THE INTERGENERATIONAL TRANSMISSION OF THE "HEALTHY IMMIGRANT EFFECT:" EXAMINING HEALTH OUTCOMES OF IMMIGRANTS' CHILDREN THROUGH SOCIAL CAPITAL

by

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To my mother and my godmother
for all of their love and support.

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Abstract

The health of children and immigrants has been paramount to the economics literature in recent years. A strong relationship between parents' socioeconomic status and children's health has been well established. The vast short- and long-term consequences of children's health outcomes, like low birth weight, have been emphasized. Similarly, empirical studies have attributed considerable importance to immigrants' health. The healthy immigrant effect (HIE), a phenomenon where immigrants are healthier upon arrival but their health diminishes through time, has been evidenced in Canada. However, the link between children's health and the HIE has not been made. Using birth weight as a health measure, the intergenerational transmission of the HIE through social capital is examined. With the National Longitudinal Survey of Children and Youth this study provides robust evidence of the perpetuation of the HIE. However, social capital does not appear to be a determinant of birth weight for immigrants' children in Canada.

List of Abbreviations Used

AIDS: Acquired Immunodeficiency Syndrome

APGAR: Appearance, Pulse, Grimace, Activity and Respiration.

ARDC: Atlantic Research Data Centre

BW: Birth Weight

BMI: Body Mass Index

CCHS: Canadian Community Health Survey

g: gram

GSS: General Social Survey

HIE: Healthy Immigrant Effect

HIV: Human Immunodeficiency Virus

IQ: Intelligence Quotient

kg: kilogram

LBW: Low Birth Weight (birth weight less than 2500 grams)

LSIC: Longitudinal Survey of Immigrants to Canada

NLSCY: National Longitudinal Survey of Children and Youth

NPHS: National Population Health Survey

OLS: Ordinary Least Squares

OVB: Omitted Variable Bias

PMK: Person Most Knowledgeable

p.p.: percentage points

PRI: Policy Research Initiative

SE: Standard Error

SES: Socioeconomic Status

UK: United Kingdom

US: United States

YSM: Years Since Migration

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Chapter 1: Introduction

The following is a study of the effects of social capital on the health outcomes of immigrants' children. In the past century there has been a considerable focus on health, as it is central to human wellbeing. The health of children specifically has been widely discussed by academics, international organizations and governments.[1] Within the considerable research emphasizing the short-term and long-term effects of adverse health outcomes on children, birth weight has been the most commonly used measure of infant health. One of the reasons for its use is because morbidity is higher for infants whose birth weight is less than 2500 grams. Low birth weight has also been associated with diminished future cognitive, economic, educational, and social outcomes (Almond, 2006; Almond, Chay, Lee, 2005; Almond and Currie, 2009; Black, S., Devereux, P., and Salvanes, K., 2005; Currie and Hyson, 1999; Currie and Moretti, 2007). Therefore, birth weight becomes a frequently recorded and standard measure of children's health.

Examining children's health outcomes in Canada is extremely appealing for several reasons. First, there are significant intergenerational benefits and costs transmitted to children through parents' characteristics (Case, Lubotsky and Paxson, 2002; Currie and Moretti 2003, 2007; Currie and Stabile, 2003). Second, the composition of the Canadian population provides additional areas of research that might not be explored in other contexts. According to data from the 2006 Census, 19.8% of the population in Canada were immigrants. Though the health of this portion of the population is important

[1] For example, the World Bank has established three Millennium Development Goals that directly target health, and one goal particularly aims at reducing infant mortality (World Bank, 2012).

in and of itself, further investigation of this particular group allows for greater research on the 'healthy immigrant effect.' This phenomenon indicates that immigrants are healthier than native-born Canadians upon arrival to Canada but their health diminishes as years go by. There have been several theoretical extensions of the healthy immigrant effect attesting to the favorable impacts of social capital and social networks in improving immigrants' health (Deri, 2002; Zhao, Xue and Gilkinson, 2010). Social capital enables immigrants to become better acculturated to Canada. With greater acculturation, immigrants incorporate Canadian values, attitudes and most importantly, behaviors that affect their health status—a potential pathway giving rise to the phenomenon. Although the literature has successfully provided robust evidence of the existence of the healthy immigrant effect and the effect of social capital,[2] no attention has been given to the health of immigrants' children. The possibility of an intergenerational transfer of the healthy immigrant effect has not been explored.

This gap provides the basis of this study, which examines the intergenerational transmission of the healthy immigrant effect through social capital. To measure whether the effect is perpetuated, a pooled cross-section of the National Longitudinal Survey of Children and Youth is used. Birth weight and probability of low birth weight are used as the principal health measures. The main focus of the research is to explain what happens to the birth weights of immigrants' children if their parents have social capital. Given the objective nature of birth weight as a measure of health status, this paper examines if the healthy immigrant effect is prevalent and immigrants' health is deteriorated or if, alternatively, perceptions of health change the longer immigrants are in Canada. By combining several methodologies from the birth weight, intergenerational transmission of

[2] See Chapter 4.

socioeconomic status, healthy immigrant effect and social networks literature, robust evidence attesting to the perpetuation of the healthy immigrant effect is found. However, social capital seems to play no role in the determination of birth weight for immigrants' children.

The paper is organized as follows. Chapters 1 through 5 review the literature of birth weight, the intergenerational transmission of socioeconomic status, the healthy immigrant effect and social capital and social networks. Chapter 6 provides a more detailed explanation of the innovation supplied by this study. Chapter 7 describes the National Longitudinal Survey of Children and Youth. Chapter 8 gives a detailed explanation of the empirical strategy. Chapter 9 presents the results for the main regressions and robustness checks. Chapter 10 endows a brief discussion of the results. Finally, Chapter 11 concludes with an overview of the main findings and policy implications.

Chapter 2: Birth Weight

2.1 The Initial Health Endowment and Birth Weight

It has been widely cited in the literature that there are significant short-run and long-run effects derived from early childhood conditions. Economists have vastly explored the 'initial health endowment' using a theoretical construct, health status. Health status can be viewed both as an input and an output. As an input, all individuals are granted an initial stock of health at birth. As an output, there is an infant health production function dependent principally on maternal behavior.

Viewing it as an input, Almond (2006) argues that health conditions can be traced back to the course of fetal development and that shocks to fetuses have significant effects later in life. In fact, the Influenza Pandemic of 1918 had long-term effects on adult outcomes for the 1919 cohort who were in-utero while the disease was rampant. The children exposed to the pandemic were shown to have higher percentages of disability, lower schooling levels and graduation rates, and higher poverty rates in later years (Almond, 2006). Similarly, Almond and Currie (2010) demonstrate that investments in early childhood have sustained effects. In fact, events that occur in a child's life before they are five years old have sizeable impacts on adult outcomes like educational attainment, income levels, and earnings. Fortunately, any damage that occurs before this age can be remedied so that the adverse impacts on later outcomes are lessened (Almond and Currie, 2010). The 'early influences' literature thus substantiates the importance of the initial health endowment.

Several birth outcomes have been used as proxies when attempting to empirically examine the initial health endowment and the infant health production function. Birth weight (BW) is one of these outcomes and the literature has successfully established empirically that low birth weight (birth weight less than 2500 grams) has consequential short- and long-run effects on cognitive, physical, and economic outcomes.

2.2 The Short- and Long-Run Effects of Birth Weight

Proxying birth weight as the initial health endowment, the literature has not only exhibited that there are significant short-term and long-term effects associated to low birth weight (LBW), but also, that these are intergenerational effects. Studies range vastly with respect to empirical frameworks, as there are natural experiments, panel studies, cross-sectional studies and twin studies (Hiscock, 2012). Natural experiments assess the effects of in-utero development, early weight gain and its impact on adult outcomes. For instance, Almond and Mazumder (2009) study the role of nutrition on birth weight by conducting a natural experiment examining the effect that the exposure to Ramadan has on infants. Maternal fasting from Arab mothers during the celebratory months of Ramadan results in lower birth weight and lower gestational length among children. These adverse effects have a strong association with disabilities in adulthood.

Cross-sectional and panel studies have also quantified the notable effects of birth weight. Currie and Hyson (1999) explore the long-run impacts of LBW on educational attainment, employment and health status for the 1958 cohort of children in Great Britain. Using demographic controls, the authors note that LBW children are significantly less likely to pass O-level exams when they are 16 years old, are less likely to be employed

full-time when they are 23 and 33 (more so for females) and are less likely to assess their health as excellent or good. However, when interacting socioeconomic (SES) variables with LBW variables to estimate the extent to which high SES mitigates LBW, the authors find little evidence of a cushioning effect (Currie and Hyson, 1999). Further investigating, Currie, Stabile, Phongsack and Roos (2010) use a Canadian panel data set to compare siblings' health. Using birth weight as one of the measures for health at birth, the proxy is a robust predictor of adverse young adult outcomes, particularly welfare payments usage and diminished educational attainment. In fact, initial health conditions are large predictors of later health and consequently, of later outcomes (Currie et al., 2010). Nonetheless, the problems of these studies—perhaps Currie and Hyson (1999) more so than Currie et al. (2010) as they do include mother fixed effects—is that these studies cannot fully address the omitted variable bias (OVB), stemming from genetic factors, differences in birth weight due to differences in gestational length or other mother-specific unobservables.

Oreopoulos, Stabile, Walld, and Roos (2008) study short- medium- and long-run effects of three different measures of infant health, BW, APGAR scores (a criterion of health at birth measuring appearance, pulse, grimace, activity and respiration) and gestational length. They include siblings and twin subsamples and control for family fixed effects. Their findings suggest that LBW is a crucial predictor of outcomes. In fact, for the sibling sample with the inclusion of family fixed effects, BW lower than 1000g increases the probability of infant mortality by over 87 percentage points. LBW additionally decreases test scores and the probability of reaching grade twelve when the

child is seventeen. Overall, infant health proxies are significant predictors of later outcomes.

Theoretical extensions of BW have quantified its effects by using twin samples. The advantage of twin studies is that the parents' characteristics that are possibly correlated with BW are eliminated, solving the OVB. Therefore, after controlling for mother fixed effects for *genetically identical* children the studies are driven entirely by environmental factors. Although most studies do find significant effects of LBW, these estimates are typically smaller than ordinary least squares (OLS) estimates.[3] Almond, Chay and Lee (2005) attest there are high costs associated with low birth weight using a twin sample from the United States. Focusing on the short-run impacts, they find that LBW increases childhood mortality, the need for assisted ventilation, and reduces the performance of the five-minute APGAR test. Likewise, there are economic costs associated to LBW; an increase in one standard deviation in birth weight reduces hospital costs for delivery and care by 0.008 standard deviations. However, when compared to the OLS results, the costs estimate drops by a factor of six when accounting for mother fixed effects, resulting in the conclusion that OLS results tend to overestimate the impact of LBW.[4]

Analogously, Black, Devereux, and Salvanes (2005) use a Norwegian twin sample arguing that cross-sectional estimates of the effect of LBW are overestimated. They find that birth weight matters in the short-run because it reduces infant mortality and increases the APGAR score but it matters much more in the long-run as it has much

[3] It is worth noting that the external validity of these studies can be questionable given that twin samples have limited intra-twin variance.

[4] Contrary to these results, using monozygotic female twins, similar studies find that cross-sectional results underestimate the effects of BW by 50%. See Behram and Rosenzweig (2004).

stronger effects on long-term outcomes such as height, body mass index (BMI), intelligence quotient (IQ) scores, education and earnings.[5] Importantly, they find that there are intergenerational effects. When estimating the effect of a mother's BW on her child's BW the authors find that a 10% increase in the mother's BW increases the first child's BW by 1.5%. Currie and Moretti (2007) further consider the intergenerational transmission of BW. Using a three-generation data set from California, they employ grandmother fixed effects to determine the effect of mother's BW on child's BW. The results confirm that if a mother was born with LBW the probability of her offspring to be LBW is increased by nearly 50%. By comparing sisters, they are able to overcome genetic biases. Similarly, if the mother was born in a zip code with high poverty levels, the incidence of her child having LBW is further increased. One of the major findings is that low maternal socioeconomic status, independently, increases the likelihood of having LBW children. Further, as an indicator of health at birth (and an input for later socioeconomic status), low birth weight is correlated with a higher incidence of living in a poor area and lower educational achievements. Therefore, the intergenerational transmission of socioeconomic status can be linked to the intergenerational transmission of birth weight.

2.3 The Infant Health Production Function

Prior to engaging in the discussion of the intergenerational transmission of socioeconomic status, it is necessary to understand the infant health production function. As previously mentioned, the health endowment can be seen as both as input and as an

[5] When allowing for non-linear effects of birth weight, comparable analyses find that birth weight has statistically significant effects on adult outcomes such as health conditions or income measures. See Royer (2009).

output. As an output, the initial health endowment is 'produced.' Rosenzweig and Schultz (1983) explore the idea of an infant's health production using birth weight. Using several behavioral variables as determinants of birth outcomes derived from the medical literature, they estimate household production of health function.[6]

The authors derive a mathematical model for a production function in which the household's preference over the child's health is characterized by a utility function. The household produces child health through a production function using health inputs, and a family specific health endowment (e.g. genetic or environmental factors). There is a budget constraint and reduced-form demand functions for goods including health inputs.[7] The resulting equation is a 'hybrid equation' where inputs and the determinants are regressed against a health measure (Rosenzweig and Schultz, 1983). This health technology production function uses health input behaviors as determinants of a child's birth weight. Health inputs are choices themselves, including delayed prenatal care, parity, smoking and mother's age. With an OLS estimation technique they estimate an infant's birth weight determined by health inputs, socioeconomic characteristics of the parents and location specific characteristics. The controls include exogenous individual characteristics like, the parent's education, husband's income, and whether the parents are black.[8]

[6] The authors use "prenatal medical care, working and smoking by the mother while pregnant, the number of births of the mother, and her age" as the determinants derived from medical literature (Rosenzweig and Schultz, 1983, p.725)

[7] The model is greatly lessened for simplicity purposes. See Rosenzweig and Schultz (1983) for the complete derivation of the health production function.

[8] The area controls include "state-level information on input and goods prices, health infrastructure, public expenditures, and labor market conditions. The added variables are hospital beds per capita; per capita governmental health expenditures; the per capita number of hospitals and health departments with family planning, medical doctors, and obstetrician-gynecologists; the unemployment rate for women aged 15-59; the general unemployment rate; the percentage of persons employed in service, government, and manufacturing industries; the per pack cost (including excise taxes) of cigarettes; the sales tax per pack on cigarettes; the price per quart of milk" (Rosenzweig and Schultz, 1983, p. 730).

Although the Rosenzweig and Schultz (1983) model is not able to disentangle causation from correlation, the results provide evidence that endogenous inputs have significant effects on birth weight. The most significant contribution of the study is that it bridges the medical literature with optimization to create a health technology, "producing" birth weight. More importantly, birth weight can be viewed as an output. Although the determinants of birth weight vary extensively (Almond and Currie, 2010; Almond and Mazumder, 2009; Black, Devereux and Salvanes, 2005; Currie and Moretti, 2007; Rosenzweig and Schultz, 1983) it is essential to explore the pathways in the discernment of potential causal relations or correlations, given that as previously addressed, LBW has tremendous impacts for both short- and long-term outcomes.

Chapter 3: The Intergenerational Transmission of Socioeconomic Status

3.1 Definitions

The health economics literature has successfully portrayed the strong relationship between socioeconomic status (SES) and health. To understand SES across generations it is important to define several terms beforehand.

When referring to *socioeconomic status*, it denotes an individual's income, education, occupation, area of residence or any other characteristics that might determine the individual's relative position socially and/or economically.

The *gradient* is the increase or decrease in health dependent on the magnitude of income or wealth an individual possesses. It can be a simple correlation, $\rho\ (x_1, x_2)$ or a partial correlation $\rho\ (x_1, x_2 \mid \mathbf{Z'})$, where x_1 is health, x_2 is income and **Z'** is a vector of variables that x_1 and x_2 might be dependent on[9]. It is because of the gradient that wealthy people have longer life spans and have a lower morbidity than poorer people. Thus, broadly explained, people with higher incomes have better health. This is evidenced across and within countries, between different demographic groups, at a point in time and over time (Ward, 2012).

Lastly, *intergenerational transmission* "refers to the transfer of individual abilities, traits, behaviors, and outcomes from parents to their children" (Lochner, 2009, p. 1) Economists have extensively examined the intergenerational transmission of human capital, mainly through educational attainment (Black, Devereux, and Salvanes, 2003;

[9] For instance, the vector of variables, **Z'**, may include factors like preferences, where an individual's preferences determines both his health and level of income he is able to attain; it can be education, where education determines health behaviors and it also affects an individual's income; it can be marital status, family characteristics and so on.

Currie and Moretti, 2003), socioeconomic status (Case, Lubotsky and Paxon, 2002; Currie, 2009), birth weight, (Black, Devereux and Salvanes, 2007; Currie and Moretti, 2007), and earnings amongst others. If the intergenerational transmission is evidenced to be robust, then, by definition, there is low mobility in whatever is being transmitted (Lochner, 2009). The transmission can occur both through causal and non-causal outlets. For instance, parents genetically pass on their ability or endowments so children are predisposed to have certain characteristics. It can similarly be caused by parents' preferences inducing behavior in their children, i.e.: a parent with a strong preference for education may encourage his/her children to graduate, to pursue higher educational degrees and so on. (Lochner, 2009).

3.2 The Socioeconomic Gradient

Case, Lubotsky and Paxon (2002) examine the origins of the socioeconomic gradient. As previously mentioned, the connection between income (or SES) and health is quite pronounced in the literature. However, for adults, it is hard to disentangle the direction of causality because there might be a feedback mechanism attached to the relationship. Focusing on children eliminates the reverse causality problem, as children do not earn income, their parents do. Therefore, the authors are able to study whether part of the intergenerational transmission of SES is manifested through the impact that parents' long-run average income exerts on children's health. Case, Lubotsky and Paxon (2002) establish the relationship between income and health status by first establishing the probability of having poor health through a linear probability model. They define this probability based on a set of 'X' controls, including the parents' education, age and year

indicators, family size, presence of parents in the household, race (indicators for black individuals) and employment status.[10] The probability of a child having poor health is determined by:

$$\mathrm{P(H|X)} = \mathrm{P(H|C} = 0, \mathrm{X)P(C} = 0|\mathrm{X)} + \mathrm{P(C|H} = 1, \mathrm{X)P(C} = 1|\mathrm{X)}$$

In words the equation establishes that, conditional on 'X', the probability of being in poor health in the absence of a chronic condition is added to the probability of being in poor health in the presence of a chronic condition, similarly, conditioned on 'X' (Case, Lubotsky and Paxon, 2002, p. 1316). The authors then derive the marginal effects of having poor health dependent on income to estimate the effect of income on poor health in the absence of a chronic condition, the severity effect and the prevalence effect:

$$\frac{\partial P(H)}{\partial \ln y} = \frac{\partial P(H|C=0)}{\partial \ln y} + \left[\frac{\partial P(H|C=1)}{\partial \ln y} - \frac{\partial P(H|C=0)}{\partial \ln y}\right] P(C=1)$$

$$+ \; [P(H|C=1) - P(H|C=0]\frac{\partial P(C=1)}{\partial \ln y}$$

The severity effect is the added impact of income on poor health if the child has a chronic condition, i.e.: the differences in health status because of income in the presence of a chronic condition. The prevalence effect, on the other hand, is the effect of income on poor health through the increased likelihood of having a chronic condition, i.e.: the probability of getting a chronic condition dependent on income (Case, Lubotsky and Paxon, 2002, p. 1316). The estimation strategy further allows to directly measure the gradients in chronic condition and the cushioning effect of income. To measure whether the gradient steepens with age the methodology is used separately for older and younger children. The results display that there is a causal relationship between long-run income and the determinants of health status. Income protects the children's health in the

[10] See Case, Lubotsky and Paxon (2002, p. 1316).

presence of a chronic condition. The relationship steepens as the children become older as the health of low-income children deteriorates over time. Thus, the study corroborates that the origins of the gradient stem from the effect of parental income on childhood health.

Further investigating the SES gradient, Currie and Stabile (2003) examine why the gradient steepens with age. The study is based on the assumption that SES impacts both the facility to detect and treat health shocks in the short-run so that its effect dispels in the long-run. The importance of the study is the variation in policy implications dependent on the reasons of the steepening. If low-SES children are less able to respond to negative impacts (i.e.: they accumulate) policies should target bettering medical care or improving the access to medical care for low-SES children. On the other hand, if low-SES children respond to negative shocks in the same way that high-SES children do but are simply subject to more shocks, then policies should focus on determining why low-SES children are more prone to adverse health shocks. Using the NLSCY, Currie and Stabile (2003) estimate the cushioning effect of income on health shocks. The results reveal that even in Canada, in the presence of a universal health care system, the steepening of the gradient holds. However, their contribution is that the worsening of the gradient for low-SES children compared to high-SES children is feasibly because low-SES children are prone to more health shocks rather than a hindered ability in recovering from such shocks.[11] The importance in studying the gradient is due to the intergenerational transmission of socioeconomic status perpetuating through time.

[11] Currie, Shields and Price (2007) attempt to replicate the results using a sample from England. Nonetheless, the study shows that here is no evidence of the gradient steepening, and that family income is not a determinant of children's health. However, Case, Lee and Paxson (2008) re-examine the relationship between income and health and argue that Currie, Shields and Price (2007) miscoded the survey and once

3.3 The Intergenerational Transmission of Socioeconomic Status

One of the most important aspects of the intergenerational transmission of socioeconomic status is that it is manifested through several outlets, including education and birth weight. Previous literature had problems establishing causality mainly because of omitted factors in the correlation between education and health outcomes. For instance, family background, lower discount rates, or higher preferences for carefulness could be omitted. Black, Devereux, and Salvanes (2003) and Currie and Moretti (2003) exploit the intergenerational transmission of educational attainment using instrumental variables. Both studies show that the there is a very well established causal relationship between mother's education and children's education. Given that higher educational attainment yields better economic outcomes (through higher income and higher earnings) the SES gradient is further propagated. As discussed previously, several studies successfully established there are significant intergenerational effects in the transmission of health through birth weight (Currie and Moretti, 2007; Black, Devereux and Salvanes, 2007). Hence, prior estimates of returns to education and improved infant birth weight underestimate the social benefits as these last more than one generation.

Chen and Li (2009) examine the nature versus nurture effect of maternal education. Using a large sample of adopted children from China, the authors find that the effect of mother's education on child's health is not necessarily in-utero, but rather, it is a nurturing effect. After controlling for income, number of siblings, environmental factors and other socioeconomic variables, mother's education is a significant determinant of

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the corrections are made, income remains to have a large role in cushioning children's health in the presence of medical conditions.

adopted children's health and this effect on the adoptee sample is similar to that of the own birth sample. These results imply that if it is a nurturing effect both parents have an impact on children outcomes. Therefore, the transmission of socioeconomic status can be induced simply by behavior—through the fostering of children (Chen and Li, 2009).

3.4 Transmission Mechanisms

The literature identifies several transmission mechanisms for the intergenerational transmission of SES including both behavioral and biological pathways. Currie (2009) employs a child health production function[12] to derive several reasons why parental SES may affect children's health. One is that wealthier families will have budget constraints that are less binding. Their ability to purchase more or even better health inputs (medical care, food, and housing) will be thus enhanced. By the same token, parents with higher value associated to their time will be less likely to forgo working time in order to invest in their children. The combined effect of income is hence uncertain.

