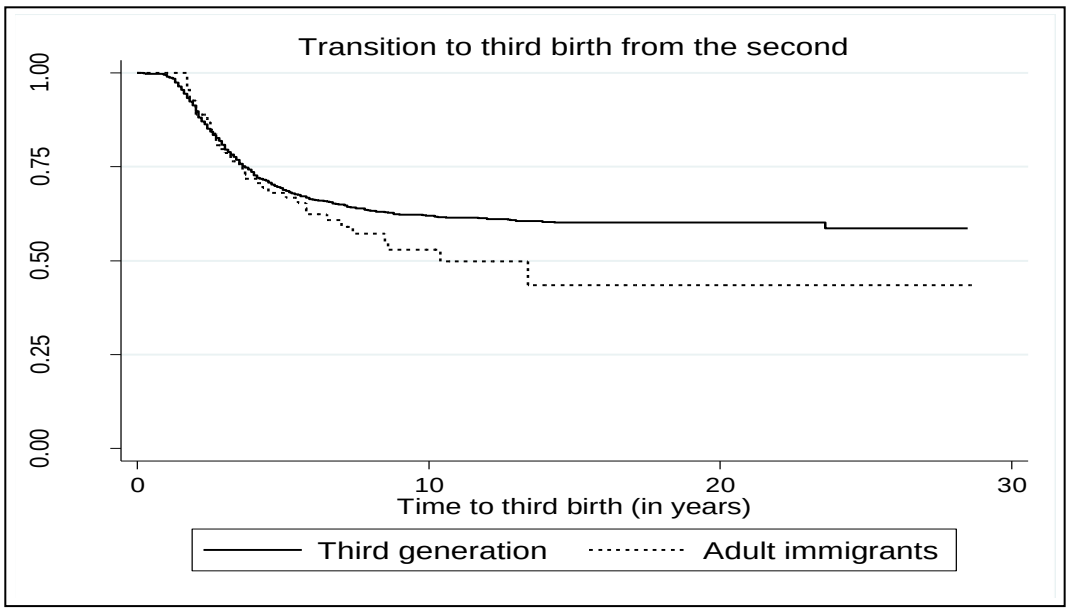
Appendix 5-37. Time to second birth from first birth: Adult immigrants vs. third generation in Canada



Log-rank test: Chi2(1) = 4.99 P-value = Pr>Chi2 = 0.026

Source: The 2006 General Social Survey

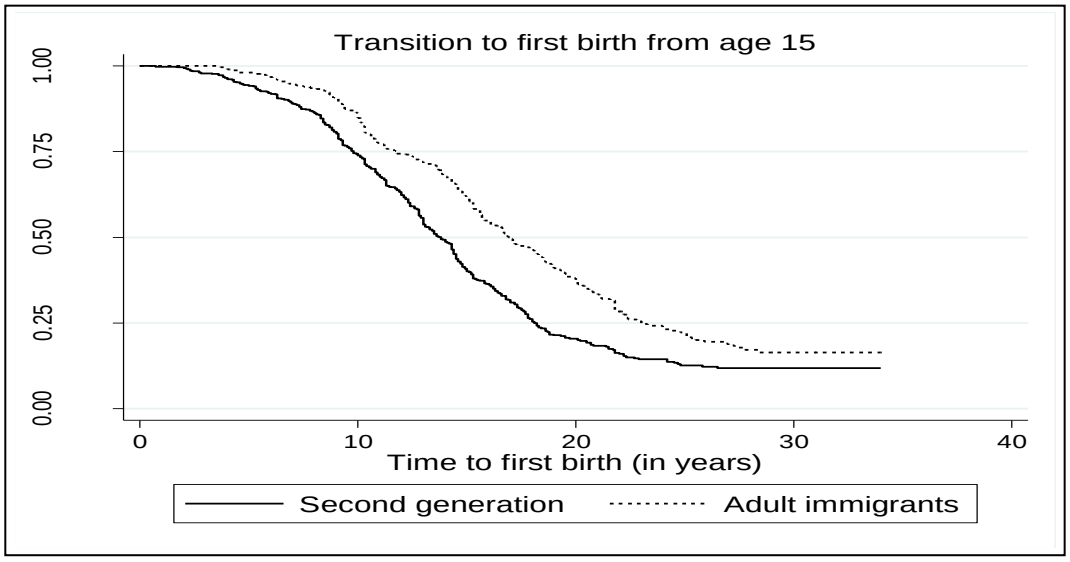
Appendix 5-38. Time to third birth from second birth: Adult immigrants vs. third generation in Canada



