Three Essays on Applied Economics: Financial Flows, Education and Health of Immigrants

By

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ABSTRACT

This dissertation consists of three essays on different attributes of immigrants and remittances over time. Using the recently available three waves of the Longitudinal Survey of Immigrants in Canada (LSIC), our first essay investigates the relationships between socio-economic characteristics and remittance behaviour of Indian and Chinese immigrants in Canada. After conducting a logistic regression on the likelihood of remitting and an instrumental variable regression of the amount remitted, the study observes significant differences between the remittance behaviour of Chinese and Indian immigrants. While Chinese remittances are mostly affected by age, income, level of education and personal investment in home country, Indian remittances are influenced by marital status, having family members in the host country, and being involved with social/religious organization in the host country. Financial variables play significant roles for both types of immigrants.

Using data from the LSIC, our second essay explores the link between health and education among recently arrived immigrants in Canada. The empirical evidence suggests that education has a positive impact on the health of newly arrived immigrants. This relationship remains valid for a few years after arrival. More educated immigrants seem to be better informed and appear to make use of health-related information. If differences in health can be explained using educational inequality then education might directly affect the quality of life. The likelihood of being in better health increases amongst those with higher levels of education.

Our third essay examines whether the financial sector of a country plays a significant role in explaining a country's capacity to take advantage of remittances to influence economic growth. Using data from 1979 to 2011 for the 33 top remittance recipient developing countries and employing the GMM approach, the study observes a positive association between remittances and growth. However, no conclusive evidence on the importance of financial development on remittance-growth nexus could be established. Moreover, remittances have the strongest effect on economic growth under repressed financial regimes. Ensuring that remittance recipients have access to financial intermediaries and promoting financial literacy may increase the positive influence of the financial sector on the relationship between remittances and economic growth.

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Dedication

Throughout the journey of my graduate studies, I lost the most valuable assets of my life, Mom and Dad. No words of appreciation would be enough recognition for their support throughout my academic journey. I dedicate this dissertation to the loving memory of my Mom and Dad. I wish their souls to be in peace.

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CHAPTER 1

INTRODUCTION

This dissertation addresses the microeconomic determinants of remittances behaviour, relationship between health and education of immigrants, and the remittance-growth nexus under different levels of financial development in top remittance recipient developing countries. Through three essays, the purpose of this dissertation is to shed light on the literature related to the immigrants and remittances. Our first two essays use data from the Canadian Research Data Centre (RDC), available through the University of Manitoba and Western University.

The common theme unifying three essays is to observe different attributes of immigrants and remittances over time[1]. While each essay's contribution to the literature is primarily empirical, their results demonstrate that an analysis of empirical outcome can elucidate how changes in policy can potentially influence the economic and social welfare of individuals and society as a whole. In addition, the results also show that the analysis of Longitudinal Survey of Immigrants Data can serve to enrich our understanding of the relationship between economic and non-economic activities that, in turn, can help to formulate correct public policies aimed at increasing well-being of the whole economy.

[1] While the results of essay 1 and 2 are based on the data from Statistics Canada, the opinions expressed in this study do not express the views of Statistics Canada.

In first essay, we use LSIC data to compare and contrast remitting behaviour of Chinese and Indian immigrants, two major groups of Canada bound migrants. We use LSIC panel data for immigrants those who arrived in Canada during October 2000 to September 2001. In the LSIC sample, the data on immigrants is collected after six months, two years, and four years of arrival. We control for demographic changes of immigrants from both countries; this is unique in existing literature.

After conducting a logistic regression on the likelihood of remitting and an instrumental variable regression of the amount remitted, the study observes significant differences between the remitting behaviour of Chinese and Indian immigrants. While Chinese remittances are mostly affected by age, income, level of education, and personal investment in home country, Indian remittances are influenced by marital status, having family members in the host country, and being involved with social/religious organization in the host country. Financial variables play significant roles for immigrants from both countries. The outcomes based on first essay may assist policy makers from home (remittance recipient) and host (remittance sending) countries in formulating more effective immigration policies. To our knowledge, this investigation, which uses a panel dataset for Canada, is first of its kind.

Using longitudinal data on Canadian immigrants, our second essay observes positive association between education and health among recently arrived immigrants. Moreover, such positive relationship is valid even after few years of

immigrants' arrival in Canada. To avoid the issue of endogeneity, the study explores the longitudinal nature of data and create a new health variable based on the change in health status of immigrants over time. Our empirical investigation suggests that better educated immigrants are more likely to have improved or same level of health upon few years of their arrival compared to less educated immigrants.

Since increased education and improved health are associated, a policy reform for ensuring more education for immigrants is warranted. However, our results suggest that the impact of education on health does not vary across immigrants' country of origin. Our research supports the idea that immigrants' health status can be improved by taking different policies to increase health literacy of immigrants and ensuring culturally and linguistically tailored training programs for health care providers.

The third essay examines how remittances can influence economic growth under different levels of financial development. Using a dynamic panel estimation of 33 top remittance recipient developing countries from 1979 to 2011, results suggest that financial development neither works as a substitute nor complements for remittance-growth nexus.