Another transmission mechanism could be that parents with different SES have different preferences and beliefs when it comes to input choices and health practices. The difference in preferences might be related to educational attainment and as such, high-SES parents may have 'improved' preferences for health inputs.[13] Similarly, low-SES children are prone to more health shocks and have lower initial health endowments at birth (Currie, 2009). Black, Devereux and Salvanes (2007) argue that nutrition in-utero can similarly affect the initial endowment, which will in turn affect the perpetuation of

[12] See Currie (2009) for the complete derivation of the production function.
[13] The term 'improved' is highly subjective, but the preferences pertaining to more educated, wealthier parents are associated to Western medical practices. For instance, in the presence of a cough parents seeking medical care by going to hospitals or doctors could be seen as an 'improved' behavior when compared to using more traditional practices, like giving an infusion to the child.

SES. Lastly, Currie and Moretti (2003) argue that there might be a 'cohort effect.' For instance, if an individual engages in healthier types of behavior depending on the average education or the average behavior of her cohort, then there will be cohort spillover effects that might be compounded through time. Although the transmission mechanisms are hard to identify and isolate, what should be kept in consideration is the importance of the dissemination of SES through health status.

Chapter 4: The Healthy Immigrant Effect

4.1 Defining the Healthy Immigrant Effect in Canada

The "healthy immigrant effect" (HIE) has been in widely examined in economic research in the last decade. The effect is defined as "an observed time path in which the health of immigrants just after migration is substantially better than that of comparable native-born people, but worsens with additional years in the new country" (McDonald and Kennedy, 2006, p. 2).[14] McDonald and Kennedy (2004) argue that the HIE in Canada was first reported by Chen et al. (1996) using the National Population Health Survey (NPHS), and later by Perez (2002) using the Canadian Community Health Survey (CCHS). Several comparative empirical studies of the healthy immigrant effect have been further conducted in Canada, the United States, the United Kingdom and Australia (Kennedy, McDonald and Biddle, 2006). The evidence from these four countries shows that immigrants from developing countries experience the healthy immigrant effect more so than do immigrants from developed countries, as these immigrants share similar characteristics to the native-born. Overall, immigrants tend to report having better health statuses on arrival than the native-born population.

The literature attributes many factors to the healthy immigrant effect such as selection, health screenings, underreporting health conditions, barriers to health care and acculturation. Further, the HIE can be separated into two main parts. According to Deri (2004), the first part of the HIE refers to a fundamental selection component affecting immigrants; those who are healthier will immigrate, ceteris paribus. The main factor of this selection process appears to be self-selection, as immigrants who are more physically

[14] See Figure 1 and Figure 2 for visual illustrations of the healthy immigrant effect.

and financially able are likely to be the ones who migrate (McDonald and Kennedy, 2004). Since these immigrants have higher incomes they are able to enjoy better diets, sanitation, and housing, and are thus healthier in general and better 'equipped' for immigration (Kennedy et al., 2006).

Another component of the selection process is the Canadian immigration policy. In 1967, Canada introduced a new non-discriminatory policy based on a 'Point System' regarding immigrant selection (Laroche, 2000). This system is still in place today and emphasizes employability. Consequently, there is a positive selection effect towards those immigrants who are healthier, as they would presumably be more productive and beneficial to Canada (Deri, 2004). Additionally, in most countries, immigrants have to undergo health screenings in order to be granted legal status in the receiving country. In Canada, health assessment is required under the Canadian Immigration Act (McDonald and Kennedy, 2004). However, there are very few immigrants that are denied entry based on their health assessment. Only 1.7% of applicants are 'inadmissible' due to medical reasons and 86% of these applicants are re-considered (Laroche, 2000). If anything, there seems to be positive selection of immigrants based on education levels and income. The effect of this positive selection from Canadian immigration authorities may further induce self-selection if only those who believe have a good chance of being granted legal status are the ones who apply to immigrate (Kennedy et al., 2006).

Countering positive of self-selection, there exists the 'salmon bias hypothesis' stating that only those immigrants who succeed will remain in the foreign country.[15]

[15] Success is broadly defined; it can be economical success, employability success, cultural success (if the immigrant adapts properly), physical success (if the immigrant is healthy), or even psychological success (if the immigrant feels content in the new country). Unsuccessful immigrants would be the ones

Unsuccessful immigrants return to their home countries, leaving only the healthy individuals in the receiving country, which would theoretically lead to better-observed health outcomes. However, no evidence has been found supporting this theory (Kennedy et al., 2006).

The second part of the healthy immigrant effect is that the health advantage that recent immigrants enjoy upon arrival is significantly reduced through the passage of time. Zhao, Xue and Gilkinson (2010) find evidence that the health gap between Canadians and immigrants narrows significantly after four years. However, McDonald and Kennedy (2004) report that actual convergence to native-born health levels occurs after approximately twenty to twenty-five years for male immigrants. One of the hypotheses justifying the convergence is that since developed countries have arguably better healthcare systems in comparison to developing countries, health conditions are underreported or not reported at all prior to arrival. Once in Canada, conditions are discovered which in turn affects self-perceived health. Consequently, both the incidence of health conditions is 'increased' and health status is 'diminished.'

Whilst there might be concerns regarding overutilization of the healthcare system and the burden to native-born Canadians, there is no evidence supporting this claim; if anything, health services are underused by immigrants (Hyman, 2000). Deri (2002) supports this claim, finding robust evidence that immigrants are more likely to underutilize health care, though it is noteworthy that the use of health care services increases if there are more doctors who speak the same language as the immigrant in their

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experiencing the opposite. Due to the SES gradient, successful immigrants would enjoy higher-SES, and as such, they would be healthier.

neighborhood. Although there is evidence of convergence in health care utilization,[16] the implications of underutilizing health care is that if immigrants have troubles accessing health care in Canada it may be reflected in their perception of health status. In fact, Zhao, Xue, and Gilkinson (2010) suggest that barriers to health care significantly impact health outcomes, and can therefore be another factor altering the HIE.

4.2 Acculturation and Social Capital

Theoretical extensions of the elements influencing the healthy immigrant effect explore the important effects that acculturation exerts on immigrants' health outcomes. By further reviewing the literature, Hyman (2000) arrives to the conclusion that the process of acculturation to the new country "provides an additional framework for understanding the relationship between migration and changes in health following migration" (p. 1). The influence of acculturation is indirectly identified through "changes in health behaviors and changes in social support and stress" (p. 1).

The definition of acculturation varies across the literature. For instance, Corral and Landrine (2008) study the changes in health behavior of ethnic minorities dependent on their levels of acculturation using a Mexican American sample of adults. In their study, they define acculturation based on a bidimensional model where acculturation depends on the loss of the minorities' ethnic culture and the gain of Anglo-Saxon culture. If the individuals have lost their ethnic culture and gained Anglo culture then they are defined as acculturated; if they have lost their culture and have not gained Anglo culture, they are marginalized; if they have not lost their culture and have gained Anglo culture,

[16] The gap in the use of health services between native-born Canadians and the average immigrant closes at approximately six years after arrival (McDonald and Kennedy, 2004).

they are bi-cultural; and finally, if they have not lost their culture but they have not gained Anglo culture either, they remained to be traditional. Although their model appears to be quite simple, there are many complications when trying to measure levels of acculturation.[17] Hyman (2000) simplifies and broadens the designation by stating that acculturation is "the process of incorporating new values, attitudes and behaviors" (p. 1). There is consequently a link established between social capital and acculturation. If the bimodality of acculturation is eliminated and simplified into an indicator of whether a person belongs to society and thus incorporates its values, attitudes and behavior, then having social capital would be the mechanism through which an individual is 'acculturated' under this new definition (Health Canada, 2006).[18] The importance of social capital will be further explored in subsequent chapters.

4.3 Methodologies Determining the Health Immigrant Effect

The literature provides several empirical frameworks to quantify the healthy immigrant effect. The identification strategies have specific variations in both dependent and independent variables.

4.3.1 Dependent Variables

Self-perceived health is one of the most cited measurements of health (Deri, 2004; Hyman, 2000; Kennedy et al., 2006; McDonald and Kennedy, 2004). However, it is a

[17] Corral and Landrine (2008) themselves use proxies for acculturation (nativity and language spoken at home) due to the identification problem of such a complex definition. Hyman (2002) presents other proxies used in the literature such as "education, wages, employment, urbanization, media use, political participation, religion, language, daily practices and social relations" (p. 44).

[18] Therefore, instead of both losing their original culture and gaining Anglo-Saxon culture, the concept of immigrant acculturation is tied to incorporating Canadian values, attitudes and most importantly, behavior (Hyman, 2000).

very subjective measurement since individuals are neither perfectly informed nor completely rational when evaluating their health. Thus, there is no consistency across individuals in what is perceived as good or bad health. These discrepancies can be found across and within different ethnic groups as well as between doctors and patients (Hurley, DeCicca and Buckley, 2011).

Self-reported chronic conditions have been similarly used as a measurement of health status (Deri, 2004; Hyman, 2000; Kennedy et al., 2006; McDonald and Kennedy, 2004; Newbold, 2006). Chronic conditions can be divided into two types, non-life threatening—"asthma, back pain, high blood pressure, allergies, migraines, ulcers, bronchitis and arthritis"—and serious conditions—"heart disease, cancer, diseases of the thyroid, Crohn's and diabetes" (McDonald and Kennedy, 2004, p. 8). These conditions are identified as Type A and Type B respectively. They are frequently used as indicator variables of whether or not the individual has been diagnosed or is suffering from one of the conditions. Nonetheless, when matching medical records with self-reported medical conditions, Baker, Stabile and Deri (2004) find that presence of chronic conditions is a severely flawed measurement of health as there are wide variations between medical records and self-reported conditions.

Activity limitation variables are equally used as health measures (Antecol and Bedard, 2005; Deri, 2004). The justification for activity limitation variables as proxies for health is related to days missed at work. Being 'unhealthy' would limit an individual's activity (Hyman, 2000). However, estimates using this measure of health could be biased due to the socioeconomic gradient evidenced between higher income levels and higher health status (Case, Lubotsky and Paxson, 2002). Income allows people to buy health

inputs (like medical care, healthy diets, and gym memberships) and thus enjoy higher health levels and lower morbidity. However, activity limitation can suffer from reverse causality. Being sick limits an individual's activity levels; particularly, it will increase his or her days missed at work, which will directly reduce the individual's earnings. This reduction in income will lower the individual's ability to buy health inputs and his or her health will be further diminished.[19] Furthermore, health care is costly, especially in the absence of health insurance. For instance, a person of low income who cannot go to work because of, say, back problems, may not be able to afford going to the doctor and can only address the problem by resting; over time this will only make the problem worse, and will limit the individual's activity even more ergo, reducing earnings. On the other hand, a high-income individual could afford to address medical problems more easily and would not lose as many working days. So the direct links between activity limitation, income and inability to work would lead to reverse causality in determining health status.

Several international studies have used *body mass index (BMI)* where obesity is an indicator of poor health (Antecol and Bedard, 2005; Deri, 2004). BMI is calculated by dividing weight in kilograms over height in meters squared. If the resulting coefficient is greater than 30, then the individual is considered obese. Costa and Steckel (1995) note the BMI serves not only as an indicator of health but also as an indicator of welfare. The limitation with BMI is that obesity cannot fully capture health status and it might be capturing additional unobserved effects, resulting in biased estimators.[20]

[19] Given that wealthier individuals have a higher opportunity cost of missing days at work it assumed that in most cases they would invest more in their health and income becomes protective of their health status. However, individuals with lower earnings may not afford such investments, so the income gradient in health steepens.

[20] The same criticisms may apply to the use of birth weight as a measure of the health. It cannot fully capture every single aspect related to a newborn's health, however it is a widely used and a standard measure of health at birth. Further, it might capture additional unobserved effects, particularly those related

4.3.2 Determinants of the Healthy Immigrant Effect

There is a wide consensus in the use of cultural, social and economic characteristics, including years since migration, as determinants of health. Socioeconomic controls are included like educational attainment, employment status and income. Given that income has a potential to become endogenous (as poor health might be directly linked to missed days at work and consequently diminished earnings) proxies for permanent income are used. This set of controls includes dividend income, whether the individual owns their dwelling, the type of dwelling, the number of bedrooms in the dwelling and the number of children living at home (Deri, 2004; McDonald and Kennedy, 2004). Demographic and cultural controls such as age, its quadratic form, indicators for whether the person is an immigrant, marital status, country of origin, language and ethnicity are likewise incorporated. McDonald and Kennedy (2004) and Deri (2004) generate synthetic cohorts for different arrival periods in order to separate the time effect (years since migration) and cohort of arrival effects. The effects that years since migration and cohort variables have on health status are interpreted as the healthy immigrant effect.

4.4 The Healthy Immigrant Effect's Outcomes

To quantify the impacts of the healthy immigrant effect McDonald and Kennedy (2004) use a probit estimation strategy, and to interpret their results they predict the health profile of an individual who is born outside of Canada and compare it to the 'baseline' 45 year old Canadian. A baseline native-born has the following characteristics:

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to mother unobserved characteristics, genetics, differences in gestational length etc. Therefore a twin-sample study is suggested for further research to overcome these problems.

"Ontario resident outside of a major city, high school education, English speaker, no dividend income and living in a rented house" (p. 1618). This reference individual, at that age, has a predicted probability of suffering from a Type A condition of 55%, on average. In comparison, on arrival, both male and female immigrants have an incidence of less than 30%. However, as years since immigration increase, the incidence increases as well, at a diminishing rate until approximately 20-25 years in Canada when immigrant health levels converge to those of the native-born. The main distinction between males and females is that self-assessed health status results do not show a clear pattern for immigrant men whereas, for women, there is robust evidence of the HIE in both health measures. Further, the results show that cohort of arrival are important factors of health.

Deri (2004) depicts similar results. First, individuals that belong to more recent arrival cohorts are less likely to report adverse health outcomes including poor health, presence of chronic condition, activity limitations, and have lower BMIs than Canadians, on average. These differences provide evidence that immigrants are healthier on arrival. In later years, immigrants report having worse health outcomes, with the strongest effects in the earlier years attesting to the diminishing characteristics of the HIE. The most important result of the paper is that with the inclusion of controls for cohort of arrival, the year since migration coefficients are all significant and positive in the determination of all adverse health outcomes. The importance of the inclusion of controls for arrival cohort is substantiated in the comparison of the coefficients. The separation of cohort allows to differentiate the HIE for individual cohorts rather than immigrants as a whole.[21] For

[21] Given the heterogeneity in individuals, grouping immigrants by cohorts allows separating effects that might be specific to the group of individuals from that cohort. Whether it is because of the 'cohort effects' that as explained by Currie and Moretti (2003), certain cohorts have certain types of knowledge and behavior specific to the cohort, or that there were certain different global beliefs or policies at the time, or

instance, there is a 9.2 percentage point increase in the likelihood of an immigrant reporting poor health after being in Canada for ten years. To measure the magnitude of this effect, Deri compares this decline in health to that of aging from 40-50 years. The increased probability of reporting a poor health status due to aging is 1.9 percentage points, almost a fifth of the HIE estimate, corroborating the paramount magnitude of the HIE. Amongst her other findings, Deri affirms that age at migration is an important determinant, as those who immigrate at older ages are more severely affected. Furthermore, it affects both genders but the effects vary dependent on the measure of health used. As such, both studies provide compelling and robust evidence of the existence of the HIE effect in Canada.

other time effects or any other type of unobservables that are particular to each individual cohort, the inclusion of controls allows to group the effects by cohort; thus, the empirical framework becomes more specific than having no controls and just observing the overall magnitude of the healthy immigrant effect for all immigrants disregarding their time of arrival.

Chapter 5: Social Capital and Social Networks

5.1 Defining Social Capital and Social Networks

Most economic models studying behavior only exhibit interactions that are controlled by the market. Therefore, a wide range of formal economic analysis lacks social factors that should be included because of their impact, like social capital and social networks (Durlauf, 2001). Social capital, public and private, has three broad definitions. First, it is defined as "the characteristics of the social organization such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam, 1995, p. 67 as cited in Zhao, Xue and Gilkinson, 2010); second, it is "the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (Bourdieu and Wacquant, 1992, p. 129 as cited in Zhao, Xue and Gilkinson, 2010); and third, social capital is "the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (Portes, 1998, p. 6 as cited in Zhao, Xue and Gilkinson, 2010).

Due to the vast array of definitions, the Canadian government developed its own interpretation so that there is a consensus across studies. Under this construct, "social capital refers to the networks of social relations that may provide individuals and groups access to resources and supports" (Health Canada, 2006, p. 7). There is both individual and collective social capital, where the former includes networks that enable the individual to access certain resources needed and the latter includes networks where social groups obtain the resources needed. A prime distinction in this definition is that

social capital becomes an independent variable, a determinant of outcomes rather than an end in and of itself.[22]

The Policy Research Initiative (PRI) developed a framework for the analysis of social capital. There are both individual (age, gender, attitudes, participation, etc.) and group level determinants (mandate, reputation, experience, members, etc.) that influence social networks in their structure (size, diversity and density) and in their dynamics. These networks in turn develop resources and support (that can be material goods and resources, support and solidarity, promotion of positive behavior, etc.) that, with complementary resources such as other forms of capital and depending on the specific and broader context of the situation, result in social, economic and health outcomes. "In essence, the network approach looks at social ties as vehicles for delivering needed resources and supports" (Health Canada, 2006, p. 8).[23] It is worth noting that social ties could also act as vehicles of poor behavior which will be subsequently discussed.

5.2 Identifying Social Networks

The identification of social networks and social interaction models varies widely across the literature. Bramoulle (2009) describes social networks broadly as any kind of relationship between agents; the main idea is that these network agents affect individuals'

[22] Although this definition was developed mainly as a tool for policy analysis, the focus is not how social capital is determined, rather the effect it has on certain outcomes, and as such it becomes a determinant of health.

[23] Under this framework the PRI defines the following terms, "Social support refers to the beneficial elements resulting from social relationships, including: emotional aid (empathy); instrumental and concrete aid; information (counseling, mentorship); accompaniment; and/or reinforcement of a sense of belonging and solidarity. Social relationships are seen as a relational resource in their own right, with the potential to transmit or exchange other types of resources (material or information) helping to meet particular needs. Support networks are characterized by the exchanges between those people providing assistance (family, friends, neighbours, volunteers, etc.) and those receiving assistance (the elderly, those who are unwell, people lacking invarious resources)" (Health Canada, 2006, p. 10)

behavioral outcomes. A binary nature to the identification of social networks can be used, i.e. belonging to a network or not, which lightens the empirical analysis (Bramoulle, 2009). More complex analytical models include the structure, dynamics and nature of the social relationships to explore the dimensions of social capital through the development of a network structure and indicators for network resources. Bouchard, Roy and van Kemenade (2006) establish the network structure through four indicators: "*size of network of strong ties*[24] *outside the household* [ranging from small, 0-11 ties to very large, over 36 ties]; *size of network of ties to organizations* (ethnic organizations, sports or social clubs, associations, etc.); *reciprocity* within the networks (provided assistance to, and received assistance from, neighbors, family or friends); as well as *volunteerism* (volunteering at least once in the preceding year)" (p.14). The network resources are constituted of two composite indexes, total social support and instrumental support (Health Canada, 2006, p. 14).

Cohen-Cole and Fletcher (2008) assert that there are several flaws in social network models and attribute changes in health outcomes (in their case, the spread of obesity) to environmental factors. Jasso, Massey and Rosenzweig (2004) argue that these environmental factors can be isolated through culture-specific epidemiology and ancestry mainly by analyzing health outcomes separating individuals by their country of origin. For instance, health status can be ethnically determined, so isolating environmental factors pre- and post-migration can be done by the inclusion of native-born, ethnical and country-specific effects in the methodology. That way, it is possible to distinguish the variability of environmental factors affecting different sub-groups.

[24] Strong ties are those with family and friends whereas weak ties are those with acquaintances.

5.3 Social Capital and Health

One of the first studies relating social capital and health took place in the Alameda County in the United States. In a nine-year follow up, Berkman and Syme, (1979) showed that higher premature morbidity rates existed for those individuals who lacked social ties through the development of a social network index. Theoretical and empirical extensions show that there is a strong link between social capital and a variety of health outcomes such as access to health care, binge drinking, leisure time, physical inactivity, food security, child behavior problems, walking activity, violent crime and homicide, life expectancy, tuberculosis case rates, life satisfaction, and suicide rates (Kawachi et al., 2004 as cited in Zhao, Xue and Gilkinson, 2010). Similarly, social capital seems to reduce suicide rates and improve life satisfaction levels.

An important caveat to note is that although the PRI established social capital as a determinant of outcomes, at the individual level, the direction of causality has not been readily identified. It is not clear whether good health affects social capital, social capital affects good health, some combination of the two, or if there is an unobserved individual characteristic determining both social capital and health. Thus, the literature has explored several mechanisms connecting social capital and health. One possibility is that social networks affect health outcomes through the diffusion of information. This diffusion in turn improves health care utilization and consequently health. Another alternative is that bestowing a safety net, social networks provide tangible assistance (money, care, resources) that might improve health. An additional option is that social influence might be exerted upon health norms encouraging healthier behavior, e.g. the encouragement/social pressure for physical activity. Lastly, networks provide emotional

support that has been proven to enhance the immune system and provide psychological support that directly impacts health. Hence, several links can establish the relation of causality so that social networks determine health outcomes.

While there are innumerable ways in which social capital, social networks and positive social cohesion have favorable impacts on health, there are also pathways that allow social capital to have negative influences on health. If the social links are of different affluence levels, meaning that there is economic distance across individuals, then it is possible that social capital in fact has adverse outcomes on health. There is evidence establishing that neighborhoods with high inequality report lower health levels than their counterparts (Hou and Myles, 2005). Further, not all health behaviors can be assumed to be beneficial to individuals. The spread of obesity has been widely analyzed within the social networks framework in both medical and economic literature. Researchers have identified how one's weight gain can be associated to weight gain from his or her social ties, friends, family, and neighbors (Christakis and Fowler, 2007).[25] Additionally, peer effects on risky behavior, particularly for teenagers, can have harmful effects like drinking and driving, drugs and alcohol use, unsafe sexual practices, and so on. Finally, not all social relationships exert a propitious outcome, nor do they all provide protective mechanisms; such outcomes can include sexual abuse, workplace conflict, bullying, physical and psychological violence, harassment, and power networks (Health Canada, 2006). Notwithstanding, in the literature at least, it seems that the favorable effects of social capital and social networks on health outweigh the deleterious ones.

[25] The authors find that the spread of obesity holds both through social networks for adults and through peer effects for adolescents (Christakis and Fowler, 2007; 2008).

5.4 Immigrants and Social Capital

Broadly, immigrants in Canada have been categorized as a vulnerable population (Health Canada, 2006).[26] As such, the role of social capital in protecting immigrants is crucial. The literature provides a wide spectrum of evidence with respect to the effect of social capital on immigrant outcomes. Li (2004) argues that the effectiveness of social capital for immigrants and ethnic minorities depends on the type of social network and class because there are economic 'penalties' associated to several ethnic ties and associations. An illustration of this is that ethnic attachment among immigrants may result in drawbacks for those maintaining their ethnic values and customs instead of adapting to the mainstream economy. However, ethnic ties can also help immigrants with respect to job market opportunities within their respective ethnic communities. In similar fashion, Xue (2008) finds that social capital in the form of kinship, friendship and organizational networks being characterized by their size, diversity, density and quality allows beneficial effects in the economic performance of recent immigrants. In fact, he provides evidence that social capital enables the economic integration of recent immigrants as their probability of getting a job increases. Similarly, immigrants are less likely to transition to poor health if they have monthly contact with family and friends (Newbold, 2009 as cited in Zhao, Xue and Gilkinson, 2010). Bouchard, Roy and van Kemenade (2006), using the General Social Survey (GSS), corroborate that having close networks of the same ethnicity is correlated with having better economic and social integration and immigrant wellbeing is ameliorated. Using the previously mentioned network structure, they find positive associations between networks with strong ties and

[26] Immigrants experience higher poverty rates in Canada when compared to native-born Canadians and they are likely to live in poorer areas (Kazemipur and Halli, 2000a; 2000b).

vigorous health and between number of ties with organizations and good health. In addition, women are more likely to report being in a favorable health status in the presence of a reciprocal support network while men are likely to report better health than their peers if they volunteered that year. For these reasons, social capital is extremely advantageous for immigrants.