Log-rank test: Chi2(1) = 1.47 P-value = Pr>Chi2 = 0.225

Source: The 2006 General Social Survey

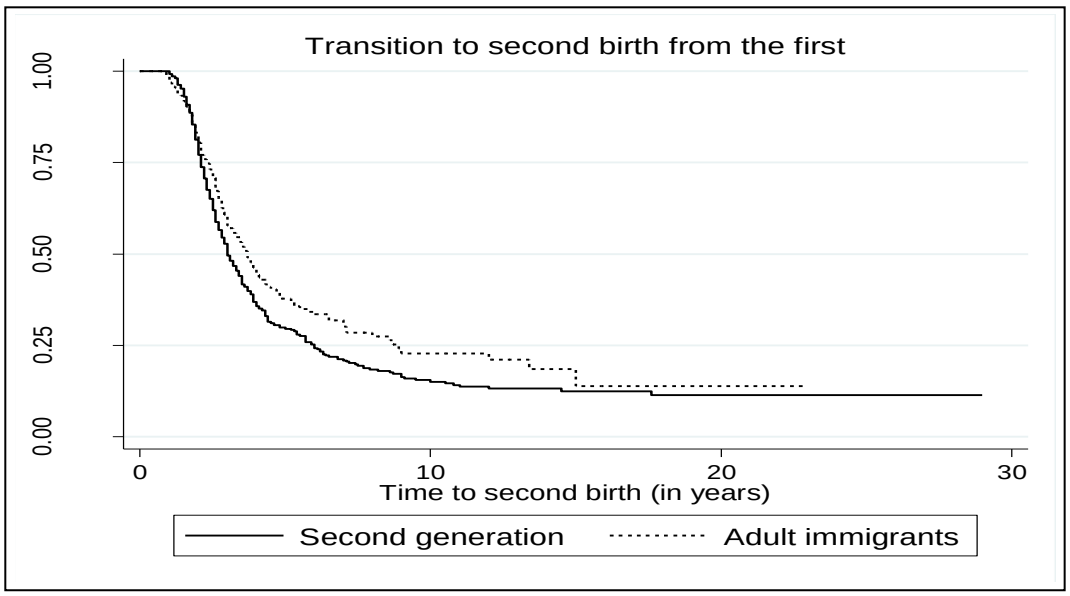
Appendix 5-39. Time to first birth from age 15: Adult immigrants vs. second generation in Canada



Log-rank test: Chi2(1) = 25.74 P-value = Pr>Chi2 = 0.000

Source: The 2006 General Social Survey

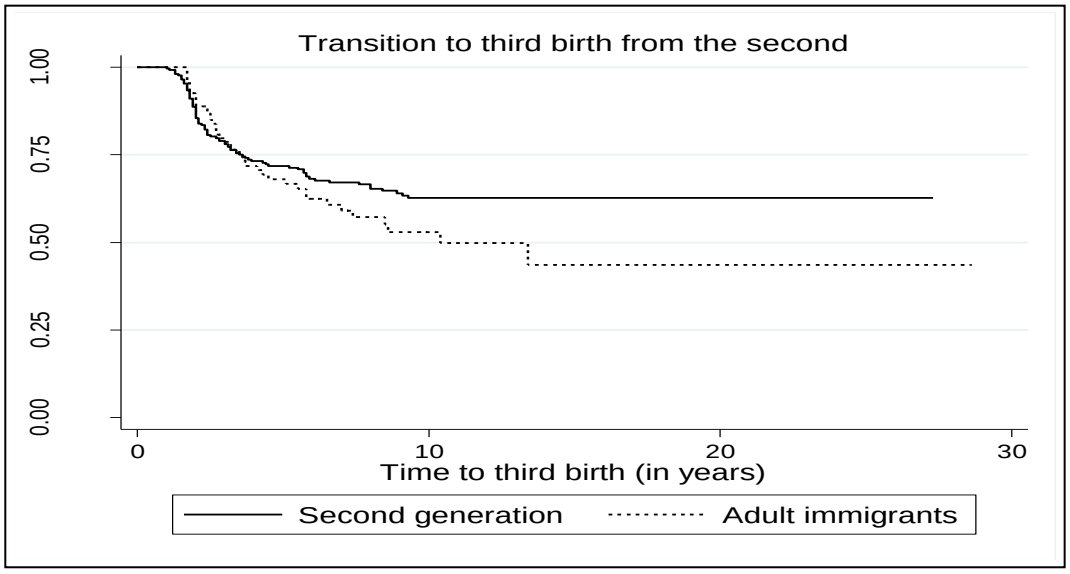
Appendix 5-40. Time to second birth from first birth: Adult immigrants vs. second generation in Canada