The study further examines whether the remittance-growth nexus varies across financial repression and liberalization period. The impact of remittances on economic growth was significant during repressed financial regimes, however, such

positive relationship between remittances and growth was absent during liberalized regime. Promoting financial literacy, reducing the cost of sending remittances through banks, and encouraging the overall use of formal financial institutions may induce stronger remittance-growth nexus under liberalized regime.

CHAPTER 2

REMITTANCE BEHAVIOUR OF INDIAN AND CHINESE IMMIGRANTS: EVIDENCE FROM CANADIAN MICRO-DATA

1. INTRODUCTION

China and India are two major sources of immigrants to Canada. Moreover, they are the two highest remittance receiving countries in the world (World Bank, 2011). In 2010, according to Citizenship and Immigration Canada (CIC), 30,197 Chinese and 30,252 Indians immigrated to Canada. Many of these immigrants and those who preceded them often send money-remittances to their country of origin, and remittances constitute a large sum of the total external resources for both countries (Ratha, 2011; World Bank, 2006).

Given the increased volume of remittance flows and the impact of such transfers on labour-exporting countries like China and India, it is important to understand the economics of remittances. What are the factors that influence migrants' decisions to remit? Why do some immigrants send much more money than others to their country of origin? There are numerous macro studies that observe the remittance behaviour of immigrants. Micro studies, however, are limited.

This study focuses on socio-economic variables to identify the remittance behaviour of Chinese and Indian immigrants. While immigrants from these two countries share some commonalities, they also have some distinctive characteristics. Due to the difference between Chinese and Indian immigrants, it is impossible to discuss them as a singular entity. Further, statistics reveal the significant differences between Chinese and Indian immigrants.

The comparison between Chinese and Indian immigrants illustrates that these two groups differ on various characteristics that are critical to remitting behaviour. Both Chinese and Indian people tend to emigrate in search of work or to reunite with their families. However, most Chinese immigrants arrive as independents. By contrast, most Indian immigrants arrive as family class immigrants. Although both groups tend to remit, the purpose of remitting and motivation behind remittances is different.

Chinese and Indian immigrants respectively constitute 15.91% and 14.43% of total immigrants in the LSIC sample. While 16.18% of Chinese immigrants intend to remit, this rate is much higher for Indian immigrants, which is 22.42%. The average amount remitted by the Chinese immigrants is much lower than that of the Indian immigrants. On average Chinese immigrants remit $3,111.49 per year while Indian immigrants remit $3,687.89[2]. Presuming profound contextual differences between

[2] For Chinese, the minimum is $150 and the maximum is $30,000. For Indians, the minimum is $200 and the maximum is $25,000.

Chinese and Indian immigrants, it may be futile to search for a general explanation of remittance motives. Therefore, this study will compare and contrast the specific factors behind the remittance behaviour of Chinese and Indian immigrants.

Although there are a few studies available on remittances to South Asia from Europe (Clark & Drinkwater, 2007; Seddon, 2004), no such studies have been conducted using Canadian data for Chinese and Indian immigrants.[3] The unavailability of comprehensive micro-data on immigrants is the major reason behind such limited research. The recently published Longitudinal Survey of Immigrants in Canada (LSIC) covers various socio-economic aspects of recent immigrants in Canada. This dataset facilitates a study of the changing characteristics of Chinese and Indian immigrants, including their gender, marital status, age, immigrant class, occupation, level of education at landing, language ability, native language, economic performance, etc. The survey collected information about Canadian immigrants who landed during the period of October 2000 to September 2001. The LSIC is a longitudinal survey, where the same immigrants were interviewed 3 times: six months, two years, and four yours after their landing.

This paper uses all three waves of the LSIC to observe the relationship between socio-economic characteristics and differences in motivation to remit among

[3] Houle and Schellenberg (2008) conducted a micro study on the remitting behaviour of immigrants in Canada. Their study includes immigrants from all of the countries in the world but does not look at the different groups separately.

Chinese and Indian immigrants in Canada. The purpose of this paper is to provide evidence on the sending side of the remittance equation, with no information on the recipient households. To gain better understanding of the remittance behaviour of immigrants, it would have been ideal to have details on the recipients. Unfortunately, this information, with such a large sample size and covering a range of ethnic groups is not readily available.

Learning about remittance behaviours is important from a policy perspective since remittances affect the lives of so many people around the world. Microeconomic data on remittance behaviour can overcome the limitations of macro data to control for individual and demographic characteristics (Faini, 1994). The results of this study should assist policy makers in both home and host countries in formulating more effective immigration policies.

The rest of the essay is organized as follows: Section 2 outlines the theoretical and empirical review of literature. Section 3 presents the methodology and data used to determine the likelihood and the amount of remittances. Section 4 presents and analyzes the results. It also identifies the similarities and differences of socio-economic characteristics of Chinese and Indian immigrants in determining the likelihood of remitting and the amount of remittances. Finally, section 5 summarizes the study and suggests areas for future research.