5.5 Social Capital and the Healthy Immigrant Effect

Further extensions of the literature assess the relationship between social capital and the healthy immigrant effect. Social networks were first introduced to the HIE literature through healthcare utilization. In an attempt to understand the HIE, Deri (2002) explores whether networks affect health care utilization. The study provides evidence that language similarities with healthcare professionals increase immigrants' health care utilization. Using the NPHS regional and language group variation, Deri (2002) constructs a variable that includes both quality and quantity characteristics of immigrants networks.[27] She focuses on immigrants whose first language is neither English nor French because these individuals are the ones who potentially face the most barriers in health care utilization. Nonetheless, there is potential for the 'reflection problem,' where isolating the direction of causation between average group behavior and individual behavior becomes an econometric problem.[28] To solve this, Deri (2002) controls for area and language group effects, measuring the impact of language density in the area and for the number of doctors that speak the same language as the individual in that same area.

[27] The quality characteristic captures the number of available contacts that an immigrant has in close proximity who speak the same language whereas the quality characteristic focuses on health care utilization levels in groups dependent on how different groups turn 'less to traditional western medicine' and thus, are less informed about it, on average (Deri, 2002).

[28] Deri (2002) gives an excellent literature review on how different studies have attempted to solve the reflection problem in identifying the effects of networks on behavior (p. 13).

One of the most important findings is that having high utilizers of health care in close proximity increases overall utilization, as these individuals know the workings of the system and are more prone to encourage use. In contrast, contact availability of low-utilizing groups tends to decreases use. Network effects have a stronger impact on preventative service utilization. Furthermore, immigrants increase utilization if there are increased numbers of doctors speaking the same language. Accordingly, Deri (2002) illustrates the importance of networks in the analysis of the HIE.

Zhao, Xue and Gilkinson (2010) investigate the existence of the healthy immigrant effect and the effects of social networks on health outcomes for different immigrant subgroups. Using the Longitudinal Survey of Immigrants to Canada (LSIC), they estimate the effect of social capital on health for the first four years after immigration. The authors employ Xue's (2008) approach in identifying kinship (family members and relatives in Canada), friendship (ties with friends) and organizational networks (community organizations, religious groups, ethnic and immigrant associations) to measure social capital. The size and diversity of the networks as well as the frequency of contact and network reciprocity establish the content of the networks.[29] Health is measured through self-assessed health and it is empirically determined by the social

[29] The authors define network content as follows; "[They] obtain an approximation of network size for family ties by counting the number of types of relatives in Canada, such as spouse, children, parents, grandparents, brothers and sisters, uncles and aunts, and cousins. For friends network, sources where immigrants met new friends, such as ethnic association or club, religious activity, through relatives or friends, sports, hobby or other club, spouse's work, ESL or FSL classes, other classes, etc., are counted to proximate the absolute size of the network. For organizational network, LSIC provides a direct measure of absolute number of groups or organizations that immigrants participated in. Social network diversity represents the social and ethnic heterogeneity of network members, which is measured by the relative numbers of non co-ethnic members and co-ethnic ones in a person's networks. Social network density is defined as the frequency of contact between network members. ... [They] create both diversity and density indexes for each type of network, which range from 0 to 1. The higher the diversity index, the more diversified the social network is. The higher the density index, the more frequently individuals contact family members, relatives, or friends, and/or the more frequently they take part in group and organizational activities. Social network reciprocity can be measured as help received from networks as well as contribution made to networks" (Zhao, Xue and Gilkinson, 2010, p. 7).

networks and controls for family income, employment status, age, gender, immigrant category,[30] residence area, education level at landing, language, barriers to health care and country of origin. In the descriptive analysis, it is outlined that in the initial period subsequent to arrival, immigrants report higher health statuses than do Canadians. However, consistent with the HIE literature, the health gap is narrowed after four years following landing; in the first wave, 97% of immigrants report being in good, very good or excellent health, but after four years, this figure drops to 92%. The authors employ several variations in functional form to disentangle several effects. The first regression includes no social capital variables; the second regression includes social capital variables (having existing networks upon landing, having relatives and friends, and making new friends); the third regression includes all network content indicators, but only frequency of contact with friends and ethnic diversity of friends are proven to be statistically significant; the fourth regression consequently includes only those two variables reporting their positive effect on health status. Moreover, for family class immigrants—when compared to other immigrant categories—individuals who have group and organizational networks are more likely to report better health status and family ties have a sizable positive effect. On this account, Zhao, Xue and Gilkinson (2010) provide robust support for the existence of the HIE in Canada with the enhanced addition of controlling for social capital and family class.

Nonetheless, it is important to note that most of the cited studies, including the last two, use self-assessed health outcomes as the dependent variable. Although perception of health is important, it might not be solely capturing health levels. Zhao,

[30] Immigrant category is grouped into five sections: family class, skilled workers—principal applicants, skilled workers—spouses and dependents, refugees and other immigrants.

Xue and Gilkinson (2010) argue that epidemiologists define self-rated health status as an "accurate reflection of health" and "valid predictor of incident mortality and chronic morbidity" (p. 6). Yet, as previously mentioned, there is no consistency across individuals as to what 'good health' consists of. Furthermore, for other health measures, like chronic conditions, self-reported medical conditions are not immediately observed in records. Individuals may affirm having a chronic condition when no doctor has given such prescription, or conditions may go undiagnosed which complicates the analysis (Baker, Stabile, and Deri, 2004).

Chapter 6: Innovation

In light of these writings, the innovation provided by this study is to use children's birth weight as a health outcome when measuring the prevalence of the healthy immigrant effect. It is important to differentiate subject of awareness—how an individual assesses his or her own health—from object of state—what their health is, objectively measured. Although statistically significant changes in health outcomes for immigrants after arrival are widely evidenced in the literature, as formerly mentioned, several problems arise with self-reported measures. Given the subjective nature of these changes, it might be that only perceptions of health are changing rather than immigrants' health being diminished as they spend more time in Canada, especially with respect to self-assessed health. If this were the case, and it is only the perception of health that changes, then policy implications would be completely different than those addressing health problems if health stock is, in fact, eroded.

This gap in identifying what changes will actually be addressed by measuring the birth weight of immigrants' children. The implications of this innovation are threefold. First, one motivation behind the analysis is attempting to provide an exogenous and objective measure of the healthy immigrant effect. Using birth weight, it will be possible to disentangle the effect of social networks on this more objective measure of health rather than on perception of health. It is worth noting that due to data limitations, the present study can only employ self-reported birth weight, as these values do not come from birth records. However, it is arguable that birth weight differs to other self-reported measures in that it is more factual. Doctors and nurses measure birth weight at time of birth and report the values both to the parents and in the medical records. Given the

novelty of having a child, it is rather unlikely that a parent would forget or confound his or her infant's birth weight. Likewise, given the medical implications of being of low birth weight, it is improbable that this precise measure would be misreported. If anything there might be a potential problem due to rounding issues, particularly around the mean, but measures are taken to solve this hurdle.

Second, the most salient aspect of the analysis is the intergenerational transmission of the healthy immigrant effect, which has not been explored in the current literature. It is evidenced that socioeconomic status can be transferred intergenerationally, but if the HIE specifically is transferred to the children then the phenomenon is multigenerational. The rationale for the transmission mechanism is as follows. In the presence of the healthy immigrant effect, if in fact immigrants' health declines as time goes by, immigrant mother's will 'produce' unhealthier babies;[31] in this case, it will be infants with lower birth weights. It is not that the birth weight of a particular child is decreased as time goes by, as this is a stationary, time invariant characteristic. Rather, as years since migration increase, immigrant mothers' health declines and consequently, the 'production' of low birth weight children increases. There are major policy implications if it is found that not only is the health of first generation immigrants diminished, but that their children's health is as well. On the other hand, if perceptions are what changes, the effect will not be seen intergenerationally by using birth weight, as this variable is unable to capture perception changes.

Third, the use of birth weight is further consequential due to the implications that this measure has on future short- and long-term outcomes and direction of causality. As it has been well established in the literature, being LBW increases infant morbidity, and has

[31] See Chapter 2, section 2.3.

been associated with diminished future cognitive, economic, educational, and social outcomes.[32] As mentioned in the literature review, attributing causality in intergenerational transmission mechanisms is very difficult. By using birth weight however, at least the reverse causality problem is eliminated, as a child's birth weight will likely have no effect in the mother's characteristics.[33]

Finally, due to the strong effects that social capital has on health outcomes, the inclusion of social capital proxies is applied to the empirical analysis. The hypothesis is that in the presence of positive social capital, the healthy immigrant effect can be mitigated partially or fully or to the point where health status is improved.[34] The study will explore whether the effect of social capital is transferred to the children; if social capital affects immigrants' health positively, then infants will have higher birth weights, lower incidences of low birth weight and better health outcomes. Thereby, the study is an amalgamation of the birth weight literature, the intergenerational transmission of socioeconomic status literature, the healthy immigrant effect literature and social capital literature to examining immigrants' children's health outcomes.

[32] See Chapter 1.
[33] It can be argued that if a child has low birth weight and consequently suffers from other diseases or lower cognitive outcomes (and for instance could need a tutor in school), it would affect the mother's socioeconomic status because of diminished income levels. However, this occurs after the child's birth and would only have an effect on younger siblings not that particular child. Further research would be required to identifying true causal intergenerational pathways.
[34] See Figure 3.

Chapter 7: Data

7.1 The National Longitudinal Census of Children and Youth

The National Longitudinal Survey of Children and Youth (NLSCY) is a long-term study of children that collected data regarding factors impacting children's development and wellbeing from 1994 until 2009. The survey thus provides very detailed information of health and demographic characteristics of the children. The initial sample in 1994 consisted of 13, 439 households. From these households, 22, 831 children ranging from 0 to 11 years of age were selected to partake in the survey. The survey consists of eight cycles and data was collected every two years. There is a cross-sectional component to the cycle where children are added to the survey in subsequent cycles and a longitudinal component where children are followed until they turn 25 years old. The survey consists of several questionnaires, some of which are asked to the children themselves and educational figures (teachers and principals), though the majority of the survey is asked to the children's person most knowledgeable (PMK). Typically, the PMK is the mother of the child participating in the survey.[35] Demographic, social and economic characteristics of the PMK are also collected, providing the basis of this study. The population of interest in the study is the set of immigrants' children. Therefore, the sample used for the analysis is restricted to the children whose parents are foreign born,

[35] In most cases, the PMK is the biological mother, albeit it can be the child's step mother, adoptive mother, foster mother, biological father, step father, adoptive father, foster father, other related individuals like grandparents or aunts and uncles or even unrelated individuals (seldom cases).

consisting of 13, 654 children.[36] The cross-sections from all eight cycles are pooled to generate the sample.

7.2 Definitions

7.2.1 Measures of Health

The principal measure of health is *birth weight.* It measures the weight of an infant in kilograms at time of birth. The allowed values in the NLSCY range from 0.5 kg to 7kg. Additionally, in order to analyze the probability of being *low birth weight*, an indicator variable is created where a child is born with low birth weight if his or her weight is below 2.5kg; a zero would correspond to children whose weight is above 2.5kg. To check the objectivity of the measure, it is inspected whether parents round up or down their child's birth weight. The data shows no particular rounded birth weight values being predominant; in fact, birth weight is normally distributed.[37]

For sensitivity checks, several other variables are used to measure children's health. For health outcomes at time of birth, an indicator of whether the child *received medical care* following birth is used. Similarly, a categorical variable, *health at birth* compares the child's health status to other children at birth on a five-point scale, ranging from poor to excellent health. For health outcomes that were not at time of birth, two variables are used, *short run health status* and *chronic condition*. The former is a categorical measure of health, ranging from poor to excellent health where the PMK rates

[36] The sample size is significantly reduced with the inclusion of the key variables and controls due to missing values. For instance, the second cycle includes no social capital variables which reduces the sample by 1739 children; immigrant controls contain numerous missing values resulting in sample sizes of approximately 6 700 children.

[37] Due to confidentiality issues, Kernel density graphs and histograms were not released by the Atlantic Research Data Centre (ARDC). Although there are no visual depictions of normality, the skewness and kurtosis normality test for birth weight yield p-values equal to zero, attesting to the normality of the variable.

the child's health, whereas the latter is an indicator variable denoting whether or not the child suffers from a chronic condition. All of these variables are used as measures of immigrants' children's health status.

7.2.2 Determinants of Health

Merging birth weight literature, the intergenerational transmission of socioeconomic status literature, the healthy immigrant effect literature, and social capital literature, several measures of health are used so as to make use of the NLSCY as best as possible.

The first set of variables includes birth determinants. The *sex of the child,* whether it was a *multiple birth* (twins, triplets or more), the *age of the mother* at time of birth, whether the mother suffered from *diabetes, high-blood pressure,* or *other health problems*, or whether the mother *smoked* during pregnancy are all included as behavioral or medical inputs and determinants that might affect a child's birth weight and corresponding health outcomes. This set of variables pertain to the 'infant health production function' and are all for the time period prior to the birth of the child.

The second set of variables contains healthy immigrant effect determinants. Although, the literature suggests that the healthy immigrant effect is determined by cultural, social and economic factors, these will be referred to as controls. The *years since migration* (and its quadratic form), *country of birth* and *cohort of arrival* pertaining to the mother of the child will be denoted as this phenomenon's determinants.

The third set of variables comprises social capital indicators. Given the nature of the data set, social networks were not easily identified, as the size, density and diversity

of the networks could not be readily observed. Fortunately, the survey asks the PMK several questions that enable the creation of several proxies for the existence or lack of social capital.[38] The first proxy is *no help*, where the PMK notes that in the event of a problem, there would be no one available to help him or her, i.e. the PMK lacks social capital. The second proxy is *ffsafe*, an indicator that the PMK has family and friends that make him or her feel safe, secure and happy. The third proxy, *emerg* is an indicator that the PMK can count on people during an emergency. The last two variables are proxies for the existence of positive social capital.[39] An important caveat to consider is that the social capital variables do not specify where the support comes from. Therefore, for immigrants, it cannot be distinguished whether the social support comes from Canadians or other immigrants of the same or different ethnicities. For this reason, the social capital variables cannot be interpreted as acculturation to Canadian culture; the variables simply denote whether an individual has social capital overall, disregarding if it is with Canadians or with ethnically similar groups.

The last set of variables includes demographic, social, economic and time controls. *Age (*and its quadratic), *marital status*, *education* levels*, permanent income* proxies—household size, ownership, size and type of dwelling, *labor force status, language*, *province* indicators—for regional effects and *cycle* indicators—for time effects are included. The last three sets of variables pertain to the mothers' characteristics when the survey was conducted.[40]

[38] See Table 1 for the questions asked during the survey for these proxies.
[39] The NLSCY incudes a social support score ranging from 0 to 24 where higher values indicate the presence of social support which would have been an ideal proxy for existence of social capital. Unfortunately, the variable is not included in Cycles 2 and 3, which substantially reduces the estimation sample by 1,739 and 3,408 respondents respectively.
[40] Arguably, the mother's characteristics during pregnancy would be what would affect the child's birth weight, not characteristics in subsequent years. Given the nature of the data set, the last three sets of

7.3 Descriptive Analysis

Figures 4 to 9 show the mean of birth weight for each cohort of arrival depending on the level of the immigrants' social capital. All figures have in common a downward trend, where more recent cohorts have lower birth weights than older cohorts, irrespective of their level of social capital. Figure 4 shows the difference in birth weight for immigrants who have positive social capital relative to those who do not. Immigrants who have friends that make them feel safe, happy and secure have children with higher birth weights for most cohorts.[41] Figure 5 shows the effect of lacking social capital. Immigrants who have no support system have children with lower mean birth weights (50-100g less) than immigrants who have social support. This difference is seen in a forty-year span, for cohorts from 1961-2000. Before and after these dates there is no difference in mean birth weight. Figure 6 shows similar results. The existence of social support results in a large difference in mean birth weight. For all but two cohorts, having people who the immigrant can count on during an emergency shows a 200g difference in mean birth weight. Given that the mean birth weight for all immigrants is 3.31kgs, it represents a 6% difference in birth weight, or nearly a third of a standard deviation. This form of social capital is perhaps the most essential when requiring support, as it is the existence of support *during* an emergency. Therefore, it is congruent that it is perhaps the largest *maintained* difference in birth weight due to social capital.

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variables are for the time period when the survey was conducted. Therefore, the methodology relies on the strong assumption that these sets of maternal characteristics were the same during the birth of the child.

[41] Due to confidentiality issues, the values for the 'before 1960' cohort for immigrants who do not have family and friends that make them feel happy, safe and secure were not released by the ARDC as there were too few observations.

It is worth noting that with the addition of two positive and two negative standard errors (SE) to the means of the variables, the raw means are not statistically different when differentiated by presence or absence of social capital. The only variable that has statistically different means is 'no help' (no one would help the individual if something went wrong) and only for the 1981-1990 cohort. For all other variables and all other cohorts, the differences lie within the +/-2 SE intervals, as shown in Figures 7-9.

Table 2 shows the means and standard deviations for the core variables used in the analysis. On average, immigrants' children have lower birth weights (104g less) and a higher likelihood of having low birth weight. The incidence for Canadian infants to weigh less than 2.5kgs is 0.054 whereas the figure is nearly two percentage points higher for immigrants' children, 0.072. Regarding other health measures, immigrants' children are less likely to receive medical care upon birth, only 13% do, whereas 18% of Canadians' children receive it. Immigrants' infants tend to have their relative health to other babies upon birth rated lower than Canadians' infants. Children of native-born parents have a higher incidence of suffering from a chronic condition, 22% of children have at least one. This figure is four p.p. lower for immigrants' children; only 18% suffer from a chronic condition. Immigrants' children have a lower rated short-run health status than Canadians' children. All of these differences between means are statistically significant at a one percent level.

Immigrant mothers are older than Canadian mothers at time of birth; they are 30 years old, on average. Immigrant mothers are similarly less likely to suffer from problems during pregnancy and they are significantly less likely (16 p.p. lower) to smoke during pregnancy. Most immigrants (74%) seem to have arrived in the thirty-year period

of 1971-2000. Overall, immigrants are older, more likely to be married and most of the sample consists of females. Immigrants are more educated, have lower levels of permanent income than Canadians, are more likely to be out of the labor force in the last 12 months and are more likely to speak a different language. One percent of immigrants are not able to speak French or English, and finally, over half of the immigrant sample considers themselves a minority—defined as being not white. The differences are statistically significant at a one percent level.

A striking difference is that the social capital proxies differ significantly between immigrants and Canadians. Immigrants are almost twice as likely to lack social capital as do Canadians; 4.6% of Canadians would have no one to help them in the event of a problem whereas this figure nearly doubles for immigrants, 9.1. Similarly, immigrants are less likely (1.4 p.p. lower) to have family and friends that make them feel safe, secure, and happy, and are less likely to have someone to count on during an emergency (1.8p.p lower). Additionally, it is interesting to note that 91.3% of the Canadian and that 84.1% of immigrant PMKs are the children's mothers. These are statistically significant differences at a one percent level of significance.

Chapter 8: Empirical Framework

8.1 Identification Strategy

To successfully estimate the effect of social networks and the intergenerational transmission of the healthy immigrant effect, several strategies are used. All eight cycles of the NLSCY are pooled to maximize sample size. All regressions are estimated for the children of immigrants. The characteristics of the person most knowledgeable are restricted to the mother's characteristics, as they comprise the majority of the sample. Several variations in functional form are employed with the inclusion of different controls, but the ones included in the study are those that seemed the most appropriate. The strategy results in a hybrid specification combining a simplified version of the infants' health production function and the healthy immigrant effect specifications. The model is further augmented by the inclusion of social capital variables.

8.2 Econometric Models

The base specification, Eq. (1), includes only determinants of the healthy immigrant effect;[42] it includes no social capital variables and no birth determinants, taking the following functional form:

$$(1) \qquad Y_i = \beta_0 + \beta_1 YSM_i + \beta_2 YSM^2_i + \beta_3 \mathbf{X}_i + \sum_k \phi\ Country_k + \sum_n \eta\ Cohort_n + \sum_l \lambda Province_l + \sum_m \pi\ Cycle_m + \varepsilon_i$$

where the dependent variable takes a binary form indicating whether the immigrant mother i's child was born weighing less than 2.5kg, P (birth weight>2500= 1| •) and the

[42] At first, the base estimation did not include any region or cycle controls. It only included YSM, YSM^2, the X'_i controls and country variables. However, with the inclusion of region and time dummies the results did not vary significantly and thus the base model was modified to include those controls.

equation is estimated using a probit model. The base specification is similarly estimated using the *birth weight* variable, determining the child's birth weight in kilograms through OLS. The independent variables are for the mother i's important characteristics. *YSM* represents years since migration and its quadratic form. The $\boldsymbol{X_i'}$ variable is a vector of the mothers' demographic and socioeconomic characteristics, *Cohort* is a collection of dummy variables for synthetic cohorts controlling for year of arrival. The cohorts are ten-year cohorts where the reference category is the cohort of immigrants who immigrated prior to 1960. *Country* is a collection of dummy variables controlling for and country of birth, the reference category is 'other country' – not the United States, United Kingdom nor a country from Europe or Asia. *Cycle* is a collection of dummy variables for each cycle to capture time effects.[43] The variables of interest are the *YSM* variables and the *Cohort* variables, as these capture the healthy immigrant effect.

Adding a collection of variables relevant to the child's health at birth further augments the model. This set of variables includes those relevant to the health technology production function. The second functional form, Eq. (2), becomes:

$$(2) \qquad Y_i = \beta_0 + \beta_1 YSM_i + \beta_2 YSM^2{}_i + \beta_3 \boldsymbol{X_i} + \sum_k \phi\, Country_k + \sum_n \eta\, Cohort_n + \sum_l \lambda Province_l + \sum_m \pi\ Cycle_m + \sum_p \rho\ Birth_p + \varepsilon_i$$

where all the dependent and independent variables remain the same as in Eq. (1). The collection of variables includes sex of the child, multiple birth, and the age of the mother. Diabetes, high-blood pressure, other health problems and smoked during pregnancy are

[43] The inclusion of year of birth controls was explored given that the increasing trends in low birth weight may be to the medical innovations that lead to increased survival rates of low birth weight infants. Nonetheless, within the sample used, there are no children born prior to 1992 who have certain mother characteristics pertaining to the infant health production function, therefore the inclusion of year of birth fixed effects is not possible within the methodology. To somewhat capture for time trends, the cycle controls are used.

all included as behavioral or medical inputs and determinants that might affect a child's birth weight and corresponding health outcomes. Although the healthy immigrant literature uses the 'population health perspective' without any inclusion of health determinants (McDonald and Kennedy, 2004), given the nature of the independent variables, birth weight and low birth weight, it was deemed necessary to include these variables, following the birth weight and intergenerational transmission of socioeconomic status literature.[44]

The third specification, Eq. (3), adds the different social capital proxies separately to Eq. (2):[45]

$$(3) \qquad Y_i = \beta_0 + \beta_1 YSM_i + \beta_2 YSM^2{}_i + \beta_3 \mathbf{X}_i + \sum_k \phi\, Country_k + \sum_n \eta\, Cohort_n + \sum_l \lambda Province_l + \sum_m \pi\ Cycle_m + \sum_p \rho\ Birth_p + \beta_4 SC_i + \varepsilon_i$$

where all the dependent and independent variables remain the same as in Eq. (2). This equation is estimated three different times. First, the *nohelp* variable is added, denoting lack of social capital if the immigrant feels there is no one that would help them. It is subsequently replaced by the *ffsafe* variable depicting the existence of social capital if the immigrant has family and friends that makes her happy, safe and secure. Lastly, the *emerg* variable replaces the previous variable denoting that the immigrant can count on people during an emergency.[46]

Finally, the full model, Eq. (4) is the hybrid model:

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[44] See Chapters 1 and 2.