Log-rank test: Chi2(1) =4.79 P-value = Pr>Chi2 = 0.028

Source: The 2006 General Social Survey

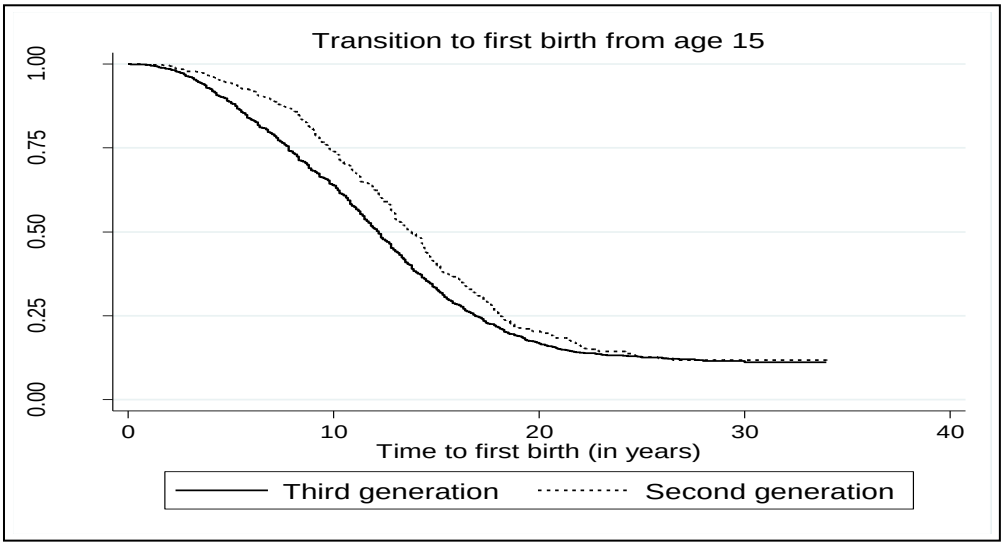
Appendix 5-41. Time to third birth from second birth: Adult immigrants vs. second generation in Canada



Log-rank test: Chi2(1) = 1.51 P-value = Pr>Chi2 = 0.219

Source: The 2006 General Social Survey

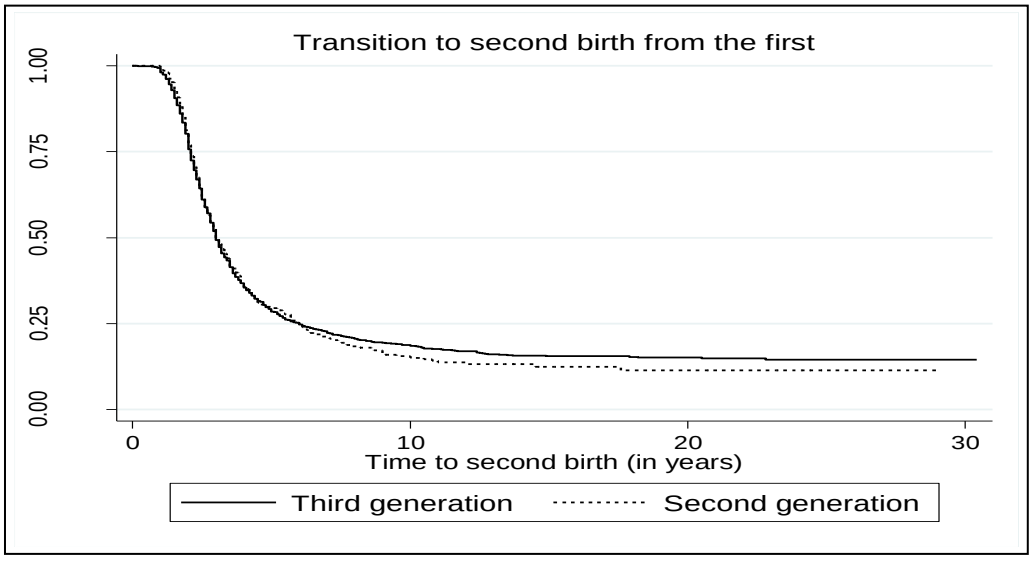
Appendix 5-42. Time to first birth from age 15: Second generation vs. third generation in Canada