2. LITERATURE REVIEW

2.1 Theoretical Perspectives of Motivation to Remit

There is no single theory that can explain the motivation to remit by immigrants (Rapoport & Docquier, 2005). Remittance literature is broadly divided between microeconomic and macroeconomic determinants of remittances. The microeconomic determinants, also known as endogenous theories, emphasize the migrant-family relationship to identify different motivations to remit. On the other hand, macroeconomic determinants, also known as the portfolio approach, emphasize macroeconomic variables that may influence individuals' decisions to remit to their home countries (Elbadawi & Rocha, 1992).

Based on endogenous theory, Lucas and Stark (1985), argue that there are three factors that play important roles in individuals' decisions to remit: pure altruism, pure self-interest, and tempered or self-enlightened altruism. Johnson and Whitelaw (1974) first introduced the idea of altruism in the context of urban-rural money transfers. In their view, the utility of migrants depends on the consumption levels of their family members, who are left behind at home. Ruiz and Silva (2009), assert that variables that increase the well-being of emigrants' family members should enter into emigrants' utility function. The utility function of migrants embodies the utility function of their family members (Agarwal & Horowitz, 2002). Lucas and Stark (1985) and Stark and Lucas (1988) focus on the motivations to remit in a more systematic way. According to them, if motivation to remit is linked with altruism,

remittances should be positively related with the remittance senders' income and negatively related with the remittance recipients' income.

Based on the idea of altruism, Funkhouser (1995) proposes a behavioural model of remittances. Remittance flows should rise with higher incomes of emigrants, lower incomes of recipients, and degree of social distance between the migrants and the remaining household members, and the intentions of migrants to return. On the contrary, remittances from an individual should fall as the number of emigrants from the same household rises. Assuming r as remittances, r^+ as positive remittances, and y_{imm} as the income of immigrants, the probability of remitting (Pr) and amount of remittances increase with immigrant's income, $\delta \Pr(r>0) \big/ \delta y_{imm} > 0$, and $\delta r^+ \big/ \delta y_{imm} > 0$, δ indicates change (Meckel, 2008).

Altruism alone fails to explain the totality of remittance transfers (Ruiz & Silva, 2009). Upon further examination, Lucas and Stark (1985) hypothesize that remitting has more to do with migrants' self-interest. Apparently, family is not at the center of the self-interest motive; however, to ensure future gain, migrants use households as a trustworthy and well-informed agent in the home country. According to Lucas and Stark (1985), remitters with self-interest may remit for various reasons e.g., aspiration to inherit, attempt to demonstrate laudable behaviour as a future investment or the intention to return to their home country.

A migrant might send remittances to their parents in their home country to ensure their inheritance. If this is true, remittances should go up with recipients' assets and wealth and decrease with risk aversion. Additionally, migrants may remit to acquire more assets and ensure their maintenance. Finally, if the migrant works in the host country temporarily and intends to return home, remittances could be used to promote investment in fixed capital (e.g. land). Such transfers would be used to enhance political influence, increase social prestige or strengthen relationships with relatives and friends. Due to the family's involvement in both altruism and the self-interest motive, in many cases, it might be difficult to isolate whether the flow of remittance is attributed to individuals caring about their family or to the selfish act of increasing their assets in the home country (Lucas & Stark, 1985).

In addition to altruism and self-interest, Lucas and Stark (1985) also assume that individuals' motivation to remit depends on "tempered altruism or enlightened self-interest". From this perspective, a self-enforcing, intertemporal, mutually beneficial contractual agreement between the migrants and their families may play a significant role in migrants' decisions to remit (Glytsos, 2001). There are two possible reasons behind such an agreement. First, remittances could be treated as a repayment of the cost borne by migrants' family to educate her/him in childhood and/or youth (Poirine, 1997). With the accumulated human capital, migrants are expected to find a better-paying job and use a part of their income as remittances to repay the cost of their education. Confirming this hypothesis, in the long run,

migrants are expected to lend money to their family and to finance the educational expenses of other members of their family.

Second, remittances could be used as an instrument of a risk reduction strategy at the household level. In the absence of a complete insurance market, during periods of risk (e.g., crop failure, price fluctuations, insecurity of land tenancy, livestock diseases and inadequate availability of agricultural wage work), informal contracts between migrants and family can be mutually beneficial. If this hypothesis is true, remittance flows will be inversely related with household income. Remittance flows will increase during crop failure and vice versa. Ultimately, remittances act as an insurance contract between migrants and their family. Further, remittances diversify households' sources of income against income shocks (Gubert, 2002; De La Briere, Sadoulet, Janvery, & Lambert, 2002).

In accordance with the exchange motive of remitting, Cox (1987) illustrates a less prevalent contractual agreement between migrants and their family/friends back home. Migrants can use remittances to buy various types of services e.g., taking care of their relatives or their assets in the home country. Based on a migrant's elasticity of demand for services in the home country, the flow of remittances might increase or decrease. In the presence of elastic demand for services, while price increases, fewer services will be in demand and the flow of remittances will decrease and vice versa. If the rate of unemployment is high in the home country, the price of services is expected to be low, therefore, *ceteris paribus*, the flow of remittances is expected to

rise. Educated migrants would have a negative tendency to remit as they have a low possibility of returning to their home country. On the contrary, Poirine (1997) argues that more educated migrants are expected to remit more in order to repay the initial investment made by the family to their education.