[45] Social capital variables are equally added to Eq. (1) prior to including birth determinants. However, the estimates with the inclusion of birth variables are quite similar to those without birth variables, but the former have higher R-squared values. Thus Eq. (3) includes both social capital variables *and* birth determinants.

[46] Eq. (3) will be subsequently referred to as (3a) with the inclusion of nohelp, (3b) with the inclusion of ffsafe and (3c) with the inclusion of emerg. For the precise definition of the social capital variables see Table 1.

$$(4) \quad Y_i = \beta_0 + \beta_1 YSM_i + \beta_2 YSM^2{}_i + \beta_3 \mathbf{X}_i + \sum_k \phi\, Country_k + \sum_n \eta\, Cohort_n + \sum_l \lambda Province_l + \sum_m \pi\ Cycle_m + \sum_p \rho\ Birth_p + \sum_s \varsigma\ Social\ Capital_s + \varepsilon_i$$

where all immigrant variables, all birth determinants, all social capital variables and the full set of controls are included. Eq. (4) is estimated for both *birth weight* and *low birth weight* using OLS and probit estimation techniques respectively. Eq. (4) becomes the principal estimation as it is set to capture the effects of social capital on birth weight as well as the perpetuation of the healthy immigrant effect.

8.3 Robustness Checks

One of the most important aspects of the study is to differentiate subject of awareness from object of state. The use of birth weight as a dependent variable allows for such an empirical pursuit. However, to ascertain that the healthy immigrant effect is in fact intergenerationally transmitted, several other independent variables are used to explore such occurrence. First, Eq. (1), Eq. (3) and Eq. (4)[47] are estimated for all immigrant PMKs using a binary variable that takes the value of one if the PMK rates his/her health as good, very good and excellent, or zero if self-assessed health status is rated fair or poor. Therefore, the presence of the healthy immigrant effect, i.e. the health of the parents being diminished, will be explored.

Second, Eq. (3b) and Eq. (4) are re-estimated for the binary variable of whether the child received medical care following birth with a probit model and for the categorical variable, health at birth (comparing the child's health status to other children) using an ordered probit. The inclusion of these two variables is to check whether there is

[47] The estimations for Eq. (3) and (4) do not include birth determinants as these are not relevant for parents' self-assessed health.

an immediate transfer of the healthy immigrant effect to the children. Given that birth weight measures health status at birth, it might be that the intergenerational transmission of the HIE is not realized until later in the child's life. Based on the premise that as a consequence of the HIE, immigrant parents will have lower health levels and will 'produce' children with lower birth weights, it is implied that the HIE is transferred at time of birth. However, it might be the case that the decrease in health stock is not immediately transferred to the child. To check whether the transmission occurs at time of birth, the variables *received medical care at birth* and *health at birth* are used. It is worth noting that the former is somewhat more objective than the latter, as receiving medical care indicates that there were complications and that the child suffered from some sort of malady, whereas *health at birth* is a comparative variable based on the mother's perception of her child's health status at birth. Nonetheless, these two variables measure health status at birth so that the distinction in the timing of the transfer of the HIE is made possible.

Similarly, all functional forms, Eq. (1)-(4), are re-estimated for two binary variables, short run health status (taking the value of one if the child's health is rated as good, very good or excellent, zero otherwise) and presence of chronic condition (taking the value of one if the child suffers from a chronic condition). As previously mentioned, the intergenerational transmission of the HIE may not be realized at birth. It might be that the HIE is transferred to children later in life or that the changes in perception of health are transferred to the children. Given that both variables are subjective, the differentiation of subject of awareness from object of state will not be possible if the HIE is present in

children's health outcomes later in their lives. Nonetheless, all of these variables are used to further explore the HIE phenomenon on children's health status.

Given that most of the health outcomes are binary variables OLS regressions are employed to check whether there is a significant difference between the probit coefficients and the OLS coefficients. Finally, another important distinction to be made is whether the child's birthplace affects his or her birth weight. The distinction between children born in Canada and children born elsewhere is important given the fact that having access to Canadian pre-natal care may be different than being pregnant in some other country. Within the sample of 13, 654 children, only 808 are born outside of Canada. Therefore, to maximize sample size, the estimation is restricted to Canadian-born children to compare the results with all immigrants' children.

Chapter 9: Results

9.1 Main Results

The main estimates are presented in Tables 3 through 5. Table 3 and Table 4 exhibit results using *low birth weight* as the dependent variable whereas Table 5 displays results using *birth weight* as the dependent variable. The results discussed will be those referring to the last functional form in the methodology, Eq. (4), as this equation evaluates the most complete estimation of health outcomes.

With respect to the probability of having low birth weight, there are several striking effects. First, both in Table 3 with the coefficients and Table 4 with the marginal effects, most coefficients show the expected signs. Male infants have a lower propensity of being born weighing less than 2.5kg. Having problems and smoking during pregnancy increases the likelihood of the child suffering from low birth weight. Being born in a multiple birth (having a twin or a triplet) significantly increases the probability of being LBW; it makes an infant almost 50 p.p. more likely to be LBW. For the healthy immigrant effect determinants, years since migration seem to play a minor effect on the probability of LBW. The marginal effect for the YSM variable is -0.004 suggesting an additional year in Canada actually reduces the likelihood of being LBW, however, it is insignificant. Although the marginal effect of the YSM^2 quadratic is significant, its value is very close to zero (0.00001859). When testing the joint significance of YSM and YSM^2, the Wald test fails to reject the null hypothesis that the two regressors are jointly

insignificant. However, with the inclusion of controls for cohort of arrival, both sets of variables are jointly significant at a 10% level of significance.[48]

Striking results arise from cohort of arrival and country of origin covariates. Immigrant mothers coming from the UK or the US have a lower likelihood of having infants of LBW. This might be an indication that immigrants from the United States and the United Kingdom are slightly healthier than other immigrants and than Canadian counterparts. Further, for the three cohorts that landed after 1971, all coefficients are significant and positive, meaning that immigrants' infants have a higher likelihood of being LBW dependent on their parents' arrival cohort. For immigrant mothers who arrived in 1981-1990, their children are 29.8 p.p. more likely to have low birth weight. For immigrants who arrived in 1991-2000 and after 2001 the figures are 22.6 p.p and 33.8 p.p respectively, showing robust evidence of the transmission of the healthy immigrant effect as cohort of arrival significantly affects the probability of LBW. Compared to other cohorts, the marginal effects seem to be increasing the newer the cohort. For instance, for immigrants who came to Canada between 1961-1970, the coefficient is only 5.6 p.p. Interestingly enough, it appears that newer cohorts 'produce' infants that are less healthy as they have an increased likelihood of being LBW.[49] This finding is congruent with those from the descriptive analysis in all graphs.[50] Although older cohort effects are not statistically different from zero, the full set of cohorts is jointly significant at a 5% level of significance.

[48] See Table 10 for joint significance tests.
[49] As previously mentioned, this might be due to technological innovations that allow the survival of children with lower birth weights. Further research will be required to explore this hypothesis.
[50] See Section 7.3 and Figures 4-9.

With respect to the demographic and socioeconomic variables, several coefficients are significant. Half of the permanent income measures are statistically different from zero and negative, living in a house and ownership of a dwelling decreases the probability of having LBW. Further, being a minority increases the probability of the child having low birth weight by 3.8 p.p. None of the education variables are significant. Not being able to speak English or French is significant and positive; immigrants who do not speak English or French have a higher likelihood (11p.p.) of having a child that is LBW. This can be a possible indication that they face barriers to health care. Not being part of the labor force in the last 12 months reduces the likelihood of the child being LBW. Given that 34% of the mothers do not work, it might be that being a stay-home mom has a positive effect on birth weight. Unfortunately, none of the social capital proxies, in any of the specifications, are statistically different from zero nor are they jointly significant. The pseudo R^2 is 20.1% for most of the regressions. Therefore all specifications predict birth weight relatively in the same way.

Similar results are portrayed when using *birth weight* as the dependent variable. Table 5 shows that male infants have higher BW, while multiple birth infants have significantly lower BW (1.04kg less). Having health problems and smoking during pregnancy also adversely impacts the child, as expected. The age of the mother is positively and significant, an additional year increases the infants' BW by 39g. However, the quadratic is negative and significant, indicating that increases in age affect BW favorably until a certain point, after which it then hinders the infant's health. All of the permanent income proxies are positive and significant showing that income favorably affects BW. Analogous to the previous results, none of the education variables are

statistically different from zero. With similar resemblance, not being able to speak English or French is statistically significant and negative indicating the potential barriers to accessing health care that immigrants may face. Not being part of the labor force is insignificant.

With respect to determinants of the HIE, for YSM and its quadratic, the coefficients are 6.550 and -0.155. An additional year in Canada will increase birth weight by 6.6g (one percent of a standard deviation). However, this occurs at a decreasing rate. Therefore, the healthy immigrant effect might be at work in that as mothers spend more time in Canada it seems that their babies are born weighing less. Although, the coefficients are insignificant, with the inclusion of controls for cohort of arrival, both sets of regressors are jointly significant at a 10% level of significance. Like the previous results, being from the United Kingdom or the United States leads to higher birth weights. Interestingly, infants of mothers being born in Asia have significantly lower birth weights, 92g. There is evidence of the healthy immigrant effect, even though none of the cohort variables are independently significant under this measure of health; they are jointly significant at a 5% level of significance.[51] Nonetheless, all social capital variables are independently and jointly insignificant. The R-squared using birth weight is 16.9%, meaning that approximately 17% of the variation of BW is explained by the regression.

When calculating the derivative of the probability of *low birth weight* and *birth weight* with respect to years since migration (using Eq. (4)) to compute the minimum and maximum values respectively, the derivatives give that the minimum probability of having low birth weight occurs at approximately 98 years since migration while birth

[51] See Tables 10 and 11.

weight reaches its maximum at approximately 21.12 years since migration. After these points, the probability of having low birth weight increases and the birth weight of immigrants' children begins to decline, respectively. Although the calculations show that health outcomes are adversely affected as years since migration increase, for low birth weight, the increased probability begins to occur after 98 years, which is irrelevant as no immigrant mother would be able to give birth at 98 YSM even if she immigrated as an infant. For birth weight, since maximum point occurs are 21.12 years since migration, the findings are consistent with the literature (McDonald and Kennedy, 2004). Nonetheless, these coefficients are insignificant.

9.2 Sensitivity Checks

The results from the robustness checks vary significantly. In regards to the parents' specification (where the probability of the parents rating their health status as good, very good or excellent depends on all socioeconomic and demographic characteristics) none of the cohort variables are statistically significant in any functional form, as shown in Table 6. Of the variables of interest, YSM variables are all negative but insignificant and YSM^2 is positive and significant by, at least a 5% significance level in all specifications. Like in previous results, the economic significance of these coefficients is that it shows the diminishing effect of years since migration on health. For the social capital variables, having friends and family (*ffsafe*) is significant when included separately and when included as a set. Therefore, social capital in the form of having friends and family is a significant determinant of the parent's health status. The only country indicator that is significant is being from the United Kingdom or the United

States, and consistent with previous models, it has a positive effect on health status for all specifications. Therefore, under this sensitivity check, there is some evidence attesting to the healthy immigrant effect for parents, as YSM^2 is the significant. The possible interpretation of this is that although *one* additional year in Canada may not affect the parents' health status, being in Canada for an extended period of time will eventually result in diminished health; the negative effect is increased as time goes by since the quadratic is positive up to a certain point. Given that self-assessed health status can be directly influenced by perception, the quadratic might be picking up precisely this, changes in perception.

The results from the children's specifications including health at birth and whether the child received special medical care show weak evidence for the HIE, as shown in Table 7. For the former, the only significant variable that was not a birth determinant was whether the mother was a minority. However, the variable has a positive effect on quantifying health status as higher; this seems to be counter-intuitive as minorities usually face more health problems than do their 'white' counterparts, but it is a possible indication that minorities perceive their health as better and consequently, perceive their child's health as better than other children. None of the immigrant or social capital variables are significant with this health measure. For the latter, with respect to the variables of interests, being from the United Kingdom or the United States and belonging to the last immigrant cohort (arriving to Canada after 2001) are both positive and significant under both functional forms. A possible explanation, which coincides with the previous results of the main specification, is that the later cohorts are less healthy and this

is why the children of immigrants from the last cohort had an increased likelihood of requiring special medical care upon birth.

The results for the specification for chronic condition and short run health status are quite interesting. As shown in Table 8, when determining the presence of a chronic condition, the coefficients for the 1991-2000 and after 2001 cohorts are statistically significant in all models except (1). These results resemble those from the estimations using birth weight; it appears that immigrants from this cohort have lower health status and that this is transmitted to their children. This is due to the fact that if a child's mother belongs to these cohorts, the child will have an increased probability of having a chronic condition. For self-assessed health status, none of the coefficients of interests are significant other than being from Europe, as shown in Table 9. Cohort of arrival variables are significant in the first specification, but the significance is lost when other variables and controls are added. In all four specifications being from Europe is negative. It might be that immigrants from this continent perceive their children as having lower health given that in no other regressions are the estimates significant. However, given that the PMK is the respondent to most of the questions, there is no way of telling whether the child in fact perceives his or her health as worse, or that the parent transmits changes in and his/her own perception of health to their offspring. Further research is required to determine the transmission of the healthy immigrant effect on other health measures. Social capital variables remain to be insignificant for all regressions using both health measures.

When re-estimating *low birth weight*, *parents' short-run health status,* whether the child *received medical care upon birth, health at birth, presence of chronic condition*

and *short-run health status,* the OLS coefficients are similar to the probit coefficients in significance but different in magnitude as shown in Tables 12-14. The results discussed would be those pertaining to the main variables, the set of healthy immigrant effect regressors and social capital regressors. In regards to the *low birth weight* variable, for the OLS estimation, the only variable of interest that is statistically significant is the quadratic for years since migration, which approaches zero. When comparing the OLS coefficients to the marginal effects of *low birth weight* in the probit estimation, it seems that the OLS coefficients actually underestimate the healthy immigrant effect. The cohort coefficients are much smaller in the OLS estimation compared to marginal effects of the probit estimation. However, these coefficients and all social capital coefficients are insignificant using OLS. Table 13 shows similar results for the parents' short run health status, only the quadratic for years since migration is statistically different from zero in the OLS regressions. The coefficients for the set of cohorts in the OLS are significantly smaller than the probit coefficients. This set as well as the social capital set of variables are statistically insignificant. As is the case with probit estimates for all remaining four measures of health for immigrants' children, virtually none of the variables of interest are significant with OLS estimates. Table 14 similarly shows that the OLS coefficients are smaller than the probit estimates for those variables. Overall, it appears that the probit models suit the analysis better and are more precise when estimating this set of dichotomous variables as OLS underestimates the effects.

When quantifying the effects of years since migration, cohort of arrival and social capital variables, for Canadian-born children the results are much smaller than for the whole sample of children. Both for the *low birth weight* and *birth weight* covariates Table

15 shows smaller coefficients than Tables 3-5 for the coefficients of interest. Although none of the variables of interest are significant, the Wald test of significance (Table 11) shows that for the *birth weight* variable, both, the set of years since migration and the set of cohort controls are jointly significant at a 1% level of significance. For the *low birth weight variable* the year since migration variables are jointly significant at a 1% level of significance and when including both sets, cohort of arrival controls and YSM variables, both sets of regressors are jointly significant at a 5% level of significance. Therefore, the restriction of the sample to Canadian-born children similarly attests to the intergenerational transmission of the healthy immigrant effect given the adverse effects that years since migration and cohort of arrival exert on birth weight. However, further research would be required to explore in detail why these differences exist between all children surveyed and Canadian-born children. For instance, the specifications could be estimated separately by the child's country of origin.

Chapter 10: Discussion

In light of these results several remarks are worth noting. First, although none of the social capital variables are significant, it might just be that the proxies cannot truly identify the effect of social capital. Most immigrants (95-97%) claim that they have positive social capital by saying that they have friends and family that make them feel safe, secure and happy and by saying that they can count on people during an emergency. On the other hand, only a few (9%) contend they lack social capital by stating that no one would help them during an emergency.[52] Therefore, it may be that the proxies are not strong enough to represent social networks, as these three measures quantify social capital merely by the existence of (or lack of) social support.

Second, the intergenerational transmission of socioeconomic status is clearly present in the results. However, the transmission mechanism is not clearly evidenced. Given that most of the permanent income variables are significant and most education variables are insignificant in most specifications it might be that the transmission mechanism occurs through income, not education. Further analysis is required in order to determine the transmission pathways for immigrants' children.

Another interesting finding regarding social variables is that immigrant mothers who do not speak English or French have a higher likelihood of having a child that is LBW; their children are born weighing approximately 200g less. This is evidenced in the regressions for all children and Canadian-born children.[53] This can be a possible

[52] See Table 1 for the exact definitions of the proxies and Table 2 for the means of the variables.
[53] For Canadian-born children the marginal effect of not speaking English or French is 0.083, increasing the probability of being LBW. Similarly, for mothers who do not speak either language, their children born in Canada weigh 148g less.

indication that they face barriers to health care and may not be able to take adequate care of their children while pregnant. This finding is consistent with previous results in the literature (Deri, 2002). If language barriers are identifying barriers to health care and children are suffering from lower birth weights because of it, then policies should be directed towards improving the prenatal health of immigrants. Nutrition campaigns directed toward immigrants can be one pursuit to attempt to improve their infants' birth weight. Similarly, increasing the number of bilingual/multilingual doctors in areas of high immigrant density could be a pathway for policy makes to address this issue.

In regards to the intergenerational transmission of the healthy immigrant effect findings, several observations need to be considered. First, the negative effect that cohort of arrival has on the probability of LBW attests to the perpetuation of the healthy immigrant effect using this measure of health. Further, the negative effect demonstrates that health is, in fact, diminishing, rather than the hypothesis that the perception of health is changing. However, it is important to note that the probability of having low birth weight reaches its minimum at 98 years since migration. On the other hand, birth weight reaches its maximum at approximately 21 years since migration, showing somewhat more relevant evidence of the HIE. After 21 years since their arrival to Canada immigrant mothers start 'producing' infants with lower birth weights. The evidence from the sensitivity checks is mixed in determining whether the transmission is realized immediately upon birth or later in life. Nonetheless, the healthy immigrant effect *is* evidenced through birth weight. Moreover, immigrants from the United Kingdom and the Unites States have higher birth weights. Paralleling McDonald and Kennedy (2004),

it could be that immigrants with closer similarities to Canadians, do not experience the HIE as strongly as immigrants with less similarities.

In addition, both the descriptive and empirical analyses appear to show that newer cohorts 'produce' infants that are less healthy as they have an increased likelihood of being LBW. Even though empirical results only show statistically significant coefficients of this incident for the 1981-2001+ cohorts, it is worth noting that most immigrants (74%) arrived in the thirty-year period of 1971-2000 and the cohort effects are jointly significant at a 5% level for both of the dependent variables, birth weight and low birth weight. Therefore, the reason why these cohorts are independently insignificant would be sample size restrictions. It would be interesting to see what the cohort effect would be if the sample was increased.

Another explanation might be the 'cohort effect' explained in Currie and Moretti (2003). If an individual engages in healthier (or harmful) types of behavior depending on the behavior of her cohort, then there will be cohort spillover effects that might be compounded through time. This might be at work here. If immigrants from 1981-1990 engaged in less healthy behaviors, the cohort spillovers might have been transferred to later arrivals, compounding the overall effect through time. This could particularly be the case if newly-arrived immigrants move towards socializing with other, older immigrants upon arrival. Purely for illustration—as only 4% of immigrants in the sample (655 mothers) smoked during their pregnancy—if it became socially acceptable to smoke while pregnant in 1981, newly arrived immigrants would not have been shunned or warned against engaging in such harmful health behaviors, compounding the effect through time, making the children of newer immigrants weigh less. It would be extremely

interesting to investigate empirical extensions of this occurrence. Likewise, it could be explored whether it has to do with technological changes and the survival of low birth weight children, as previously mentioned. It would also be quite important given that because of the intergenerational transmission of the HIE, the social and economic consequences of the HIE are underestimated. First, the gradient in health remains between immigrants and Canadians, as immigrants have children with lower birth weights, even after controlling for country of origin. The implications of having LBW in future outcomes like education, earnings or perpetuation of LBW are unfavorable in Canada. Likewise the future medical short- and long-run effects of LBW increase the economic burden to society. It is not only that immigrants' health declines but also that their children have adverse health outcomes. Under a universal health care system, this results in taxpayers being harmed so that the government can publicly pay for all medical costs. Therefore, improving the immigrants' health and their infants' health should be a focal issue for Canadian policy makers.

Lastly, a twin study replicating the results would be extremely beneficial. As there are countless of mother specific characteristics, using a twin sample controlling for these unobservables would increase the validity of the findings. The addition of year of birth fixed effects is another pathway for future research. Similarly, controlling for children's place of birth could give more precise results to the determination of birth weight.

Chapter 11: Conclusion

The importance of health at birth is unmistakable. This study explored a novel avenue of research regarding immigrants' children's birth weight to measure whether there is an intergenerational transmission of the healthy immigrant effect and whether social capital plays a role in determining birth weight. The strategy employed a hybrid specification combining a simplified version of the infants' health production function and the healthy immigrant effect specifications. The model was further augmented by the inclusion of social capital variables. Using the NLSCY, the analysis provided robust evidence of the perpetuation of the healthy immigrant effect using birth weight as a measure of infants' health status. Alternative measures of health yielded mixed results. There is additional evidence of the existence of an income gradient and of the intergenerational transmission of socioeconomic status among immigrants in Canada. No evidence is found supporting any effect of social capital on children's birth weight. Several pathways of future research are identified to explore the reasons behind the perpetuation of the healthy immigrant effect. It is thus concluded that the health of immigrants should not be dismissed, as previous results underestimate the economic and social costs of the phenomenon by not considering the perpetuation of the effect. Therefore, enhancing the health of immigrant mothers and of their newborns should be of prime importance for policy makers.