Log-rank test: Chi2(1) = 12.04 P-value = Pr>Chi2 = 0.000

Source: The 2006 General Social Survey

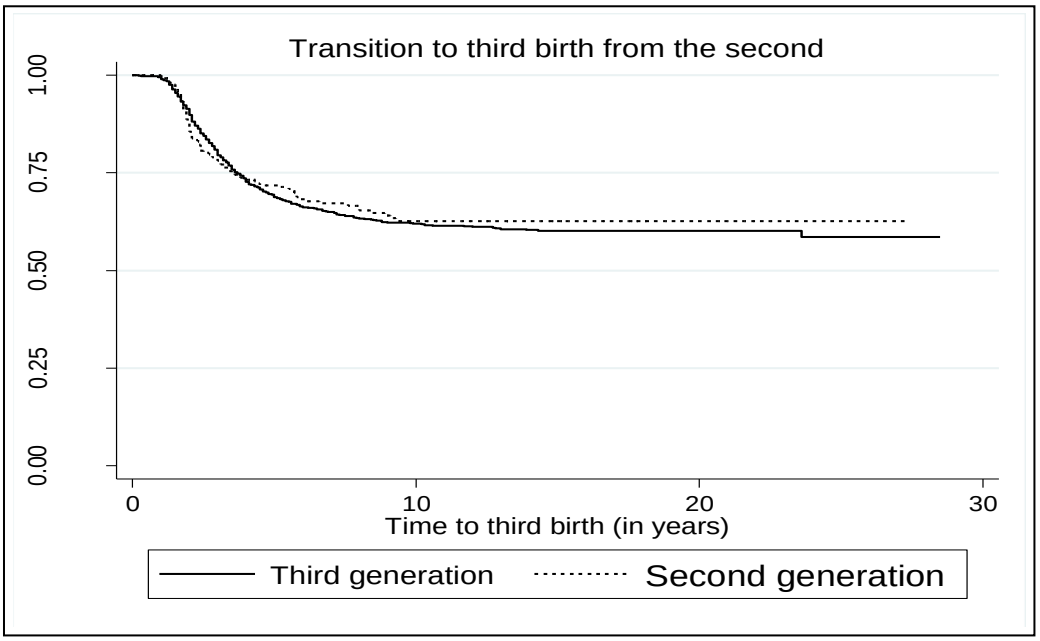
Appendix 5-43. Time to second birth from first birth: Second generation vs. third generation in Canada



Log-rank test: Chi2(1) = 0.16 P-value = Pr>Chi2 = 0.686

Source: The 2006 General Social Survey

Appendix 5-44. Time to third birth from second birth: Second generation vs. third generation in Canada



Log-rank test: Chi2(1) = 0.12 P-value = Pr>Chi2 = 0.731

Source: The 2006 General Social Survey

Appendix 6-1. Sensitivity analysis of the 2010 Alberta Fertility Survey

Generation Status	Cox regression estimates (Hazard Ratios)			OLS estimates	Weibull regression estimates (Hazard Ratios)			Poisson estimates
	1st birth	2nd birth	3rd birth	Cumulative fertility	1st birth	2nd birth	3rd birth	Cumulative fertility
1st generation vs. 3rd generation	0.539**	0.662**	1.183	-0.335**	0.532**	0.649**	0.933	-0.232**
Child immigrants vs. 3rd generation	0.976	1.106	1.828*	-0.010	1.124	1.136	1.448*	-0.092
Adult immigrants vs. 3rd generation	0.451**	0.571**	0.855	-0.504**	0.440**	0.565**	0.712	-0.294**
1st generation vs. 2nd generation	0.544**	0.749	1.589	-0.304**	0.526**	0.731	1.305	-0.243*
Child immigrants vs. 2nd generation	1.095	1.265	2.293**	0.149	1.151	1.352	2.069*	-0.006
Adult immigrants vs. 2nd generation	0.433**	0.652**	0.998	-0.585**	0.414**	0.631*	0.934	-0.365**
2nd generation vs. 3rd generation	0.971	0.896	0.773	-0.002	1.038	0.890	0.783	0.001

Note: All models include control variables of age, age squared, age at first marriage, education, employment duration, and perceived financial condition

Source: The 2010 Alberta Fertility Survey