An alternative model, developed by Lubkemann (2005), explains why immigrants continue to remit and invest in their country of origin despite the fact that they do not have any intention to return. According to his model, immigrants' communities in their home country initiate the process of receiving continuous flows of remittances. To avoid the risk of losing remittances, home communities create an economy where immigrants' financial and migratory behaviours are held in high moral esteem. Using remittances as a symbolic transaction, emigrants continue to participate in such an economy.

Rapoport and Docquier (2005) extend the microeconomic motivations to remit to six factors: altruism, exchange, inheritance, strategic, insurance, and investment. The first four are individualistic motives, and the last two are familial motives. However, the differences in classifications in the literature are attributed to the ways motivations are defined. In some cases, it is extremely difficult to discriminate between these different motives (Rapoport & Docquier, 2005).

As the migration contexts of remittances differ greatly, it would be trifling to search for a general explanation of remittance motivation (Carling, 2008)[4]. Apart from structured motivational models (Lucas & Stark, 1985; Funkhouser, 1995; Fernando, 2005; Ecer & Tompkins, 2010), many other factors, such as migration dynamics, the nature of families and households, and the norms and values relating to migration and remittances, may influence the decision of migrants to remit.

2.2 Empirical Evidence of the Determinants of Remitting Behaviour

Most of the studies relating to the determinants of remitting behaviour have used survey data to conduct empirical investigation. Based on microeconomic studies, various factors may influence individuals' decisions to remit e.g., migrants' demographic characteristics, financial capacity to remit, obligation to family, intention to return to the home country, etc. Micro-studies have been conducted from two perspectives: whether or not migrants decide to send remittances at all and the amount they choose to remit.

The seminal work of Lucas and Stark (1985) assumes a wide range of motives, ranging from altruism to self-interest, as determinants of remittance flows. Using data on Botswana, their study could not find any strong evidence in favour of altruism. Theoretically, if altruism works as a determinant of remittance flows, then

[4] Carling, J. (2008) mentions (Amuendo-Dorantes, & Pozo, S. 2006a; Amuendo-Dorantes, & Pozo, S. 2006b; Cai, Q., 2003; Craciun, C.,2006; DeVoretz, D.J. & Vadean, F., 2005; Hoddinott, J., 1994; Osili, U.O., 2007; Sana, M. & Massey, D., 2005).

there should be more transfers (remittance flows) towards low-income earning families. However, contrary to the theoretical argument, the study by Lucas and Stark (1985) finds a positive link between remittances received and the current income of remittance recipient households.

Although altruism is an important motivation to remit, self-interest might play a stronger role in determining remittance flows. Lucas and Stark (1985) assert that altruistic motives of remittances often include an element of self-enforcing arrangement as a determinant of remittance flows; therefore, it would be better to hypothesize "tempered altruism or enlightened self-interest" (Lucas & Stark, 1985) as a major determinant of remittance flows. It is evident from their study on Botswana that during negative economic shocks, households with higher risks of losing crops are likely to receive more remittances, which supports the hypothesis of "tempered altruism".

Stark (1991) argues that the motivation to migrate and the flow of remittances are best understood as part of families' risk reduction or family co-insurance arrangement, which resembles the portfolio-investment strategy of a firm. Such behaviour could be treated as an intertemporal or contractual agreement between the migrants and their agents in the home country. Hoddinott (1994), using data from Kenya, argues that altruism cannot work as a sole motive for remittances. Moreover, interest in inheritance and loan repayment plays a significant role in the motivation to remit.

Altruism and self-interest as two motivating factors that contribute to remittances are supported by Osili (2004). Based on Nigerian immigrants in Chicago and a matched sample of their families in Nigeria, Osili (2004) observes that wealthier families tend to receive lower transfers. Such an observation supports altruism as a motivation to remit. However, remittances sent to finance investment in Nigeria are positively related with households' wealth in their country of origin. Wealthier households act as trustworthy agents to do business on behalf of migrants.

Brown (1997), using survey data from the Pacific Island in Australia, tests the determinants of likelihood of remitting by immigrants. Her study incorporates the following four categories of variables as determinants of remittances: demand side pressure on migrants from the receiving end, especially family and community ties; supply side variables that affect migrant's capacity to remit, such as income and net wealth; motivational variables, such as altruism and self-interest; and duration of migrants' absence. Empirically, both demand side and supply side variables influence the likelihood of remitting. From the demand side, migrants' remittances are positively related with the presence of surviving parents or spouse in the migrants' home countries. Analogously, from the supply side, migrants' incomes are positively related with the propensity to remit.

An individual's decision to remit could be influenced by individual characteristics and household characteristics. Most of the above mentioned studies, however, fail to incorporate various individual characteristics (e.g. motivations

behind migration, immigrants' occupation, family obligation, or relationship with ethnic group) as determinants of remittances. Moreover, these studies are limited to immigrants from one particular country.