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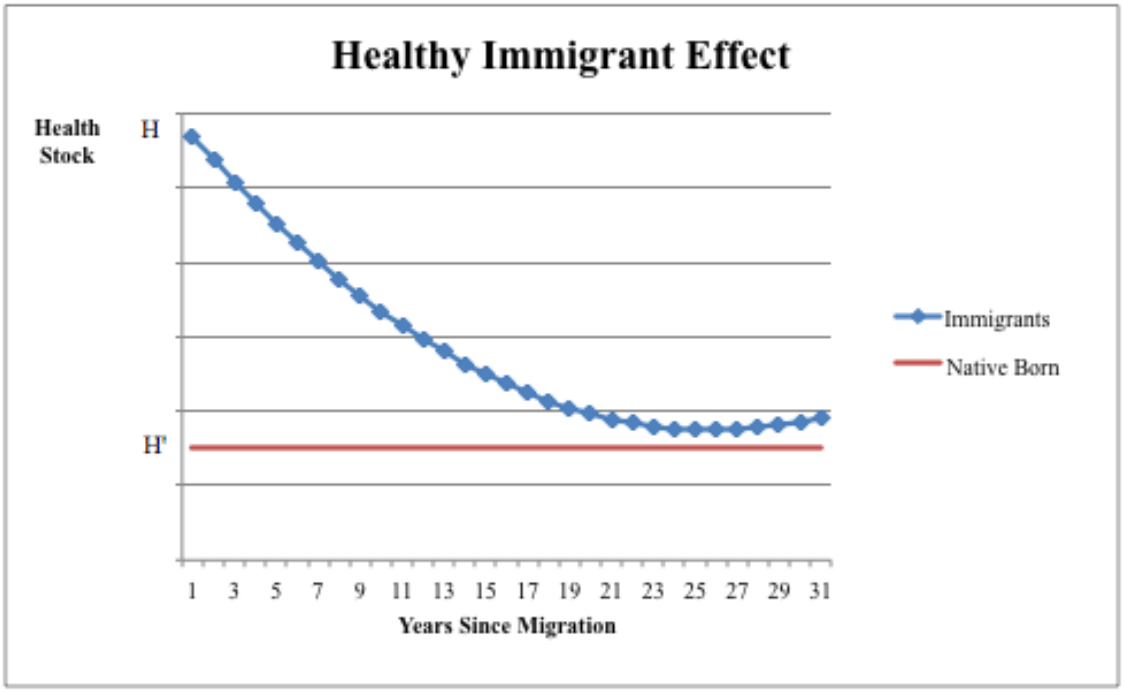
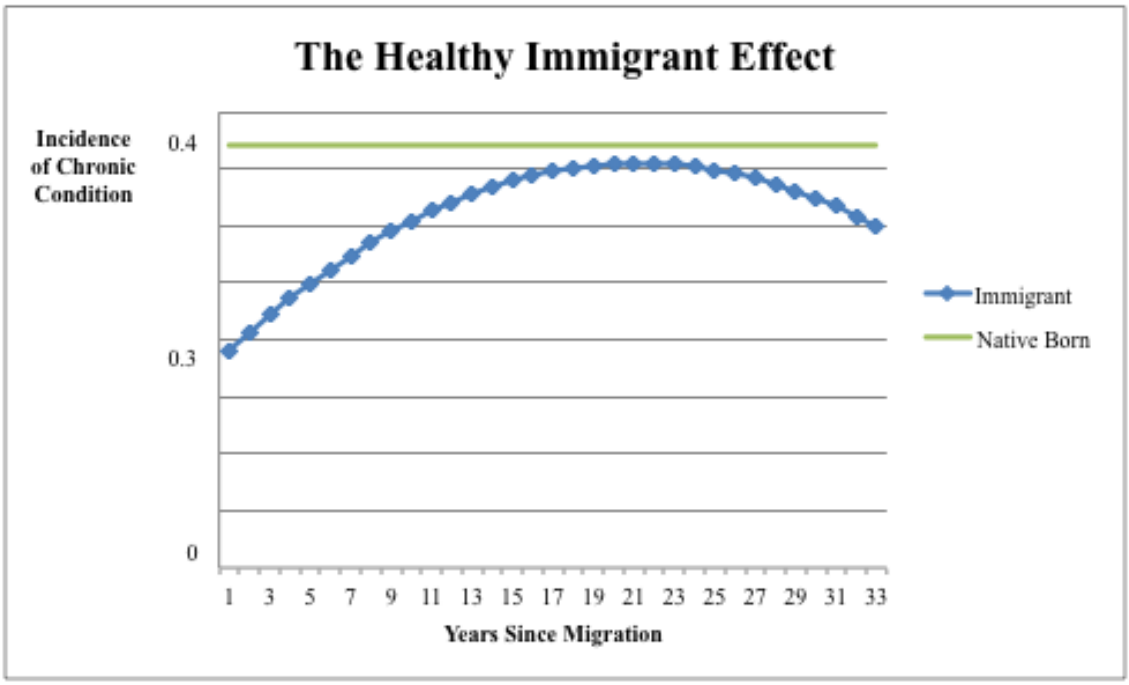
Appendix A: Figures and Tables

Figure 1. The Healthy Immigrant Effect: Health Stock



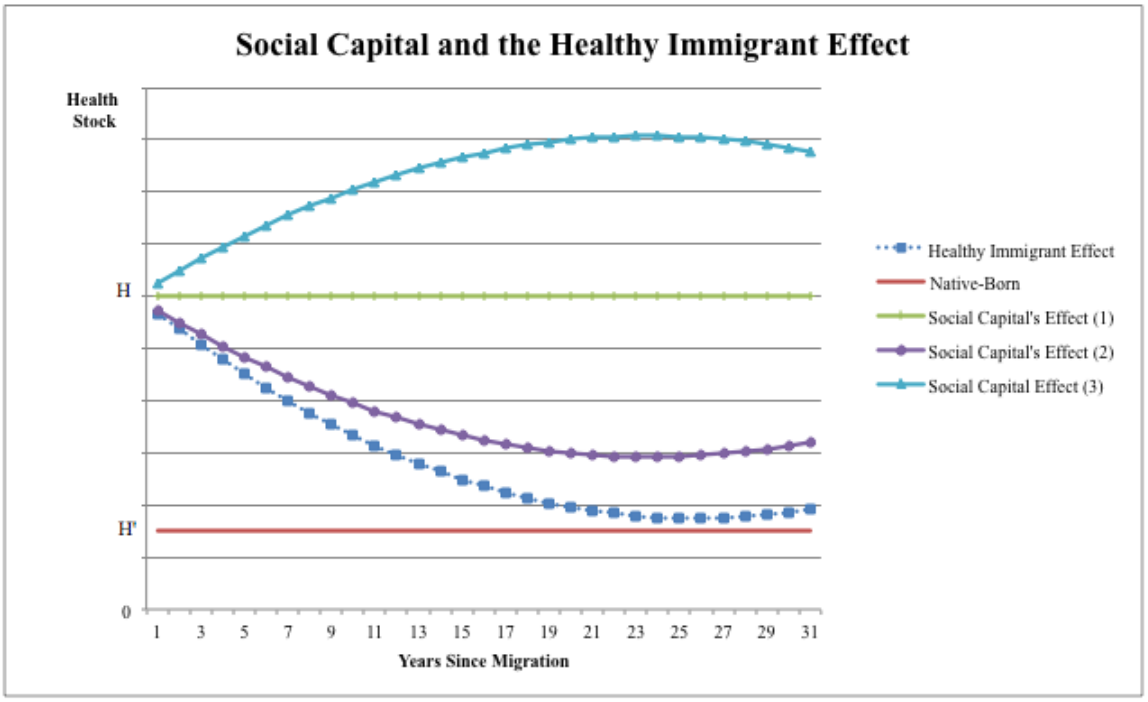
Note: The graph is a depiction of both parts of the healthy immigrant effect. First, upon arrival, immigrants have a health advantage, the difference between H and H'. Second, as they spend more years in Canada, their health levels decline and converge to that of native-born Canadians. According to the literature, the convergence occurs at approximately 20-25 years since migration (McDonald and Kennedy, 2004).

Figure 2. The Healthy Immigrant Effect: Incidence of Chronic Conditions



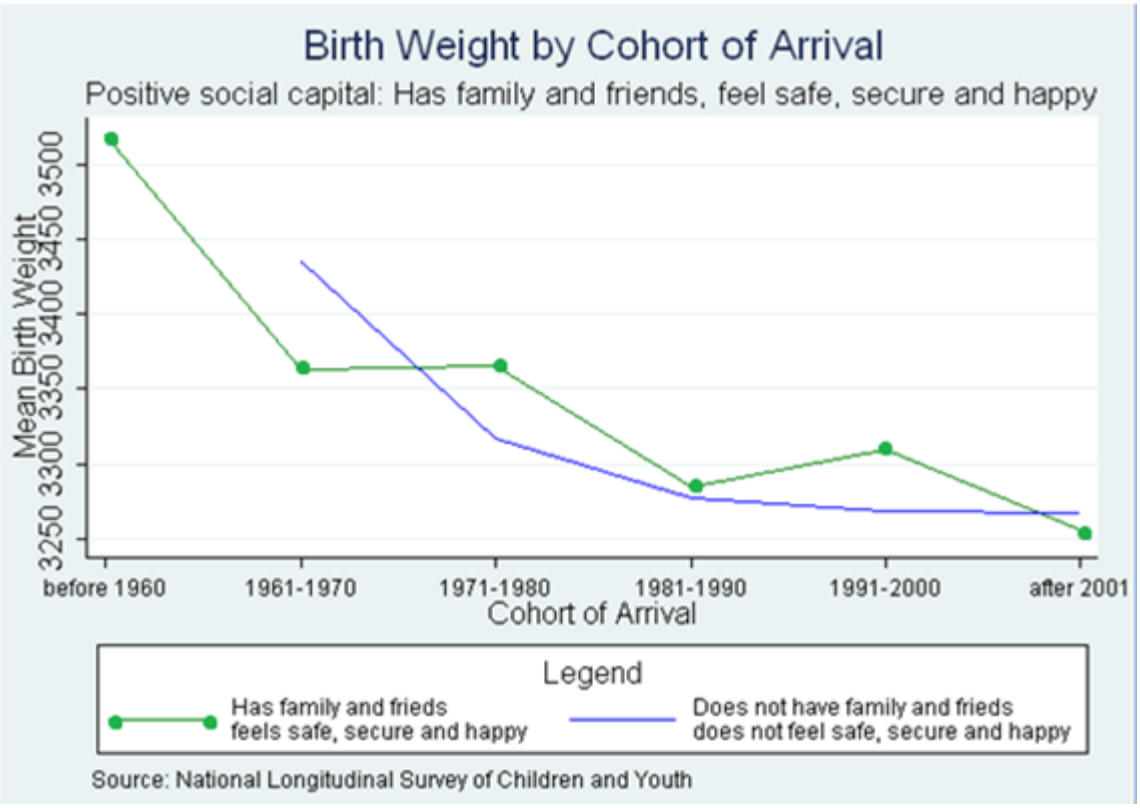
Note: The graph is a depiction of how the health of immigrants converges to that of native-born Canadians by the increase in the likelihood of suffering from a chronic condition. The incidence values are the means values from the National Longitudinal Survey of Children and Youth. According to the literature, the convergence occurs at approximately 20-25 years since migration (McDonald and Kennedy, 2004).

Figure 3. Social Capital and the Healthy Immigrant Effect



Note: The effects of positive social capital on the healthy immigrant effect can be several. It can have no effect on the health of immigrant; the stock of health will be decreased, as it would normally be by the healthy immigrant effect. Social capital can fully mitigate the healthy immigrant effect and maintain the health advantage that immigrants have initially upon arrival as depicted by (1). Likewise, it can buffer the effect, lessening the impact in the reduction of health stock as shown by (2). Finally, positive social capital can have such large beneficial effect on health outcomes that not only does it eliminate the HIE completely, but it also makes immigrants healthier, increasing their health stock.

Figure 4: Birth Weight by Cohort of Arrival
Positive social capital: has family and friends, feel safe, secure and happy



Note: The means for the 'before 1960' cohort for individuals who do not have family and friends could not be released by the ARDC because it had too few observations

Figure 5: Birth Weight by Cohort of Arrival
Lacks social capital: no one would help immigrant if something went wrong

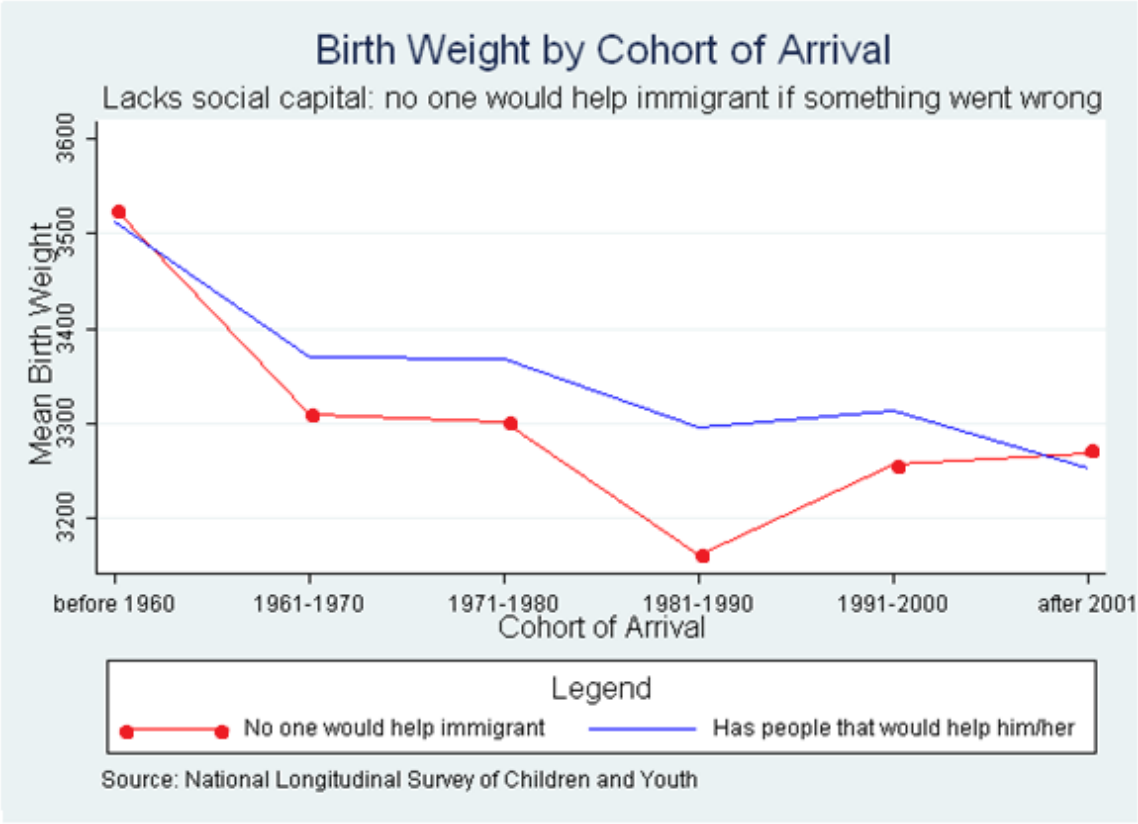


Figure 6: Birth Weight by Cohort of Arrival
Positive social capital: can count on people during an emergency

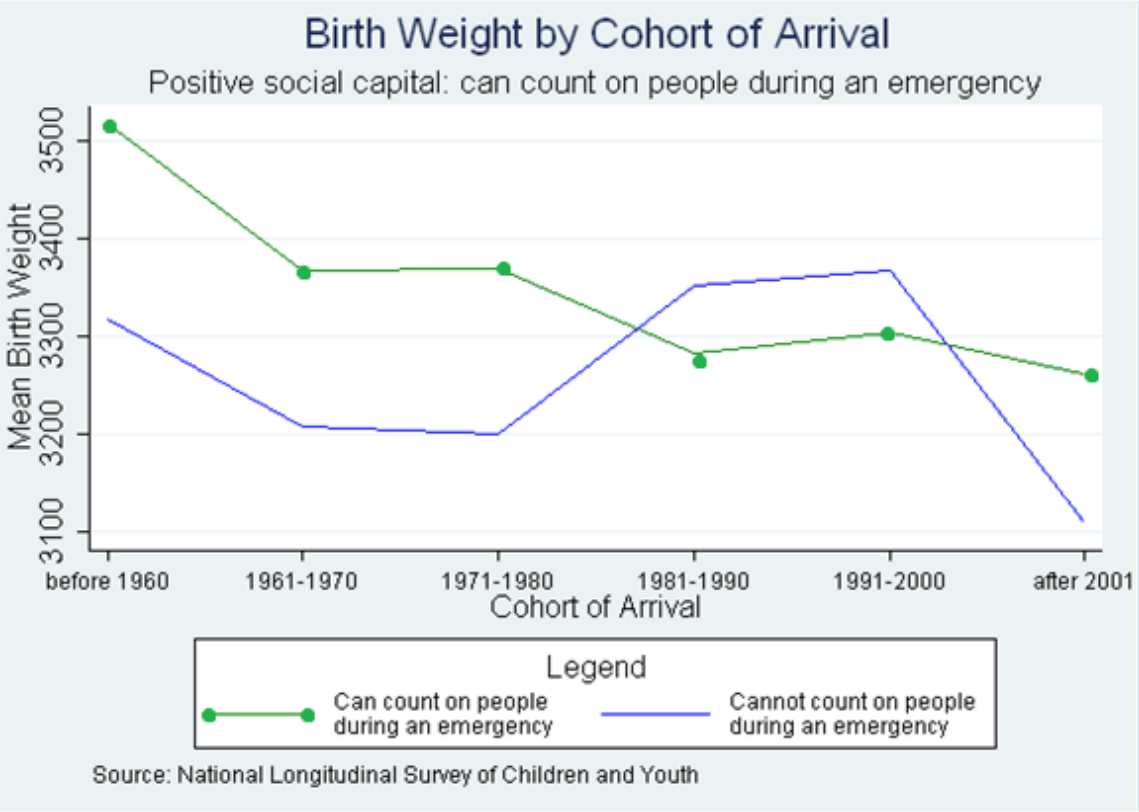
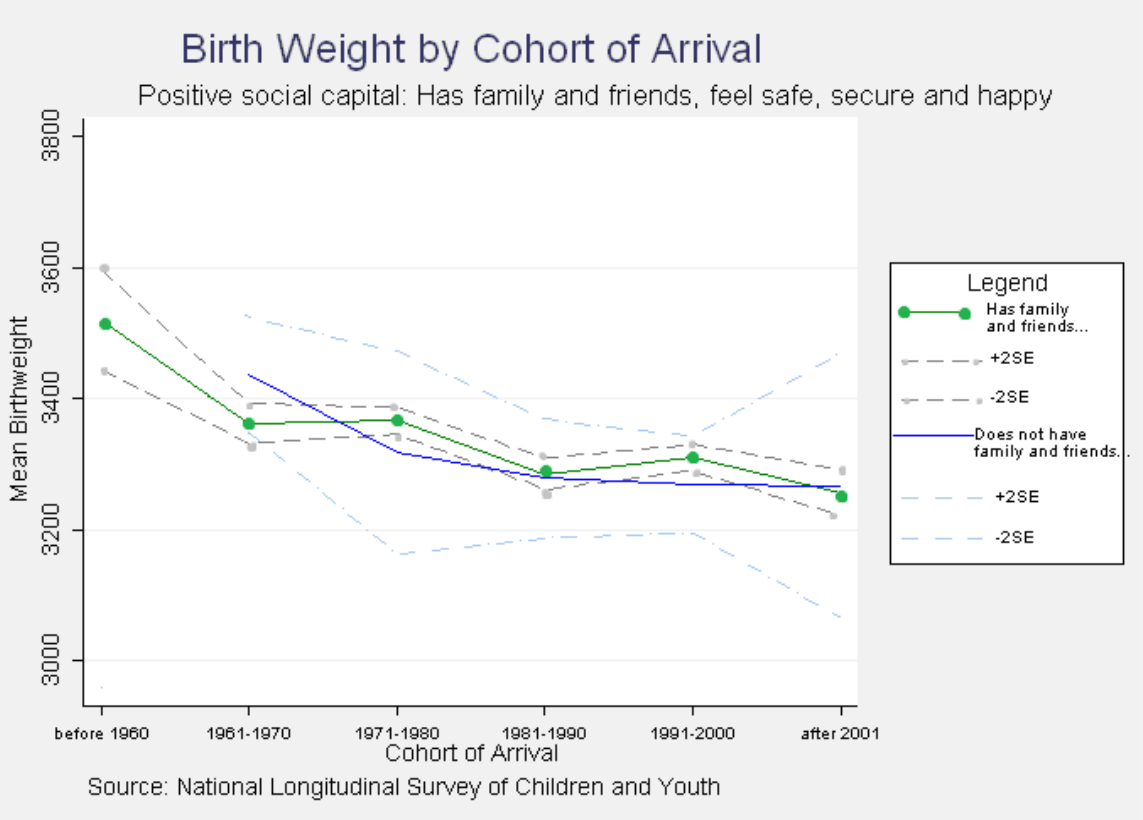


Figure 7: Birth Weight by Cohort of Arrival with Standard Errors
Positive social capital: has family and friends, feel safe, secure and happy



Note: The means for the 'before 1960' cohort for individuals who do not have family and friends could not be released by the ARDC because it had too few observations.