Using survey data on a diverse set of ethnic minority households in England and Wales, Clark and Drinkwater (2007) test the empirical validity of altruism and mutual contractual agreements in immigrants' remitting behaviour. Their study includes an extended list of household characteristics as determinants of remittances. Due to the unavailability of data from recipient households, their study is limited to the sending side of remitters' behaviour. The probability of remitting strongly increases with income and the number of immigrants in the households. It is also evident that the presence of social distance between remitters and recipients affects the probability to remit. Among different ethnic groups, Clark and Drinkwater (2007) find that Caribbean people and Pakistanis are most likely to remit and Indians are least likely. Additionally, the study also explores the remittance-decay hypothesis--the impact of the duration of stay in the host country on remittances is valid for Caribbean people only. By contrast, the incidence of remitting increases slightly over time for Pakistanis and Indians.

When some immigrants remit and others do not, the important question arises about the relationship between motivation to remit and individual characteristics, such as gender, ethnicity, marital status, age, time elapsed since migration, income, educational attainment, etc. Vanway (2004) examines altruistic and contractual

patterns of remittances using a gendered approach. Using data from Thailand, she argues that both male and female are motivated to remit based on altruism and contractual agreement. However, female migrants from poorer households tend to remit altruistically, whereas male migrants from richer households tend to remit based on contractual agreements. Despite low incomes, female domestic workers tend to remit a greater share of their income compared to their male counterparts (Rahman & Fee, 2009). However, Osaki (1999) could not find gender as a significant determinant of remitting behaviour of Thai immigrants.

A few cross-country studies are available that examine remitting behaviour of individuals. Menjivar, DaVanzo, Greenwell, & Valdez (1998) conduct a survey on the remittance behaviour of Filipino and Salvadoran immigrants in Los Angeles, United States. Using logistic regression and ordinary least square (OLS), the authors observe that individual characteristics, financial capacity to remit, intention to migrate, personal investment in host country, and family obligation in host and home countries all play significant roles in determining the remittance behaviour of immigrants. The study could not find any difference between the two groups in their remittance sending behaviour. However, significant differences remain in terms of the amount remitted.

Among Filipinos, family income tends to be a strong and positive predictor of the likelihood of remitting and the amount remitted. Middle aged people tend to remit more compared to younger and older respondents. Motivation for migration also

influences the amount remitted. People who immigrated for better economic opportunities or political reasons tend to remit less compared to people who immigrated for family reunification. Without having family members in the host country, immigrants tend to face more difficulties in their transition time in the host country. Therefore, they tend to remit less. The empirical outcome of this study supports altruism as a considerable determinant for remittance behaviour. Having investments and length of stay in the host country are negatively related with migrants' remittance behaviour. Finally, the study argues that remittance behaviour is negatively linked with having family members in the host country, while it is positively linked with having family members in the home country.

In addition to the financial capacity to remit, human capital accumulation may also influence the likelihood of remitting. Funkhouser (1995) examines the determinants of remittances using household data from El Salvador and Nicaragua. Using a probit model on likelihood of remitting and tobit and two-stage self-selection models on the amount to remit, the author observes that education is negatively related with migrants' probability to remit, while sex or age have no significant relationship with the probability of remitting. Having close family members in the host country increases both the likelihood of, and amount of, remittances. Among emigrants from Nicaragua, the age variable is negatively correlated with the decision to remit and the level of remittances. The remittance decay hypothesis, which argues that there is a decline in remittances with each year from initial migration, is

supported by studies of Nicaraguan immigrants but not by studies of Salvadoran immigrants.

Houle and Schellenberg (2008) analyzed the remittance behavior of Canadian immigrants using the LSIC dataset. They found strong association of sex, age, income, savings, employment status, and other non-economic factors with the likelihood of remitting and the amount remitted. Moreover, their study includes regions of birth as a dummy variable. Despite significant differences across countries from a particular region, Houle and Schellenberg (2008) treated all migrants from a particular region as one entity. Hence, their study failed to generate any country specific results. In fact, Houle and Schellenberg (2008) implicitly identified this problem and left this question for future research.

Using the second wave of LSIC dataset and a tobit estimate, Unheim and Rowlands (2013) investigate the determinants of the amount remitted of recent immigrants in Canada. They claim that immigrants' family income, number of jobs, age, investments in home country, membership of different groups are positively associated with the amount of remittances. On the other hand, level of education, being a business and refugee class immigrant, housing costs, and the size of the family of immigrating units are negatively related with the amount of remittances. They observe that South East Asian immigrants tend to remit the highest amount while central Asians remit the least. Their study is limited to the wave 2 of LSIC and

only concentrates on the amount of remittances using a truncated samples of immigrants for whom the amount of remittances is available.

Motivations to remit may also vary across immigrants' country of origin. However, to our knowledge, thus far, there is no such study available that focuses on the determinants of remittances from Canadian immigrants based on their country of origin. To that end, this study tries to mitigate such a gap in the literature by examining the determinants of remittances of Canadian permanent residents from two major sources, China and India. In specific, this study will address the question "what motivates recently immigrated Chinese and Indian immigrants to remit and their amount of remittances from Canada".

This study adopts the basic approach of Houle and Schellenberg (2008) but it departs significantly from their study. In additional to the explanatory variables considered by Houle and Schellenberg (2008), we include an extended choice of explanatory variables relating to immigrants: marital status, motivations to migrate, having immediate family in Canada, investment in the home country, and the relationship to ethnic group in the host country. One caveat of microeconomic modeling is that if explanatory variables exhibit bi-directional causality with the dependent variable, then the model can suffer from an endogeneity issue. None of the studies using LSIC data offers correction of such endogeneity. This study uses the longitudinal design of the survey to correct for the existence of any potential endogeneity associated with remittances within the model.

3. DATA AND METHODOLOGY

3.1 Data and The Model

In our dataset, there are data on two groups of immigrants: a Chinese born group and an Indian born group. This research first presents descriptive statistics of the explanatory variables by their country of origin. Based on the descriptive statistics, the study indicates whether the differences between the two groups are statistically significant.

To examine the determinants of remittances, we estimate a regression model between immigrant's decision to remit and their individual and household behavior. In our model, we consider only one decision unit: migrant, who makes the decision to send remittances or not. During the first wave of LSIC survey, immigrants were asked the following questions: "Since you came to Canada, have you sent money outside Canada to relatives or friends?"[5]

In the second and third wave, the same immigrants were located and asked,

"Since your last interview, have you sent money outside Canada to relatives or friends?"

If the answer was yes, respondents were subsequently asked,

"How much money have you sent outside Canada to relatives or friends?"

[5] The LSIC study focuses on individual migrants instead of households. The dataset also reports whether the individual being interviewed is the most knowledgeable person about the household or not however, this study couldn't find any significant impact on individual's decision to remit and s/he being the most knowledgeable person on the household.

This study uses the first and second questions as the basis for preparing the dependent variable. Hence, the dependent variable is the decision to remit. The third question formulates the dependent variable for analyzing the determinants of the amount remitted. For theoretical foundations related to the explanatory variables this study relies on different motives of remittances suggested in the literature. The LSIC dataset contains information about characteristics of households living in Canada. It does not include any information regarding recipients' characteristics, and, therefore, this study cannot test for all underlying theories. This study also incorporates major demographic and economic variables in the vector of regressors. However, many of the demographic variables are difficult to interpret without having detailed information regarding family migration history.

In the remittance literature, contradictory outcomes are available regarding the relationship between migrants' gender, marital status, and remitting behaviour. Vanway (2004) suggests that gender and marital status of migrants might influence their decision to remit. Posel (2001) argues that men are generally more likely to remit, while women tend to remit a larger proportion of their wage than men. The relationship between marital status and remitting behaviour is also not clear. Marriage itself may be less important to explain remittance behaviour, but married migrants accompanied with a spouse and children tend to remit less compared to single individuals (Hagen-Zanker & Siegel, 2007). This study includes gender and marital status as a determinant of remittances.

Most of the empirical studies include age as a predictor of individual's decision to remit (Menjivar et al., 1998; Clark & Drinkwater, 2007; Houle & Schellenberg, 2008) but do not provide any clear indication about the relationship. Instead, there are contrasting arguments about the relationship between age and remittances. As age increases, migrants might accumulate some wealth and tend to remit more back home (Clark & Drinkwater, 2007). On the contrary, younger immigrants are expected to send more remittances while they have no families of their own to support in the host country (Menjivar et al., 1998). We create dummies for five different age groups and include them as a predictor of individuals` decision to remit.

Immigrants' financial capacity is one of the major variables that influences the decision to remit. Income and employment status of immigrants comprises the financial capacity variable (Menjivar et al., 1998). As income is directly linked with the capacity to remit, one may expect a positive relationship between these two variables. However, such an argument cannot always be justified. If altruism plays a significant role, migrants are expected to send remittances despite low income. In Norway, Somalians are less financially stable than all other immigrants. Nonetheless, while 60 percent of Somalian immigrants face difficulties of maintaining basic expenses for food, transportation, and other basic expenses, 80 percent of them

regularly remit (Carling, 2008)[6]. We examine the impact of financial capacity on individuals' decision to remit.

Personal investments/savings in countries of origin tends to influence immigrants' remittance behaviour (Menjivar et al., 1998). In the LSIC survey, all of the respondents were asked whether they had personal savings/investment back home. If so, then they were asked how much savings were left back home. Clark and Drinkwater (2007) argue that personal savings/investments back home positively influence the likelihood of remitting and the amount remitted. This study includes personal savings/investments back home as an explanatory variable[7].

Theoretically, there is a possibility that the level of human capital and language ability influence immigrants' willingness and ability to remit (Menjivar et al., 1998). The level of human capital can be measured using level of education upon immigrants landing in Canada. Level of education can also work as a predictor of potential earning and, as such, the capacity to remit. However, in practice, it is hard to

[6] In many cases, the relationship between income and remittances is likely to depend critically on conditions back home. Migrants may view income in relative rather than absolute terms (how much he or she is better off than his or her relatives). Additionally, how desperate the situation is back home will also play a part. As mentioned in the text, even poor migrants will remit if relatives at home are facing a crisis. As such, the income-remittance relationship could be group specific. However, in the LSIC dataset, there is no group specific information available to capture such an income-remittance relationship.