Figure 8: Birth Weight by Cohort of Arrival with Standard Errors
Lacks social capital: no one would help immigrant if something went wrong

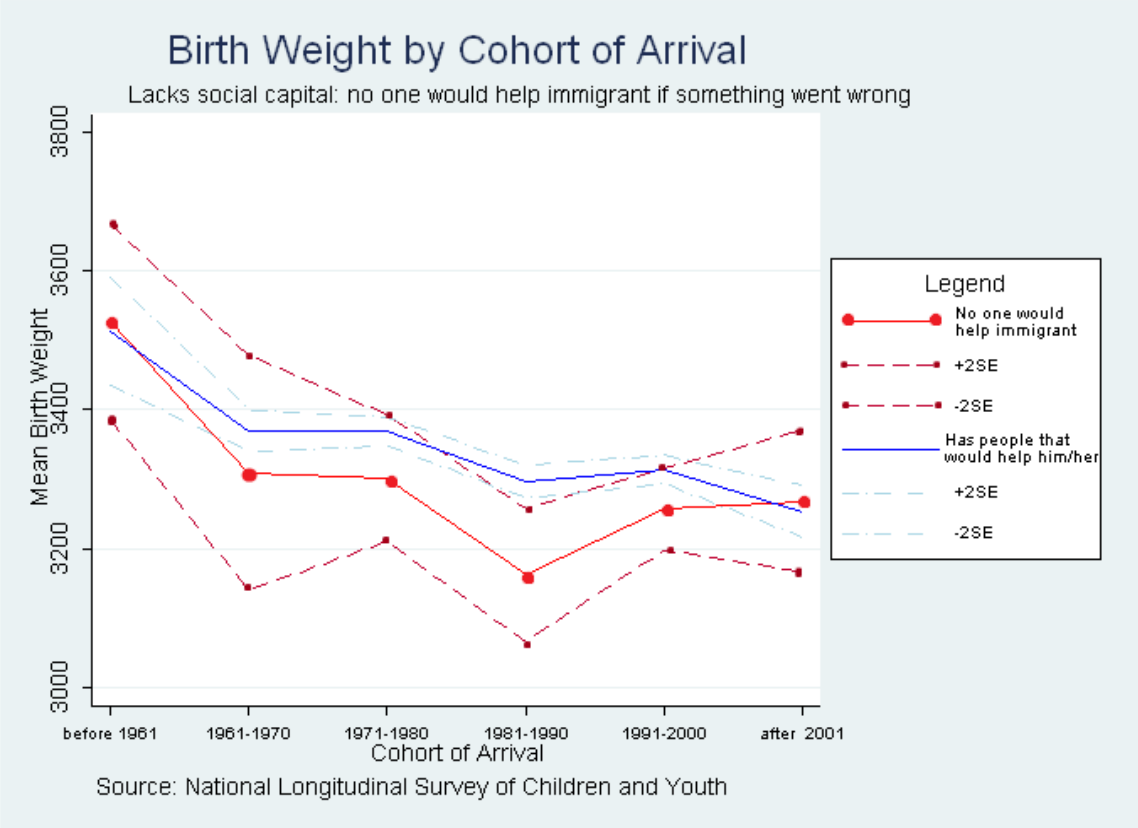


Figure 9: Birth Weight by Cohort of Arrival with Standard Errors
Positive social capital: can count on people during an emergency

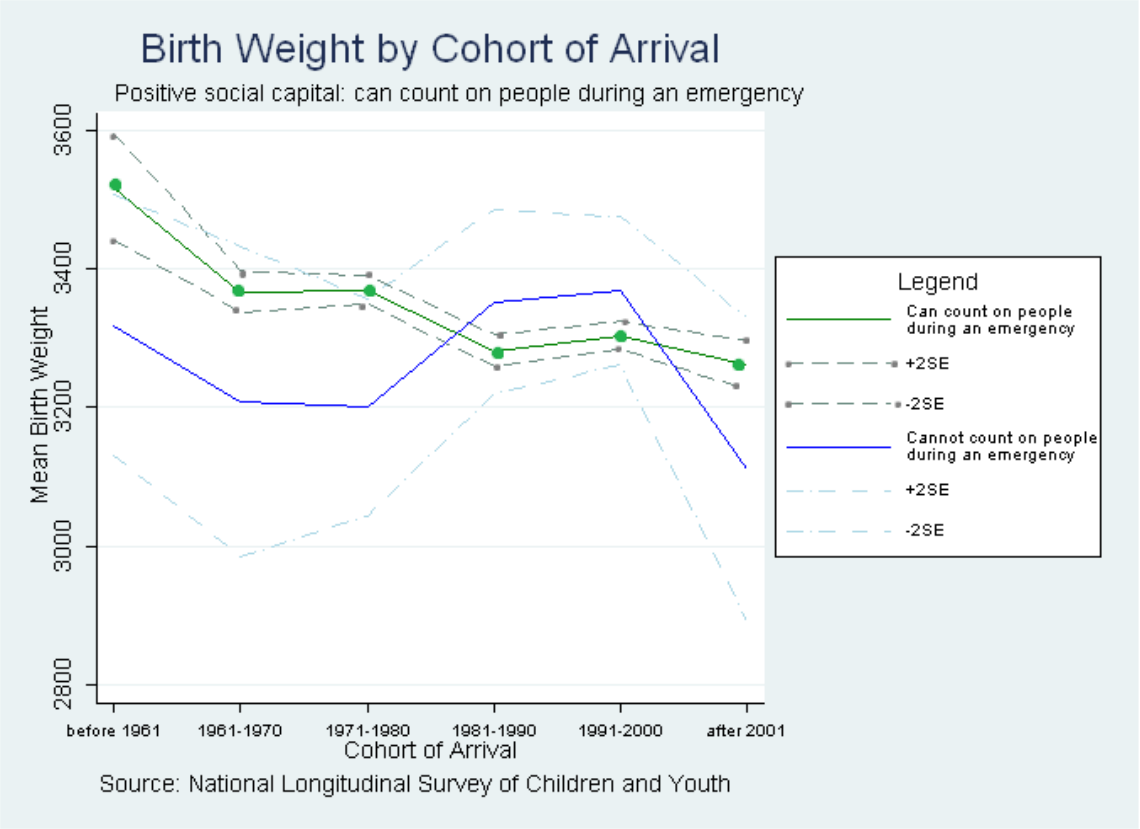


Table 1. Definitions of Proxies for Social Capital

Variable Label	Survey Question Asked	Empirical Definition
No one would help individual – *'nohelp'*	Do you strongly disagree, disagree, agree, or strongly agree with the following statement: If something went wrong, no one would help me.	- *nohelp*=1 if respondent strongly agrees or agrees with statement. - *nohelp*=0 if respondent strongly disagrees or disagrees with statement.
Has family and friends – *'ffsafe'*	Do you strongly disagree, disagree, agree, or strongly agree with the following statement: I have family and friends who help me feel safe, secure and happy.	- *ffsafe*=1 if respondent strongly agrees or agrees with statement. - *ffsafe*=0 if respondent strongly disagrees or disagrees with statement.
Can count on people in emergency – *'emerg.'*	Do You Strongly Disagree, Disagree, Agree, Or Strongly Agree With The Following Statement: There are people I can count on in an emergency.	- *emerg*=1 if respondent strongly agrees or agrees with statement. - *emerg*=0 if respondent strongly disagrees or disagrees with statement.

Note: This set of social support questions are asked in all cycles of the National Longitudinal Survey of Children and Youth except in cycle two.

Table 2. Descriptive Statistics of Key Variables

	Canadian Born		Immigrants	
	Weighted Mean	St. Deviation	Weighted Mean	St. Deviation
Children's Variables				
Measures of Health				
Birth weight	3411.473	583.724	3307.827	618.021
Low birth weight	0.054	0.226	0.072	0.259
Received med. care at birth	0.181	0.385	0.138	0.345
Health at birth	1.489	0.881	1.573	0.865
Chronic condition	0.220	0.415	0.185	0.389
Short-run health status	1.515	0.744	1.603	0.769
Parents' Variables				
Measures of Health				
Self-assessed health	1.968	0.915	2.125	0.963
Chronic condition	0.412	0.492	0.341	0.474
Social Capital Variables				
No one would help individual	0.046	0.209	0.091	0.287
Has family and friends	0.966	0.180	0.952	0.213
Can count on people in emerg.	0.984	0.126	0.966	0.181
Immigrant Variables				
Years since migration	N/A	N/A	17.469	11.079

Table 2. Descriptive Statistics of Key Variables

Born in Asia	N/A	N/A	0.254	0.435
Born in Europe	N/A	N/A	0.159	0.366
Born in the UK or US	N/A	N/A	0.125	0.331
Born in another country	N/A	N/A	0.460	0.498
Arrived prior to 1960	N/A	N/A	0.050	0.218
Arrived in 1961-1970	N/A	N/A	0.130	0.336
Arrived in 1971-1980	N/A	N/A	0.234	0.424
Arrived in 1981-1990	N/A	N/A	0.261	0.439
Arrived in 1991-2000	N/A	N/A	0.245	0.430
Arrived after 2001	N/A	N/A	0.080	0.272
Birth Variables				
Sex of child (% of males)	0.511	0.500	0.521	0.500
Multiple birth	0.028	0.165	0.030	0.171
Age of mother at birth	28.321	5.065	30.359	5.244
Diabetes	0.059	0.236	0.080	0.271
High-blood pressure	0.107	0.309	0.076	0.265
Other health problems	0.190	0.393	0.136	0.343
Smoked during pregnancy	0.208	0.406	0.048	0.213
Controls				
Age	35.139	6.495	37.191	6.756
Sex (% of males)	0.082	0.275	0.154	0.361
Marital status	0.848	0.359	0.880	0.325
Minority	0.036	0.185	0.581	0.493
Did not complete high school	0.274	0.446	0.248	0.432

Table 2. Descriptive Statistics of Key Variables

Completed high school	0.225	0.418	0.250	0.433
Undergraduate degree	0.131	0.337	0.163	0.369
Other post-secondary	0.355	0.479	0.304	0.460
Higher degree	0.013	0.113	0.033	0.179
Lives in a house	0.748	0.434	0.561	0.496
Owns dwelling	0.766	0.423	0.698	0.459
More than 2 bedrooms	0.859	0.348	0.775	0.417
More than 5 bedrooms	0.014	0.118	0.022	0.147
Household has 1-2 people	0.043	0.203	0.022	0.145
Household has 3-4 people	0.632	0.482	0.558	0.497
Household has 5+ people	0.325	0.468	0.421	0.494
Not in the labour force	0.307	0.461	0.342	0.474
Speaks French	0.147	0.354	0.018	0.131
Speaks other languages	0.081	0.273	0.684	0.465
Does not speak F or E.	0.000	0.013	0.014	0.116
Mothers	0.913	0.282	0.841	0.365
Pooled sample size	143568		13654	

Note: The pooled cross-sections from the National Longitudinal Survey of Children and Youth. The health measures, health at birth, short-run health status and self-assessed health are based on a five point scale where one equals excellent, two equals very good, three equals good, four equals fair and five equals poor. The set of parent variables refer to the questions asked about the PMK's characteristics.

Table 3. Effects of Cohort of Arrival and Social Capital on Children's Health

Dependent Variable: Low Birth Weight (infant's weight at birth <2.5kg)

	(1)	(2)	(3a)	(3b)	(3c)	(4)
YSM	-0.037*	-0.022	-0.033	-0.032	-0.032	-0.033
	(0.015)	(0.017)	(0.018)	(0.018)	(0.018)	(0.018)
YSM^2	0.001**	0.001***	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Arrived in 1961-1970	-0.051	0.157	0.381	0.373	0.371	0.387
	(0.204)	(0.306)	(0.353)	(0.352)	(0.352)	(0.352)
Arrived in 1971-1980	-0.076	0.496	0.739	0.722	0.726	0.752
	(0.249)	(0.399)	(0.449)	(0.447)	(0.448)	(0.446)
Arrived in 1981-1990	0.034	1.170*	1.437**	1.412**	1.423**	1.455**
	(0.304)	(0.483)	(0.536)	(0.534)	(0.535)	(0.531)
Arrived in 1991-2000	-0.097	1.228*	1.444*	1.418*	1.432*	1.466*
	(0.354)	(0.539)	(0.590)	(0.589)	(0.590)	(0.582)
Arrived after 2001	-0.250	1.269*	1.460*	1.426*	1.444*	1.491*
	(0.418)	(0.600)	(0.651)	(0.650)	(0.650)	(0.640)
No help			0.053			0.063
			(0.130)			(0.136)
Ffsafe				0.032		0.045
				(0.187)		(0.195)
Emerg					-0.031	-0.020
					(0.213)	(0.226)
Age	-0.020	-0.009	0.000	0.001	0.003	0.001
	(0.036)	(0.055)	(0.056)	(0.057)	(0.057)	(0.056)
Age^2	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Minority	-0.032	0.371***	0.361***	0.364***	0.363***	0.362***
	(0.090)	(0.094)	(0.098)	(0.099)	(0.099)	(0.098)

Table 3. Effects of Cohort of Arrival and Social Capital on Children's Health

Married	0.059	-0.034	-0.064	-0.065	-0.065	-0.068
	(0.093)	(0.119)	(0.122)	(0.122)	(0.123)	(0.122)
Lives in a house	-0.195**	-0.226**	-0.217**	-0.222**	-0.232**	-0.204**
	(0.072)	(0.078)	(0.078)	(0.078)	(0.078)	(0.106)
Owns dwelling	-0.104**	-0.278**	-0.296**	-0.286**	-0.295**	-0.300**
	(0.092)	(0.105)	(0.110)	(0.110)	(0.110)	(0.110)
More than 2 bedrooms	-0.035	-0.077	-0.147	-0.143	-0.141	-0.145
	(0.157)	(0.182)	(0.187)	(0.186)	(0.186)	(0.187)
Household 3-4 people	-0.097	-0.207	-0.231	-0.236	-0.234	-0.227
	(0.159)	(0.176)	(0.181)	(0.181)	(0.181)	(0.182)
Household of 5+ people	-0.021	-0.346	-0.333	-0.339	-0.340	-0.330
	(0.168)	(0.184)	(0.188)	(0.189)	(0.189)	(0.188)
Did not complete HS	0.023	0.126	0.120	0.122	0.115	0.118
	(0.081)	(0.100)	(0.105)	(0.108)	(0.108)	(0.105)
Undergraduate degree	-0.244*	-0.038	-0.038	-0.040	-0.041	-0.036
	(0.106)	(0.111)	(0.113)	(0.113)	(0.113)	(0.113)
Other post-secondary	-0.076	0.043	0.052	0.049	0.045	0.055
	(0.092)	(0.105)	(0.112)	(0.112)	(0.112)	(0.112)
Higher degree	0.050	0.172	0.191	0.187	0.189	0.196
	(0.170)	(0.178)	(0.179)	(0.179)	(0.179)	(0.179)
Not in the labor force	-0.092	-0.117*	-0.148*	-0.144*	-0.141	-0.145*
	(0.054)	(0.069)	(0.074)	(0.072)	(0.072)	(0.073)
Does not speak F or E.	0.343**	0.611**	0.637**	0.635**	0.634**	0.637**
	(0.204)	(0.227)	(0.228)	(0.228)	(0.227)	(0.228)
Born in Asia	0.342***	-0.081	-0.093	-0.092	-0.090	-0.094
	(0.085)	(0.083)	(0.086)	(0.085)	(0.085)	(0.086)
Born in Europe	0.120	0.019	-0.009	-0.011	-0.010	-0.009
	(0.110)	(0.117)	(0.125)	(0.126)	(0.126)	(0.126)
Born in the UK or US	-0.267**	-0.345**	-0.383**	-0.382**	-0.379**	-0.378**
	(0.100)	(0.112)	(0.118)	(0.117)	(0.117)	(0.118)

Table 3. Effects of Cohort of Arrival and Social Capital on Children's Health

Sex of child (M=1)		-0.133*	-0.159*	-0.157*	-0.160*	-0.160*
		(0.067)	(0.069)	(0.069)	(0.069)	(0.069)
Multiple birth		1.838***	1.777***	1.779***	1.779***	1.777***
		(0.130)	(0.138)	(0.138)	(0.138)	(0.138)
Age of mother at birth		-0.022	-0.024	-0.024	-0.024	-0.025
		(0.017)	(0.018)	(0.018)	(0.018)	(0.017)
Diabetes		0.041	0.033	0.031	0.037	0.035
		(0.108)	(0.112)	(0.112)	(0.111)	(0.112)
High-blood pressure		0.600***	0.610***	0.608***	0.607***	0.609***
		(0.095)	(0.100)	(0.100)	(0.100)	(0.100)
Other health problems		0.613***	0.627***	0.626***	0.625***	0.629***
		(0.086)	(0.089)	(0.089)	(0.089)	(0.089)
Smoked		0.598***	0.600***	0.602***	0.600***	0.598***
		(0.112)	(0.120)	(0.120)	(0.120)	(0.120)
Constant	-0.607	1.881	1.721	1.684	1.715	1.712
	(0.735)	(1.024)	(1.077)	(1.106)	(1.104)	(1.117)
Cycle Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Birth Variables	No	Yes	Yes	Yes	Yes	Yes
Social Capital Vars.	No	No	One	One	One	All
Log Likelihood	-980578.8	-453042.8	-411969.4	-412687.2	-412423.6	-411150.3
Pseudo R-Squared	0.044	0.201	0.201	0.200	0.201	0.201
N	11213	7392	6809	6829	6811	6785

Note: All regressions are estimated with a probit using the pooled cross-sections from the National Longitudinal Survey of Children and Youth. The column numbers correspond to the equations described in the Empirical Framework chapter. The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.

Table 4. Marginal Effects for Cohort of Arrival and Social Capital on Children's Health

Dependent Variable: Low Birth Weight (infant's weight at birth <2.5kg)

	dy/dx (1)	dy/dx (2)	dy/dx (3a)	dy/dx (3b)	dy/dx (3c)	dy/dx (4)
YSM	-0.005*	-0.002	-0.004	-0.004	-0.004	-0.004
YSM^2	0.000**	0.000***	0.000***	0.000***	0.000***	0.000***
Arrived in 1961-1970	-0.006	0.019	0.055	0.053	0.053	0.056
Arrived in 1971-1980	-0.009	0.071	0.119	0.115	0.116	0.122
Arrived in 1981-1990	0.004	0.215*	0.292**	0.285**	0.288**	0.298**
Arrived in 1991-2000	-0.097	0.179*	0.221*	0.216*	0.219*	0.226*
Arrived after 2001	-0.027	0.269*	0.327*	0.316*	0.322*	0.338*
No help			0.006			0.007
Ffsafe				0.004		0.005
Emerg					-0.004	-0.002
Age	-0.003	-0.001	0.000	0.000	0.000	0.000
Age^2	0.000	0.000	0.000	0.000	0.000	0.000
Minority	-0.041	0.039***	0.038***	0.038***	0.038***	0.038***
Married	0.007	-0.004	-0.007	-0.008	-0.007	-0.008
Lives in a house	-0.028**	-0.034**	-0.033**	-0.034**	-0.036**	-0.038**
Owns dwelling	-0.025**	-0.028**	-0.035**	-0.035**	-0.037**	-0.037**
More than 2 bedrooms	-0.045	-0.022	-0.032	-0.026	-0.017	-0.015
Household of 3-4 people	-0.013	-0.024	-0.027	-0.027	-0.027	-0.026
Household of 5+ people	-0.003	-0.362	-0.035	-0.036	-0.036	-0.035
Did not complete HS	0.002	0.015	0.014	0.014	0.014	0.014
Undergraduate degree	-0.028	-0.004	-0.004	-0.004	-0.004	-0.004
Other post-secondary	-0.010	0.005	0.006	0.006	0.005	0.006
Higher degree	0.007	0.021	0.024	0.024	0.024	0.025
Not in the labor force	-0.012	-0.013*	-0.016*	-0.016*	-0.015	-0.016*
Does not speak F or E.	0.056**	0.105**	0.111**	0.111**	0.110**	0.111**

Table 4. Marginal Effects for Cohort of Arrival and Social Capital on Children's Health

Born in Asia	0.051***	-0.009	-0.010	-0.010	-0.010	-0.010
Born in Europe	0.164	0.002	-0.001	-0.001	-0.001	-0.001
Born in the UK or US	-0.030**	-0.031**	-0.034**	-0.034**	-0.033**	-0.034**
Sex of child (M=1)		-0.015*	-0.018*	-0.018*	-0.018*	-0.018*
Multiple birth		0.522***	0.499***	0.500***	0.500***	0.499***
Age of mother at birth		-0.002	-0.002	-0.003	-0.003	-0.003
Diabetes		0.005	0.004	0.003	0.004	0.004
High-blood pressure		0.076***	0.078***	0.078***	0.078***	0.078***
Other health problems		0.078***	0.080***	0.081***	0.080***	0.080***
Smoked		0.076***	0.077***	0.077***	0.078***	0.077***
Cycle Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Birth Variables	No	Yes	Yes	Yes	Yes	Yes
Social Capital Vars.	No	No	One	One	One	All

Note: For all dummy variables the dy/dx is for a discrete change from 0 to 1. : All marginal effects are estimated for of the eight cycles of the National Longitudinal Survey of Children and Youth. The column labels correspond to the marginal coefficients for regressions from Table 2. Individual marginal effects are significant at the 5%*, 1%** or 0.1%*** level

Table 5. Effects of Cohort of Arrival and Social Capital on Children's Health

Dependent Variable: Birth Weight

	(1)	(2)	(3a)	(3b)	(3c)	(4)
YSM	4.117	4.095	6.427	6.129	7.122	6.550
	(5.878)	(5.243)	(5.514)	(5.497)	(5.498)	(5.509)
YSM^2	-0.199	-0.052	-0.144	-0.131	-0.144	-0.155
	(0.151)	(0.119)	(0.126)	(0.125)	(0.125)	(0.125)
Arrived in 1961-1970	-48.301	-80.539	-151.425	-144.624	-147.997	-155.396
	(96.398)	(100.646)	(106.022)	(105.649)	(106.042)	(104.630)
Arrived in 1971-1980	30.292	-90.376	-199.292	-189.445	-192.788	-211.339
	(108.123)	(119.136)	(125.168)	(124.541)	(125.211)	(123.043)
Arrived in 1981-1990	-18.675	-105.243	-225.314	-212.959	-212.834	-241.875
	(130.706)	(142.355)	(149.370)	(148.711)	(149.314)	(146.219)
Arrived in 1991-2000	-2.472	-37.586	-159.510	-145.654	-139.341	-174.644
	(147.266)	(159.818)	(166.397)	(165.797)	(166.252)	(161.786)
Arrived after 2001	-37.468	-76.153	-203.162	-189.002	-179.910	-222.154
	(164.456)	(175.482)	(183.068)	(182.367)	(182.822)	(177.997)
No help			-32.243			-39.087
			(35.855)			(37.658)
Ffsafe				26.806		31.454
				(55.256)		(55.088)
Emerg					-22.293	-48.283
					(66.946)	(66.753)
Age	22.299	48.280**	40.600**	39.473*	39.360*	39.010*
	(14.976)	(15.420)	(15.388)	(15.409)	(15.429)	(15.364)
Age^2	-0.161	-0.649**	-0.576**	-0.561**	-0.557**	-0.557**
	(0.212)	(0.207)	(0.206)	(0.206)	(0.206)	(0.206)
Minority	-80.367**	-136.222	-120.248	-120.923	-120.216	-118.672
	(25.916)	(24.937)	(25.693)	(25.740)	(25.754)	(25.788)

Table 5. Effects of Cohort of Arrival and Social Capital on Children's Health

Married	-63.900*	-52.985	-44.142	-44.250	-43.102	-44.289
	(28.628)	(35.527)	(36.686)	(36.842)	(37.019)	(37.109)
Lives in a house	98.969**	156.878***	143.907**	150.295**	152.720**	144.050**
	(37.723)	(46.829)	(50.857)	(50.816)	(50.712)	(50.968)
Owns dwelling	119.973***	217.033**	204.848**	204.918**	206.370**	207.076**
	(58.748)	(61.328)	(65.525)	(64.737)	(64.648)	(65.646)
More than 2 bedrooms	79.897*	86.317**	84.626**	90.039**	88.241*	84.708**
	(31.458)	(30.793)	(34.571)	(34.644)	(34.619)	(34.671)
Household 3-4 people	121.218***	244.345***	229.281***	239.771***	238.181***	239.356***
	(67.663)	(61.472)	(63.698)	(63.695)	(63.676)	(63.572)
Household 5+ people	61.592***	265.524***	244.116***	254.305***	252.708***	253.117***
	(68.433)	(62.763)	(65.103)	(65.058)	(65.055)	(64.879)
Did not complete HS	21.461	-34.314	-33.560	-33.311	-37.519	-36.186
	(28.870)	(29.260)	(31.481)	(31.583)	(31.678)	(31.495)
Undergraduate degree	48.625	-8.226	3.006	3.656	4.441	2.473
	(33.355)	(31.046)	(31.577)	(31.581)	(31.545)	(31.648)
Other post-secondary	39.448	-37.187	-24.971	-21.323	-22.105	-25.113
	(29.501)	(28.049)	(29.113)	(29.103)	(29.072)	(29.279)
Higher degree	19.453	-3.388	-2.825	-1.211	-0.392	-4.865
	(67.780)	(51.702)	(52.168)	(52.107)	(52.242)	(52.377)
Not in the labor force	48.579*	17.429	23.117	22.024	20.037	22.980
	(19.571)	(19.001)	(19.927)	(19.651)	(19.659)	(19.928)
Does not speak F or E.	-146.450	-190.972*	-192.444*	-195.076*	-194.988*	-193.739*
	(88.777)	(76.403)	(77.573)	(77.411)	(77.073)	(77.600)
Born in Asia	-206.221***	-95.605***	-94.205***	-93.472***	-93.682***	-92.363***
	(28.012)	(24.352)	(24.829)	(24.798)	(24.786)	(24.813)
Born in Europe	-48.423	12.780	26.592	26.892	25.030	25.335
	(36.379)	(33.848)	(35.771)	(35.711)	(35.648)	(35.649)
Born in the UK or US	68.564*	74.574**	91.667**	92.230**	90.446**	90.592**
	(27.928)	(28.661)	(29.767)	(29.604)	(29.694)	(29.827)

Table 5. Effects of Cohort of Arrival and Social Capital on Children's Health

Sex of child (M=1)		108.774***	108.162***	108.919***	110.102***	110.527***
		(18.394)	(18.923)	(18.837)	(18.864)	(18.903)
Multiple birth		-1062.15***	-1044.37***	-1046.11***	-1046.52***	-1043.72***
		(61.526)	(65.216)	(65.721)	(65.682)	(65.200)
Age of mother at birth		4.472	7.823	8.077	7.473	8.164
		(4.626)	(4.646)	(4.606)	(4.600)	(4.605)
Diabetes		-2.349	-2.178	-2.723	-3.514	-3.850
		(31.500)	(33.050)	(32.933)	(32.803)	(33.136)
High-blood pressure		-50.992	-55.409	-53.141	-51.741	-54.698
		(45.441)	(47.204)	(47.096)	(47.125)	(47.279)
Other health problems		-156.402***	-158.836***	-158.953***	-161.352***	-160.197***
		(30.150)	(31.953)	(31.854)	(31.851)	(32.141)
Smoked		-215.900***	-212.221***	-212.788***	-210.569***	-211.116***
		(31.105)	(33.397)	(33.232)	(33.260)	(33.360)
Constant	2793.804	1493.999	1641.365	1605.891	1664.284	1625.219
	(308.648)	(311.565)	(315.881)	(320.369)	(320.908)	(326.676)
Cycle Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Birth Variables	No	Yes	Yes	Yes	Yes	Yes
Social Capital Vars.	No	No	One	One	One	All
Log Likelihood	-82145.133	-56623.177	-52153.989	-52304.801	-52164.909	-51966.860
R-Squared	0.058	0.170	0.169	0.169	0.169	0.169
N	10543	7306	6731	6751	6734	6708

Note: All regressions are estimated by OLS using the pooled cross-sections from the National Longitudinal Survey of Children and Youth. The column numbers correspond to the equations described in the Empirical Framework chapter. The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.