[7] The LSIC dataset also provides information about how much money is left back home as saving. If we categorize the amount of saving back home into different groups as Houle and Schellenberg (2008) did, we couldn't qualify for the data disclosure threshold set by Statistics Canada. As we are dealing with only two countries therefore, we have fewer observations than Houle and Schellenberg (2008).

find any consistent effect of education on remittance sending. According to the endogenous theory, educated migrants might be in a contractual arrangement with their family in the country of origin. Therefore, migrants are expected to pay back their families following migration (Lucas & Stark, 1985). But, empirical support for such an argument is weak (Merkle & Zimmermann, 1992).

Lianos (1997) casts doubt about the informal contractual arrangement as a motive of remittances. He argues that it is difficult to imagine that a child could enter into such a contractual arrangement while s/he would not understand the meaning of such an arrangement and would have little or no power to refuse it. Further, no parent would keep their child out of school due to the child's potential failure to go to abroad in future. Lianos' argument could be valid for primary education. Although parents do not enforce any contractual arrangement, however, secondary and tertiary education in developing countries are treated as an investment. The educational gender gap in developing countries is partly attributed to the return from educating a child. A significant percentage of parents in many developing countries find that the payoff from educating girls is lower than that from educating boys. Therefore, the percentage of girls in secondary and tertiary education is much smaller than that for boys (Todaro & Smith, 2012). To test the validity of educational attainment on immigrants' remitting behavior, this study incorporates a dummy variable for immigrants' level of education.

Language ability is mostly self-assessed by ability to read, write and speak. Menjivar et al. (1998) argue that learning English may open up new opportunities for immigrants. Attending language instruction may create new attachments for immigrants in the host country and thus, weaken immigrants' propensity to maintain attachments to the home country. However, Menjivar et al. (1998) could not find any significant relationship between language ability and the likelihood of remitting. This outcome is supported by Houle and Schellenberg (2008). Based on the outcome of previous studies, this study excludes language capability as a predictor of remittance behaviour of immigrants.

The category of immigration has an influential role in the decision to remit (Menjivar et al., 1998). Immigrants enter into Canada in various categories: economic class, family-class, provincial nominee, business class and refugees. The economic/skilled worker class immigrants are selected based on their educational attainment, language abilities and other factors. Economic/skilled immigrants are expected to earn more than those in the family class and refugee class. A consistent relationship between the class of immigrants and their remitting behaviour may be difficult to establish. According to the "tempered altruism" argument, family class immigrants may feel more obligations to remit compared to those in the economic class. This study incorporates the class of immigrants as a possible contributor to their decision to remit.

Migrants' involvement with their ethnic communities in their host country, such as through social/religious organizations, often works as a possible predictor of the remittance behaviour. The relationship between ethnic composition and remittance behaviour is not precise in the empirical literature. Keeping a close association with the same ethnic group reflects a sustained attachment with the home country that motivates migrants to remit. Such involvement also ensures a self-interested incentive to invest in social relations in the community of origin. The behaviour of individuals in a neighbourhood might be affected by the characteristics and earlier behaviour of older members of their group. This could be termed as the role model or neighbourhood effect. Alternatively, the peer group effect might influence immigrants to remit. In such cases, contemporaneous behaviour of a peer group might influence new immigrants' decisions to remit (Durlauf, 2004). This study incorporates a dummy of immigrants' relationship with their ethnic group as an explanatory variable for determining their remitting behaviour[8].

3.2. Estimation Strategy

The standard approach of determining households' remittance behaviour is to postulate an unobservable latent variable y_i^*, which illustrates the household remittance behaviour (Clark & Drinkwater, 2007). Based on the observable

[8] There could be a presumption that the motivation to remit (between Chinese and Indian immigrants) might be related, not so much to differing nationalities, but to the make-up of immigrants (such as more Indians come through family reunification). Such a concern is taken care of by incorporating the major class of immigrants from India and China as an explanatory variable.

characteristics of households, this study uses the following behavioural equation to estimate households' remittance behaviour:

$$y_i^* = x_i\beta + \varepsilon_i$$

where, i=1,….n, x is the vector of household characteristics, β is the vector of parameters to be estimated, and ε is random error component. Based on the availability of data, a dummy is used where $d_i = 1$ if $y_i^* > 0$ (i.e. the individual remits) and zero otherwise.

Based on the binary (0,1) nature of the dependent variable, we could treat the model as linear in parameters and use the linear probability model (LPM). However, despite the inherent simplicity of the LPM model, we will not use it. The LPM model may produce predicted probabilities that are less than zero or greater than one, but since the estimated coefficients are predicted probabilities, they must lie between zero and one. Another related problem is that the probabilities cannot be linearly related to the independent variables for all their possible values (Wooldridge, 2009).