Table 6. Effects of Cohort of Arrival and Social Capital on Parents' Health

Dependent Variable: Self-Assessed Health Status (1=Excellent, Very Good, Good; 0=Fair Poor)

	(1)	(2)	(3a)	(3b)	(3c)	(4)
YSM	-0.050***	-0.030	-0.024	-0.025	-0.026	-0.027
	(0.015)	(0.017)	(0.018)	(0.019)	(0.019)	(0.018)
YSM^2	0.001**	0.001**	0.001*	0.001*	0.001*	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Arrived in 1961-1970	0.113	0.334	0.231	0.319	0.294	0.251
	(0.264)	(0.279)	(0.359)	(0.361)	(0.361)	(0.360)
Arrived in 1971-1980	0.003	0.419	0.278	0.376	0.351	0.284
Arrived in 1981-1990	0.073	0.750	0.472	0.666	0.634	0.478
	(0.319)	(0.416)	(0.505)	(0.511)	(0.512)	(0.505)
Arrived in 1991-2000	0.165	1.007*	0.713	0.926	0.868	0.709
	(0.329)	(0.479)	(0.567)	(0.572)	(0.574)	(0.567)
Arrived after 2001	-0.157	0.789	0.552	0.790	0.739	0.560
	(0.345)	(0.542)	(0.622)	(0.628)	(0.630)	(0.623)
No help			-0.092	0.790	0.739	-0.053
			(0.095)	(0.628)	(0.630)	(0.096)
Ffsafe				0.418**		0.300*
				(0.131)		(0.140)
Emerg						-0.071
						(0.194)
Age	-0.012	-0.018	-0.029	-0.028	-0.031	-0.024
	(0.030)	(0.030)	(0.030)	(0.031)	(0.030)	(0.030)

Table 6. Effects of Cohort of Arrival and Social Capital on Parents' Health

Age^2	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sex PMK (M=1)	0.031	0.015	0.054	(0.001)	(0.012)	0.058
	(0.097)	(0.093)	(0.092)	(0.094)	(0.095)	(0.093)
Minority	-0.058	-0.157	-0.102	-0.116	-0.094	-0.110
	-(0.903)	(0.089)	(0.087)	(0.088)	(0.088)	(0.088)
Married	0.144	0.172	0.161	0.129	0.144	0.147
	(0.104)	(0.106)	(0.105)	(0.105)	(0.108)	(0.105)
Lives in a house	0.205*	0.235*	0.058	0.095	0.106	0.052
	(0.095)	(0.092)	(0.095)	(0.095)	(0.096)	(0.096)
Owns dwelling	0.091	0.058	0.130	0.109	0.097	0.125
	(0.091)	(0.092)	(0.096)	(0.096)	(0.096)	(0.097)
More than 2 bedrooms	-0.026	0.003	0.015	0.003	0.015	0.017
	(0.092)	(0.092)	(0.096)	(0.096)	(0.095)	(0.097)
Household 3-4 people	0.100	0.118	-0.048	0.005	-0.053	-0.008
	(0.222)	(0.220)	(0.248)	(0.248)	(0.239)	(0.248)
Household of 5+ people	0.127	0.147	0.030	0.059	-0.004	0.060
	(0.234)	(0.231)	(0.260)	(0.260)	(0.251)	(0.260)
Did not complete HS	-0.318***	-0.386***	-0.310***	-0.310***	-0.328***	-0.313***
	(0.093)	(0.090)	(0.094)	(0.094)	(0.095)	(0.095)
Undergraduate degree	-0.073	0.011	0.040	0.058	0.035	0.049
	(0.100)	(0.115)	(0.116)	(0.117)	(0.117)	(0.118)
Other post-secondary	-0.100	-0.116	-0.079	-0.102	-0.122	-0.083
	(0.099)	(0.105)	(0.110)	(0.111)	(0.112)	(0.112)
Higher degree	0.365*	0.387*	0.405*	0.407*	0.415*	0.419*
	(0.158)	(0.167)	(0.166)	(0.167)	(0.170)	(0.171)

Table 6. Effects of Cohort of Arrival and Social Capital on Parents' Health

Not in the labor force	-0.114	-0.129*	-0.141*	-0.134*	-0.144*	-0.135*
	(0.065)	(0.065)	(0.068)	(0.068)	(0.068)	(0.069)
Does not speak F or E.	-0.538**	-0.541**	-0.399	-0.419*	-0.425*	-0.395
	(0.205)	(0.206)	(0.205)	(0.208)	(0.206)	(0.207)
Born in Asia	0.036	0.064	-0.015	-0.049	-0.048	-0.003
	(0.076)	(0.079)	(0.077)	(0.079)	(0.080)	(0.079)
Born in Europe	-0.106	-0.056	-0.140	-0.158	-0.151	-0.156
	(0.150)	(0.140)	(0.145)	(0.145)	(0.145)	(0.145)
Born in the UK or US	0.225**	0.279*	0.214*	0.201*	0.210*	0.211*
	(0.106)	(0.102)	(0.103)	(0.104)	(0.103)	(0.103)
Constant	2.725***	2.115***	2.600***	2.021***	2.2689***	2.28***
	(0.665)	(0.745)	(0.822)	(0.846)	(0.849)	(0.853)
Cycle Dummies	No	Yes	Yes	Yes	Yes	Yes
Region Dummies	No	Yes	Yes	Yes	Yes	Yes
Birth Variables	No	No	Yes	Yes	Yes	Yes
Social Capital Vars.	No	No	One	One	One	All
Log Likelihood	-982018.05	-963648.31	-798809.14	-802500.85	-803166.21	-789351.02
Pseudo R-Squared	0.0792	0.0965	0.0717	0.0802	0.0772	0.0729
N	12764	12764	11390	11407	11379	11329

Note: All regressions are estimated by using a probit on the pooled cross-sections from the National Longitudinal Survey of Children and Youth. Column (1) is Eq. (1) with no controls; column (2) is Eq. (1) and the rest of the column numbers correspond to the equations described in the Empirical Framework chapter with the exclusion of birth variables. The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.

Table 7. Effects of Cohort of Arrival and Social Capital on Children's Health

Dependent Variable:	*Received Medical Care* (1=Yes; 0=No)		*Health at Birth* (1=Excellent, Very Good, Good; 0=Fair or Poor)	
	(3b)	(4)	(3b)	(4)
YSM	0.020	0.021	-0.013	-0.013
	(0.016)	(0.015)	(0.012)	(0.012)
YSM^2	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Arrived in 1961-1970	0.013	0.003	0.129	0.131
	(0.284)	(0.284)	(0.266)	(0.267)
Arrived in 1971-1980	0.353	0.329	0.128	0.125
	(0.332)	(0.332)	(0.318)	(0.319)
Arrived in 1981-1990	0.623	0.592	0.230	0.227
	(0.399)	(0.397)	(0.377)	(0.379)
Arrived in 1991-2000	0.843	0.810	0.153	0.155
	(0.444)	(0.439)	(0.416)	(0.418)
Arrived after 2001	0.979*	0.944*	0.075	0.067
	(0.488)	(0.480)	(0.448)	(0.450)
Ffsafe	0.271	0.300	0.085	0.106
	(0.152)	(0.168)	(0.113)	(0.121)
No help		-0.026		-0.062
		(0.120)		(0.080)
Emerg		-0.105		-0.091
		(0.195)		(0.120)

Table 7. Effects of Cohort of Arrival and Social Capital on Children's Health

Age	-0.033	-0.035	0.039	0.038
	(0.044)	(0.044)	(0.033)	(0.033)
Age^2	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)
Minority	0.037	0.035	0.137*	0.134*
	(0.074)	(0.074)	(0.055)	(0.055)
Married	-0.134	-0.133	0.095	0.100
	(0.097)	(0.097)	(0.081)	(0.082)
Lives in a house	0.195	0.226	0.016	0.013
	(0.072)	(0.078)	(0.053)	(0.054)
Owns dwelling	0.104	0.278	0.003	0.011
	(0.092)	(0.105)	(0.058)	(0.058)
More than 2 bedrooms	0.035	0.077	-0.112	-0.116
	(0.157)	(0.182)	(0.060)	(0.060)
Household of 3-4 people	-0.301	-0.303	-0.128	-0.133
	(0.184)	(0.183)	(0.138)	(0.138)
Household of 5+ people	-0.372*	-0.368	-0.134	-0.143
	(0.189)	(0.188)	(0.143)	(0.144)
Did not complete HS	0.046	0.049	-0.045	-0.044
	(0.087)	(0.087)	(0.061)	(0.061)
Undergraduate degree	0.184*	0.182*	-0.044	-0.047
	(0.090)	(0.090)	(0.070)	(0.070)
Other post-secondary	0.182*	0.173*	0.039	0.039
	(0.086)	(0.086)	(0.064)	(0.064)
Higher degree	0.045	0.021	-0.130	-0.139
	(0.131)	(0.132)	(0.104)	(0.105)

Table 7. Effects of Cohort of Arrival and Social Capital on Children's Health

Not in the labour force	-0.068	-0.068	-0.031	-0.027
	(0.059)	(0.059)	(0.044)	(0.044)
Does not speak F or E.	0.060	0.063	0.189	0.196
	(0.281)	(0.283)	(0.174)	(0.175)
Born in Asia	0.058	0.054	0.038	0.041
	(0.078)	(0.078)	(0.057)	(0.057)
Born in Europe	0.009	0.012	-0.027	-0.027
	(0.091)	(0.090)	(0.077)	(0.077)
Born in the UK or US	0.239**	0.236**	0.037	0.025
	(0.083)	(0.083)	(0.075)	(0.075)
Sex of child (M=1)	0.247***	0.248***	0.145***	0.146***
	(0.055)	(0.056)	(0.041)	(0.042)
Multiple birth	0.734***	0.732***	-0.070	-0.071
	(0.138)	(0.138)	(0.138)	(0.138)
Age of mother at birth	0.020	0.020	-0.017	-0.017
	(0.014)	(0.014)	(0.010)	(0.010)
Diabetes	0.032	0.042	0.119	0.111
	(0.101)	(0.102)	(0.072)	(0.073)
High-blood pressure	0.447***	0.448***	0.136	0.138
	(0.087)	(0.087)	(0.073)	(0.073)
Other health problems	0.377***	0.376***	0.233**	0.235**
	(0.074)	(0.075)	(0.063)	(0.063)
Smoked	0.459***	0.456***	0.168	0.171
	(0.112)	(0.112)	(0.093)	(0.094)
Constant	0.687	0.697	1.167	1.076
	(0.903)	(0.920)	(0.673)	(0.682)

Table 7. Effects of Cohort of Arrival and Social Capital on Children's Health

Cycle Dummies	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes
Birth Variables	Yes	Yes	Yes	Yes
Social Capital Vars.	One	All	One	All
Log Likelihood	-632039.83	-627620.37	-1712687.00	-1701575.40
Pseudo R-Squared	0.152	0.154	0.042	0.042
N	6781	6738	6779	6736

Note: All regressions are estimated by using probits on the pooled cross-sections from the National Longitudinal Survey of Children and Youth. The column numbers correspond to the equations described in the Empirical Framework chapter. The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.

Table 8. Effects of Cohort of Arrival and Social Capital on Children's Health

Dependent Variable: Presence of Chronic Condition (1=Presence; 0=Absence)

	(1)	(2)	(3a)	(3b)	(3c)	(4)
YSM	0.042**	0.021	0.025	0.025	0.026	0.025
	(0.013)	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)
YSM^2	-0.001	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Arrived in 1961-1970	0.126	-0.023	0.110	0.108	0.105	0.105
	(0.177)	(0.278)	(0.323)	(0.322)	(0.322)	(0.322)
Arrived in 1971-1980	0.116	0.338	0.479	0.475	0.467	0.467
	(0.225)	(0.324)	(0.370)	(0.369)	(0.369)	(0.370)
Arrived in 1981-1990	0.248	0.600	0.703	0.693	0.677	0.672
	(0.301)	(0.387)	(0.434)	(0.434)	(0.434)	(0.434)
Arrived in 1991-2000	0.415	0.772*	0.893*	0.891*	0.876*	0.861*
	(0.350)	(0.435)	(0.481)	(0.480)	(0.481)	(0.482)
Arrived after 2001	0.466	0.736	0.898*	0.888*	0.862*	0.852*
	(0.402)	(0.481)	(0.527)	(0.525)	(0.526)	(0.527)
No help			0.070			0.080
			(0.099)			(0.102)
Ffsafe				0.036		0.035
				(0.124)		(0.133)
Emerg					0.107	0.125
					(0.145)	(0.153)
Age	-0.082*	0.072*	0.062	0.061	0.058	0.060
	(0.035)	(0.041)	(0.042)	(0.042)	(0.042)	(0.042)

Table 8. Effects of Cohort of Arrival and Social Capital on Children's Health

Age^2	0.001**	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Minority	-0.092	-0.024	-0.003	-0.005	-0.001	0.001
	(0.071)	(0.072)	(0.075)	(0.075)	(0.075)	(0.075)
Married	0.005	0.061	0.024	0.021	0.022	0.021
	(0.095)	(0.108)	(0.109)	(0.110)	(0.111)	(0.110)
Lives in a house	-0.070	-0.056	-0.083	-0.085	-0.077	-0.077
	(0.067)	(0.065)	(0.068)	(0.068)	(0.069)	(0.069)
Owns dwelling	0.004	0.049	0.073	0.071	0.064	0.066
	(0.072)	(0.071)	(0.075)	(0.074)	(0.075)	(0.075)
More than 2 bedrooms	0.078	-0.031	0.011	0.008	0.006	0.005
	(0.070)	(0.073)	(0.077)	(0.077)	(0.077)	(0.077)
Household of 3-4 people	0.047	-0.254	-0.315*	-0.319*	-0.319*	-0.318*
	(0.173)	(0.187)	(0.189)	(0.190)	(0.190)	(0.190)
Household of 5+ people	0.003	-0.392**	-0.471**	-0.475**	-0.474**	-0.473**
	(0.179)	(0.196)	(0.197)	(0.199)	(0.199)	(0.199)
Did not complete HS	-0.094	0.046	0.049	0.056	0.051	0.044
	(0.073)	(0.077)	(0.082)	(0.082)	(0.083)	(0.082)
Undergraduate degree	0.095	0.182**	0.214**	0.212**	0.211**	0.212**
	(0.083)	(0.082)	(0.084)	(0.084)	(0.084)	(0.084)
Other post-secondary	-0.032	0.176**	0.245***	0.243***	0.241***	0.246***
	(0.076)	(0.077)	(0.082)	(0.082)	(0.082)	(0.082)
Higher degree	-0.069	0.073	0.109	0.106	0.107	0.108
	(0.129)	(0.134)	(0.136)	(0.136)	(0.136)	(0.137)
Not in the labour force	-0.084	0.000	0.022	0.023	0.024	0.021
	(0.051)	(0.052)	(0.055)	(0.055)	(0.055)	(0.055)

Table 8. Effects of Cohort of Arrival and Social Capital on Children's Health

Does not speak F or E.	-0.165*	-0.055	-0.027	-0.025	-0.015	-0.017
	(0.172)	(0.199)	(0.201)	(0.199)	(0.200)	(0.200)
Born in Asia	0.159	0.114*	0.108	0.107	0.104	0.106
	(0.073)	(0.069)	(0.072)	(0.072)	(0.072)	(0.072)
Born in Europe	-0.051	0.017	-0.010	-0.008	-0.004	-0.008
	(0.087)	(0.095)	(0.099)	(0.098)	(0.099)	(0.099)
Born in the UK or US	-0.004	-0.060	-0.018	-0.016	-0.013	-0.012
	(0.082)	(0.084)	(0.087)	(0.087)	(0.087)	(0.088)
Sex of child (M=1)		0.227***	0.200***	0.199***	0.195***	0.196***
		(0.050)	(0.052)	(0.052)	(0.052)	(0.052)
Multiple birth		-0.023	-0.123	-0.119	-0.119	-0.122
		(0.137)	(0.146)	(0.146)	(0.146)	(0.146)
Age of mother at birth		-0.084***	-0.087***	-0.086***	-0.086***	-0.086***
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Diabetes		0.208**	0.232***	0.228***	0.232***	0.234***
		(0.085)	(0.088)	(0.087)	(0.087)	(0.088)
High-blood pressure		-0.022	-0.064	-0.062	-0.063	-0.065
		(0.095)	(0.098)	(0.097)	(0.098)	(0.098)
Other health problems		0.238***	0.252***	0.257***	0.253***	0.252***
		(0.069)	(0.073)	(0.073)	(0.073)	(0.074)
Smoked		0.064	0.092	0.085	0.087	0.088
		(0.121)	(0.129)	(0.129)	(0.129)	(0.129)
Constant	-0.199	-1.734*	-1.610*	-1.620*	-1.643*	-1.705**
	(0.689)	(0.790)	(0.833)	(0.844)	(0.846)	(0.857)
Cycle Dummies	Yes	Yes	Yes	Yes	Yes	Yes

Table 8. Effects of Cohort of Arrival and Social Capital on Children's Health

Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Birth Variables	No	Yes	Yes	Yes	Yes	Yes
Social Capital Vars.	No	No	One	One	One	All
Log Likelihood	-176839716	-802892.43	-731913.81	-733438.64	-731644.55	-729254.75
Pseudo R-Squared	0.037	0.050	0.058	0.057	0.057	0.0576
N	10889	7274	6731	6751	6733	6707

Note: All regressions are estimated by using a probit on the pooled cross-sections from the National Longitudinal Survey of Children and Youth. The column numbers correspond to the equations described in the Empirical Framework chapter. The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.

Table 9. Effects of Cohort of Arrival and Social Capital on Children's Health

Dependent Variable: Child's Short Run Health Status (1=Excellent, Very Good, Good; 0=Fair or Poor)

	(1)	(2)	(3a)	(3b)	(3c)	(4)
YSM	-0.017	-0.009	-0.016	-0.016	-0.017	-0.017
	(0.023)	(0.029)	(0.031)	(0.031)	(0.031)	(0.031)
YSM^2	-0.001	0.000	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Arrived in 1961-1970	-1.112*	-0.019	0.020	0.039	0.033	0.038
	(0.495)	(0.488)	(0.507)	(0.505)	(0.507)	(0.508)
Arrived in 1971-1980	-1.203	0.445	0.548	0.573	0.559	0.572
	(0.614)	(0.547)	(0.577)	(0.574)	(0.576)	(0.577)
Arrived in 1981-1990	-1.711*	0.304	0.499	0.530	0.503	0.522
	(0.728)	(0.667)	(0.710)	(0.705)	(0.710)	(0.709)
Arrived in 1991-2000	-1.707*	0.586	0.712	0.752	0.720	0.742
	(0.796)	(0.722)	(0.772)	(0.766)	(0.773)	(0.769)
Arrived after 2001	-1.941*	0.650	0.773	0.814	0.778	0.800
	(0.884)	(0.833)	(0.885)	(0.878)	(0.886)	(0.882)
No help			0.075			0.105
			(0.149)			(0.155)
Ffsafe				0.205		0.186
				(0.200)		(0.228)
Emerg					0.206	0.160
					(0.182)	(0.202)
Age	0.056	0.008	0.009	0.012	0.009	0.010
	(0.058)	(0.077)	(0.079)	(0.079)	(0.079)	(0.079)

Table 9. Effects of Cohort of Arrival and Social Capital on Children's Health

Age^2	-0.001	0.000	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Minority	-0.075	-0.123	-0.117	-0.119	-0.112	-0.119
	(0.155)	(0.142)	(0.150)	(0.150)	(0.150)	(0.151)
Married	0.139	-0.059	-0.014	-0.039	-0.030	-0.042
	(0.186)	(0.206)	(0.206)	(0.213)	(0.208)	(0.214)
Lives in a house	0.184	0.055	0.057	0.052	0.064	0.058
	(0.117)	(0.126)	(0.131)	(0.131)	(0.130)	(0.132)
Owns dwelling	-0.019	0.020	-0.023	-0.029	-0.030	-0.031
	(0.204)	(0.111)	(0.118)	(0.116)	(0.118)	(0.118)
More than 2 bedrooms	-0.063	0.028	0.010	0.011	0.007	0.013
	(0.159)	(0.131)	(0.137)	(0.136)	(0.138)	(0.135)
Household of 3-4 people	0.590	-0.078	-0.077	-0.049	-0.057	-0.038
	(0.313)	(0.345)	(0.350)	(0.356)	(0.352)	(0.356)
Household of 5+ people	0.538	-0.185	-0.169	-0.142	-0.153	-0.132
	(0.297)	(0.351)	(0.355)	(0.360)	(0.357)	(0.359)
Did not complete HS	-0.081	-0.267*	-0.294**	-0.285**	-0.288**	-0.291**
	(0.157)	(0.137)	(0.141)	(0.140)	(0.141)	(0.141)
Undergraduate degree	-0.135	-0.211	-0.238	-0.239	-0.242	-0.236
	(0.155)	(0.159)	(0.159)	(0.162)	(0.161)	(0.161)
Other post-secondary	0.060	0.075	0.024	0.020	0.024	0.024
	(0.160)	(0.145)	(0.151)	(0.152)	(0.151)	(0.151)
Higher degree	-0.002	0.248	0.239	0.241	0.230	0.242
	(0.267)	(0.282)	(0.283)	(0.286)	(0.284)	(0.285)
Not in the labour force	0.036	0.040	0.006	0.013	0.013	0.009
	(0.107)	(0.112)	(0.115)	(0.115)	(0.115)	(0.115)

Table 9. Effects of Cohort of Arrival and Social Capital on Children's Health

Does not speak F or E.	0.075	-0.028	-0.012	0.026	0.019	0.013
	(0.291)	(0.288)	(0.288)	(0.299)	(0.293)	(0.293)
Born in Asia	-0.146	-0.154	-0.158	-0.157	-0.163	-0.161
	(0.117)	(0.137)	(0.142)	(0.143)	(0.143)	(0.142)
Born in Europe	0.095	-0.372**	-0.395**	-0.399**	-0.400**	-0.400**
	(0.169)	(0.165)	(0.171)	(0.172)	(0.172)	(0.172)
Born in the UK or US	0.015	-0.153	-0.104	-0.104	-0.109	-0.107
	(0.195)	(0.158)	(0.167)	(0.168)	(0.168)	(0.169)
Sex of child (M=1)		-0.057	-0.077	-0.079	-0.077	-0.079
		(0.092)	(0.096)	(0.096)	(0.096)	(0.096)
Multiple birth		-0.286	-0.345	-0.341	-0.337	-0.340
		(0.244)	(0.245)	(0.246)	(0.246)	(0.245)
Age of mother at birth		0.019	0.011	0.011	0.012	0.011
		(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
Diabetes		-0.344**	-0.336**	-0.335**	-0.325**	-0.335**
		(0.137)	(0.137)	(0.138)	(0.137)	(0.137)
High-blood pressure		0.170	0.150	0.152	0.150	0.150
		(0.156)	(0.158)	(0.158)	(0.157)	(0.158)
Other health problems		-0.307**	-0.345***	-0.341***	-0.344***	-0.350***
		(0.130)	(0.131)	(0.132)	(0.132)	(0.132)
Smoked		-0.067	-0.107	-0.111	-0.108	-0.109
		(0.202)	(0.206)	(0.206)	(0.206)	(0.206)
Constant	2.450*	2.119	2.109	1.837	1.869	1.740
	(1.218)	(1.361)	(1.416)	(1.383)	(1.428)	(1.412)
Cycle Dummies	Yes	Yes	Yes	Yes	Yes	Yes

Table 9. Effects of Cohort of Arrival and Social Capital on Children's Health

Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Birth Variables	No	Yes	Yes	Yes	Yes	Yes
Social Capital Vars.	No	No	One	One	One	All
Log Likelihood	-259951.31	-117014.17	-109878.25	-109797.12	-109840.92	-109609.02
Pseudo R-Squared	0.060	0.085	0.084	0.085	0.085	0.086
N	10917	7282	6739	6759	6741	6715

Note: All regressions are estimated by using a probit on the pooled cross-sections from the National Longitudinal Survey of Children and Youth. The column numbers correspond to the equations described in the Empirical Framework chapter. The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.

Table 10. Tests of Joint Significance of Selected Sets of Immigrant Mothers' Characteristics

All Children	Birth Weight	Low Birth Weight
Wald test for social capital variables	0.994	0.470
Wald test for YSM effects (*p-value*)	0.556	0.015
Wald test for cohort effects (*p-value*)	0.048	0.042
Wald test for YSM and cohort effects (*p-value*)	0.059	0.060

Note: The results are based on the estimation of Eq. (4) for the dependent variables *birth weight* and *low birth weight* for all children. The null hypothesis that the sets of regressors are jointly insignificant in the determination of these health outcomes; immigrants' children's birth weight is not a function of social capital variables, years since migration, cohort of arrival or both when estimated together.

Table 11. Tests of Joint Significance of Selected Sets of Immigrant Mothers' Characteristics

Canadian-Born Children	Birth Weight	Low Birth Weight
Wald test for social capital variables	0.990	0.455
Wald test for YSM effects (*p-value*)	0.253	0.006
Wald test for cohort effects (*p-value*)	0.174	0.523
Wald test for YSM and cohort effects (*p-value*)	0.002	0.026

Note: The results are based on the estimation of Eq. (4) for the dependent variables *birth weight* and *low birth weight* for Canadian-born children. The null hypothesis that the sets of regressors are jointly insignificant in the determination of these health outcomes; immigrants' children's birth weight is not a function of social capital variables, years since migration, cohort of arrival or both when estimated together.

Table 12. Effects of Cohort of Arrival and Social Capital on Children's Health

Dependent Variable: Low Birth Weight (Ordinary Least Squares Estimation)

	(1)	(2)	(3a)	(3b)	(3c)	(4)
YSM	-0.005	-0.003	-0.004	-0.004	-0.003	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
YSM^2	0.000*	0.000**	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Arrived in 1961-1970	-0.015	-0.047	-0.015	-0.016	-0.017	-0.015
	(0.036)	(0.052)	(0.055)	(0.055)	(0.055)	(0.055)
Arrived in 1971-1980	-0.020	-0.019	0.012	0.010	0.010	0.012
	(0.038)	(0.060)	(0.064)	(0.064)	(0.064)	(0.064)
Arrived in 1981-1990	-0.006	0.030	0.064	0.061	0.063	0.064
	(0.043)	(0.066)	(0.071)	(0.071)	(0.071)	(0.071)
Arrived in 1991-2000	-0.026	0.025	0.054	0.051	0.053	0.055
	(0.049)	(0.071)	(0.076)	(0.076)	(0.076)	(0.077)
Arrived after 2001	-0.055	0.023	0.052	0.048	0.052	0.053
	(0.058)	(0.078)	(0.083)	(0.083)	(0.083)	(0.083)
No help			-0.002			-0.002
			(0.015)			(0.016)
Ffsafe				0.014		0.020
				(0.018)		(0.020)
Emerg					-0.015	-0.023
					(0.024)	(0.027)
Age	-0.006	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.005)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)

Table 12. Effects of Cohort of Arrival and Social Capital on Children's Health

Age^2	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Minority	-0.006	0.050***	0.055***	0.055***	0.055***	0.055***
	(0.013)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Married	0.015	-0.003	-0.008	-0.008	-0.007	-0.008
	(0.012)	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)
Lives in a house	0.001	0.009	0.010	0.010	0.010	0.010
	(0.011)	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)
Owns dwelling	-0.023	-0.002	0.000	-0.001	0.000	0.000
	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
More than 2 bedrooms	-0.002	-0.013	-0.015	-0.015	-0.014	-0.015
	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.013)
Household 3-4 people	-0.009	-0.035	-0.039	-0.039	-0.041	-0.039
	(0.022)	(0.033)	(0.035)	(0.035)	(0.035)	(0.035)
Household of 5+ people	0.008	-0.054	-0.059	-0.058	-0.060	-0.058
	(0.024)	(0.033)	(0.036)	(0.036)	(0.036)	(0.036)
Did not complete HS	0.003	0.021	0.019	0.018	0.018	0.018
	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
Undergraduate degree	-0.028*	-0.004	-0.004	-0.004	-0.004	-0.004
	(0.015)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Other post-secondary	-0.009	0.008	0.011	0.011	0.010	0.011
	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
Higher degree	0.020	0.019	0.021	0.020	0.021	0.021
	(0.029)	(0.021)	(0.022)	(0.022)	(0.022)	(0.022)
Not in the labor force	-0.017	-0.003	-0.005	-0.005	-0.005	-0.005
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)

Table 12. Effects of Cohort of Arrival and Social Capital on Children's Health

Does not speak F or E.	0.028	0.083*	0.089*	0.088*	0.088*	0.089*
	(0.049)	(0.041)	(0.041)	(0.041)	(0.041)	(0.041)
Born in Asia	0.058***	-0.022	-0.028*	-0.027*	-0.027*	-0.027*
	(0.016)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Born in Europe	0.026	0.013	0.012	0.012	0.012	0.012
	(0.018)	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)
Born in the UK or US	-0.040**	-0.011	-0.011	-0.011	-0.011	-0.010
	(0.014)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Sex of child (M=1)		-0.028***	-0.031***	-0.031***	-0.031***	-0.031***
		(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Multiple birth		0.376***	0.366***	0.365***	0.365***	0.365***
		(0.048)	(0.052)	(0.052)	(0.052)	(0.052)
Age of mother at birth		-0.004	-0.004*	-0.004*	-0.004*	-0.004*
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Diabetes		-0.011	-0.008	-0.009	-0.008	-0.009
		(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
High-blood pressure		0.086***	0.092***	0.091***	0.091***	0.092***
		(0.019)	(0.020)	(0.020)	(0.020)	(0.020)
Other health problems		0.058***	0.060***	0.059***	0.059***	0.060***
		(0.014)	(0.015)	(0.015)	(0.015)	(0.015)
Smoked		0.083***	0.085**	0.085**	0.085**	0.084**
		(0.025)	(0.027)	(0.027)	(0.027)	(0.027)
Constant	0.283*	0.160	0.153	0.138	0.165	0.152
	(0.112)	(0.131)	(0.138)	(0.140)	(0.140)	(0.142)
Cycle Dummies	Yes	Yes	Yes	Yes	Yes	Yes

Table 12. Effects of Cohort of Arrival and Social Capital on Children's Health

Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Birth Variables	No	Yes	Yes	Yes	Yes	Yes
Social Capital Vars.	No	No	One	One	One	All
R-Squared	0.022	0.305	0.300	0.300	0.300	0.301
N	11124	7314	6764	6784	6766	6740

Note: All regressions are estimated with OLS using the pooled cross-sections from the National Longitudinal Survey of Children and Youth. The column numbers correspond to the equations described in the Empirical Framework chapter. The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.

Table 13. Effects of Cohort of Arrival and Social Capital on Parents' Health

Dependent Variable: Short-Run Health Status (OLS Estimates)

	(1)	(3a)	(3b)	(3c)	(4)
YSM	-0.003	-0.002	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
YSM^2	0.000	0.000**	0.000*	0.000*	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Arrived in 1961-1970	0.043	0.033	0.047	0.043	0.036
	(0.040)	(0.051)	(0.052)	(0.052)	(0.052)
Arrived in 1971-1980	0.051	0.038	0.052	0.048	0.038
	(0.046)	(0.058)	(0.059)	(0.059)	(0.059)
Arrived in 1981-1990	0.105	0.069	0.100	0.094	0.069
	(0.059)	(0.071)	(0.073)	(0.073)	(0.071)
Arrived in 1991-2000	0.136*	0.100	0.134	0.126	0.098
	(0.067)	(0.080)	(0.083)	(0.083)	(0.080)
Arrived after 2001	0.120	0.089	0.126	0.119	0.088
	(0.075)	(0.087)	(0.090)	(0.090)	(0.087)
No help		-0.014			-0.009
		(0.015)			(0.015)
Ffsafe			0.075		0.046
			(0.029)		(0.026)
Emerg				0.060	-0.004
				(0.040)	(0.033)
Age	0.006	0.002	0.002	0.002	0.003
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)

Table 13. Effects of Cohort of Arrival and Social Capital on Parents' Health

Age^2	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sex PMK (M=1)	0.003	0.009	-0.001	-0.002	0.008
	(0.013)	(0.012)	(0.013)	(0.014)	(0.012)
Minority	-0.012	-0.007	-0.006	-0.004	-0.008
	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
Married	0.022	0.023	0.019	0.020	0.022
	(0.017)	(0.018)	(0.017)	(0.018)	(0.018)
Lives in a house	0.027*	0.005	0.012	0.012	0.005
	(0.013)	(0.013)	(0.014)	(0.014)	(0.013)
Owns dwelling	0.010	0.017	0.014	0.012	0.016
	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)
More than 2 bedrooms	0.000	0.001	-0.001	0.001	0.001
	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
Household 3-4 people	0.032	0.000	0.007	0.002	0.004
	(0.043)	(0.041)	(0.040)	(0.039)	(0.041)
Household of 5+ people	0.034	0.010	0.014	0.008	0.013
	(0.045)	(0.043)	(0.042)	(0.041)	(0.043)
Did not complete HS	-0.051***	-0.040***	-0.041***	-0.044***	-0.041***
	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
Undergraduate degree	0.007	0.010	0.012	0.010	0.010
	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)
Other post-secondary	-0.012	-0.008	-0.012	-0.014	-0.008
	(0.013)	(0.015)	(0.015)	(0.015)	(0.015)
Higher degree	0.034*	0.038*	0.038*	0.037*	0.037*
	(0.015)	(0.015)	(0.015)	(0.015)	(0.016)

Table 13. Effects of Cohort of Arrival and Social Capital on Parents' Health

Not in the labor force	-0.015	-0.016	-0.016	-0.017	-0.016
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Does not speak F or E.	-0.079*	-0.061	-0.064	-0.065	-0.060
	(0.036)	(0.036)	(0.037)	(0.037)	(0.036)
Born in Asia	0.010	-0.002	-0.008	-0.007	0.000
	(0.011)	(0.010)	(0.011)	(0.011)	(0.010)
Born in Europe	-0.007	-0.018	-0.019	-0.018	-0.019
	(0.018)	(0.021)	(0.021)	(0.021)	(0.021)
Born in the UK or US	0.014	0.015	0.015	0.015	0.016
	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Constant	0.283	0.153	0.138	0.165	0.152
	(0.112)	(0.138)	(0.140)	(0.140)	(0.142)
Cycle Dummies	Yes	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes	Yes
Birth Variables	No	No	No	No	No
Social Capital Vars.	No	One	One	One	All
R-Squared	0.052	0.037	0.043	0.041	0.038
N	12764	11390	11407	11379	11329

Note: All regressions are estimated by using OLS on the pooled cross-sections from the National Longitudinal Survey of Children and Youth. Column numbers correspond to the equations described in the Empirical Framework chapter with the exclusion of birth variables. The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.

Table 14. Effects of Cohort of Arrival and Social Capital on Children's Health (OLS Estimates)

Dependent Variables:	Received Medical Care (1=Yes; 0=No)	Health at Birth (1=Excellent, Very Good, Good; 0=Fair or Poor)	Presence of Chronic Condition (1=Presence; 0=Absence)	Short Run Health Status (1=Excellent, Very Good, Good; 0=Fair or Poor)
	(4)	(4)	(4)	(4)
YSM	0.007*	-0.005	0.006	0.000
	(0.003)	(0.008)	(0.004)	(0.001)
YSM^2	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Arrived in 1961-1970	-0.064	-0.020	0.033	0.000
	(0.067)	(0.129)	(0.075)	(0.013)
Arrived in 1971-1980	0.010	-0.018	0.120	0.016
	(0.081)	(0.170)	(0.088)	(0.016)
Arrived in 1981-1990	0.049	0.064	0.166	0.013
	(0.094)	(0.212)	(0.103)	(0.020)
Arrived in 1991-2000	0.101	0.017	0.213*	0.023
	(0.102)	(0.242)	(0.114)	(0.023)
Arrived after 2001	0.133	-0.027	0.216*	0.024
	(0.110)	(0.266)	(0.124)	(0.027)
No help	-0.025	-0.027	0.017	0.003
	(0.020)	(0.056)	(0.024)	(0.005)
Ffsafe	0.076**	0.090	0.004	0.007
	(0.029)	(0.074)	(0.031)	(0.011)

Table 14. Effects of Cohort of Arrival and Social Capital on Children's Health (OLS Estimates)

Emerg	-0.048	-0.048	0.022	0.004
	(0.040)	(0.076)	(0.029)	(0.009)
Age	-0.008	0.033	0.014	0.000
	(0.009)	(0.021)	(0.010)	(0.003)
Age^2	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Minority	0.013	0.070*	0.000	-0.003
	(0.015)	(0.036)	(0.017)	(0.004)
Married	-0.026	0.054	0.005	-0.002
	(0.021)	(0.051)	(0.025)	(0.007)
Lives in a house	-0.020	0.004	-0.015	0.002
	(0.015)	(0.036)	(0.017)	(0.005)
Owns dwelling	0.001	-0.010	0.016	-0.001
	(0.016)	(0.039)	(0.017)	(0.004)
More than 2 bedrooms	-0.027	-0.061	0.000	0.001
	(0.017)	(0.041)	(0.017)	(0.005)
Household 3-4 people	-0.067	-0.062	-0.087	-0.001
	(0.051)	(0.087)	(0.054)	(0.009)
Household of 5+ people	-0.080	-0.072	-0.124**	-0.005
	(0.052)	(0.090)	(0.056)	(0.010)
Did not complete HS	0.010	-0.023	0.010	-0.011*
	(0.017)	(0.042)	(0.018)	(0.006)
Undergraduate degree	0.039*	-0.018	0.048**	-0.006
	(0.017)	(0.047)	(0.020)	(0.005)
Other post-secondary	0.040*	0.038	0.055***	0.001
	(0.017)	(0.043)	(0.019)	(0.005)

Table 14. Effects of Cohort of Arrival and Social Capital on Children's Health (OLS Estimates)

Higher degree	0.009	-0.081	0.021	0.003
	(0.025)	(0.066)	(0.030)	(0.005)
Not in the labor force	-0.005	-0.023	0.006	0.001
	(0.012)	(0.029)	(0.013)	(0.004)
Does not speak F or E.	-0.002	0.165	-0.005	-0.002
	(0.047)	(0.151)	(0.043)	(0.007)
Born in Asia	0.003	0.019	0.026	-0.005
	(0.016)	(0.041)	(0.017)	(0.005)
Born in Europe	0.015	-0.015	-0.002	-0.016**
	(0.018)	(0.047)	(0.022)	(0.008)
Born in the UK or US	0.079***	0.026	-0.005	-0.003
	(0.019)	(0.045)	(0.020)	(0.003)
Sex of child (M=1)	0.047***	0.095***	0.048***	-0.003
	(0.011)	(0.028)	(0.012)	(0.003)
Multiple birth	0.056	-0.048	-0.028	-0.022
	(0.044)	(0.111)	(0.035)	(0.021)
Age of mother at birth	0.003	-0.012	-0.021***	0.000
	(0.003)	(0.007)	(0.003)	(0.001)
Diabetes	-0.028	0.085	0.060**	-0.013
	(0.020)	(0.055)	(0.024)	(0.008)
High-blood pressure	0.100***	0.108*	-0.015	0.005
	(0.024)	(0.053)	(0.024)	(0.005)
Other health problems	0.059**	0.177***	0.065***	-0.014**
	(0.020)	(0.049)	(0.020)	(0.007)
Smoked	0.097**	0.107	0.018	-0.007
	(0.029)	(0.061)	(0.032)	(0.011)

Table 14. Effects of Cohort of Arrival and Social Capital on Children's Health (OLS Estimates)

Constant	0.101	0.957*	0.019	0.970
	(0.189)	(0.421)	(0.200)	(0.054)
Cycle Dummies	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes
Birth Variables	Yes	Yes	Yes	Yes
Social Capital Vars.	All	All	All	All
R-Squared	0.158	0.094	0.052	0.014
N	6738	6736	6707	6715

Note: All regressions are estimated by using OLS on the pooled cross-sections from the National Longitudinal Survey of Children and Youth. The column numbers correspond to the equations described in the Empirical Framework chapter; estimates are determined using Eq. (4). The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level

Table 15. Effects of Cohort of Arrival and Social Capital on Canadian Children's Health

Dependent Variable:	Low Birth Weight		Birth Weight
	(4)	dy/dx (4)	(4)
YSM	-0.016	-0.001	3.369
	(0.021)		(5.222)
YSM^2	0.001*	0.000	0.012
	(0.000)		(0.115)
Arrived in 1961-1970	-0.053	-0.004	-38.003
	(0.446)		(110.039)
Arrived in 1971-1980	0.330	0.031	-71.855
	(0.531)		(125.805)
Arrived in 1981-1990	1.021	0.134	-46.278
	(0.615)		(145.844)
Arrived in 1991-2000	0.978	0.098	39.514
	(0.672)		(161.928)
Arrived after 2001	1.140	0.178	-36.176
	(0.746)		(177.733)
No help	-0.085	-0.006	1.995
	(0.133)		(31.869)
Ffsafe	0.162	0.011	10.469
	(0.179)		(44.606)
Emerg	-0.321	-0.032	13.733
	(0.215)		(61.021)
Age	-0.009	-0.001	39.892***

Table 15. Effects of Cohort of Arrival and Social Capital on Canadian Children's Health

	(0.060)		(14.759)
Age^2	0.000	0.000	-0.613***
	(0.001)		(0.199)
Minority	0.472***	0.034	-138.772***
	(0.116)		(24.221)
Married	0.008	0.001	-68.515
	(0.151)		(36.715)
Lives in a house	0.119	0.009	30.864*
	(0.103)		(22.898)
Owns dwelling	-0.059	-0.005	5.459
	(0.115)		(26.654)
More than 2 bedrooms	-0.054	-0.004	25.644
	(0.110)		(28.133)
Household 3-4 people	-0.272	-0.022	210.034***
	(0.217)		(61.508)
Household of 5+ people	-0.441	-0.031	221.688***
	(0.229)		(64.549)
Did not complete HS	0.179	0.015	-43.096
	(0.109)		(28.182)
Undergraduate degree	-0.036	-0.003	-0.492
	(0.131)		(29.724)
Other post-secondary	0.100	0.008	-27.610
	(0.124)		(27.136)
Higher degree	0.281	0.027	9.545
	(0.217)		(50.666)
Not in the labor force	-0.046	-0.003	-0.860

Table 15. Effects of Cohort of Arrival and Social Capital on Canadian Children's Health

	(0.078)		(18.592)
Does not speak F or E.	0.636**	0.083	-148.433*
	(0.245)		(68.315)
Born in Asia	-0.117	-0.009	-67.829***
	(0.098)		(23.397)
Born in Europe	0.098	0.008	-3.958
	(0.157)		(34.401)
Born in the UK or US	-0.198	-0.013	45.477
	(0.148)		(30.684)
Sex of child (M=1)	-0.253***	-0.020	118.906***
	(0.076)		(17.555)
Multiple birth	1.323***	0.265	-709.300***
	(0.178)		(58.423)
Age of mother at birth	-0.024	-0.002	9.618**
	(0.019)		(4.213)
Diabetes	-0.099	-0.007	39.051
	(0.121)		(29.895)
High-blood pressure	0.547***	0.063	-3.744
	(0.105)		(40.040)
Other health problems	0.452***	0.047	-95.699***
	(0.097)		(26.604)
Smoked	0.603***	0.075	-182.958***
	(0.149)		(30.834)
Constant	-1.956	-	2431.492***
	(1.139)		(281.011)

Table 15. Effects of Cohort of Arrival and Social Capital on Canadian Children's Health

Cycle Dummies	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes
Birth Variables	Yes	Yes	Yes
Social Capital Vars.	All	All	All
R-Squared	-	-	0.302
Pseudo R-Squared	0.359	0.359	-
N	6580	6580	6513

Note: The regression for *low birth weight* is estimated using a probit. The regression for *birth weight* is estimated by using OLS on the pooled cross-sections from the National Longitudinal Survey of Children and Youth. The column numbers correspond to the equations described in the Empirical Framework chapter; estimates are determined using Eq. (4). The dy/dx column refers to the marginal effects estimated for *low birth weight.* The excluded dummy variables are whether the household size is of one or two people, if the mother completed High School, other country of birth (different than UK/US, not in Europe/Asia), and if the cohort of arrival was the group that immigrated prior to 1960. Robust standard errors are included in parentheses. Individual coefficients are significant at the 5%*, 1%** or 0.1%*** level.