To avoid the LPM limitations, this study considers a class of binary response models of the following form:

$$P(y_i = 1 | x_i) = H(\beta_0 + \beta_1 x_1 + ... + \beta_k x_k) = H(\beta_0 + X\beta),$$

Where H is strictly taking the values between zero and one: $0 < H(z) < 1$, for all real numbers z. In the literature, various nonlinear functions have been suggested for H to

ensure the probabilities lie between zero and one. However, in the majority of the applications, two models, logit and probit are often used (Wooldridge, 2009).

The choice between using the logit or probit model depends on assumptions about the nature of data. In both cases, the purpose is to estimate the response probability,

$P[y_i = 1 | x_i]$, which represents the probability to remit conditional on x_i-explanatory variables. The logistic model arises when $F(x_i'\beta) = \frac{e^{x_i'\beta}}{1+e^{x_i'\beta}} = \Lambda(x_i'\beta)$

where $\Lambda(\ )$ indicates the logistic distribution.

Theoretically, the logit model follows the logistic distribution whereas probit model follows the standard normal distribution. If the response probability has a fatter tail, then the logistic model is more appropriate. An alternative is to assume standard normal density, which leads to probit estimation. Often both models give similar answers; however, the logistic model is less computationally intensive (Wooldridge, 2009).

In our sample, as the response probability is logistically distributed, we follow a multivariate logistic model. The study creates different dummy variables using all categorical explanatory variables. For each explanatory variable, using one selected group as a reference, the study estimates logistic regression.

Using logistic regression, this study identifies the determinants of the remittance behaviour of both groups of immigrants[9]. However, as the coefficients of the logit model do not have any meaningful interpretation, this study estimates the marginal effects of the probability of remitting. The diagnostic statistic for these models suggests that they fit the data reasonably well and do not suffer from a mis-specified functional form. The potential multicollinearity between explanatory variables (age, education, income) is tested. The study conducts such tests by dropping the explanatory variables individually in turn and observing the changes to marginal effects of the other variables. The results of the marginal effects are robust[10].

This study creates dummies for all possible predictors of the likelihood of remitting and the amount remitted. The possible factors are gender (male and female), marital status (married and other), age (coded as 15-24, 25-34,35-44,45-54, 55 and above), education (high school or less, college, undergraduate, and graduate), motivations to migrate (family reunification, economic opportunity, business and other), households income (coded as less than $10,000, $10,000 to $24,999, $25,000 to $44,999, $45,000 to $70,000, $70,000 and above), immigrants' characteristics or

[9] Initially, this study also includes all of the variables included in Houle and Schellenberg (2008) but dropped some of them later due to their insignificant impact on the incidence of remitting and the amount remitted (the dependent variable).

[10] The alternative is to estimate the behaviour of both groups within the same equation and include country dummies to observe the difference between coefficients based on immigrants' country of origin, however, both estimation procedures are expected to produce similar results.

employment status (full time employed, part-time or unemployed or not in the labour force), having immediate family in Canada (yes or no), having investment or saving in home country (yes or no), having investment in host country (yes or no), family obligation (coded as living along, spouse lives with respondent, spouse and child, spouse with child and others) and the relationship with ethnic group (coded as very close, close, somewhat close, and not close at all).

The factors that influence the decision to remit might differ from the factors that influence the amount of remittances. Therefore, separate equations are estimated to explain the decision to remit and the amount of remittances. While logistic regression determines the likelihood of remitting, an instrumental variable model estimates the coefficient of variables that influence the amount remitted. Banarjee (1984) argues that both the likelihood of remitting and amount to remit are part of the same process; therefore, they estimate one equation using tobit regression. On the contrary, Funkhouser (1995) argues that the coefficients influencing the decision to remit are different than the coefficients predicting the amount of remittances. He argues that the presence of sample selection might produce biased estimates. To avoid such bias, Funkhouser uses the two stage Heckman (1976) sample selection model. The major difficulty of using a two-stage model is to find a group of variables that influence the amount to remit but not the likelihood of remitting. This study could not find the presence of such an indicator in the dataset. Massey and Basem (1992) and Houle and Schellenberg (2008) observe that the relative strengths of variables differ

between the likelihood of remitting and the amount remitted. Following the argument of the latter group, this study estimates an instrumental variable model to find the possible predictors of the amount remitted.

As Ordinary Least Square (OLS) has limitations in controlling for endogeneity (Wooldridge, 2001; Greene, 2003), the longitudinal nature of data helps to take care of such issues by using a time lag between the dependent and independent variables. The decision to remit variable is available for three time periods: six months, two years, and four years after arrival. To avoid the issue of endogeneity, this study uses lag independent variables of the current period to identify the impact on current period dependent variables. Independent variables are measured at the start of the reference period and thus precede the decision to remit. Hence the estimation becomes an instrumental variable estimation. For weighted analysis, the study uses sampling and bootstrap weights that come with the dataset. Such weighting schemes would produce descriptive tables and regression results to approximate the behaviour of the underlying population as closely as possible.

4. RESULTS AND ANALYSIS

4.1 Univariate Analysis

This section provides a comparative overview of social, economic, and demographic characteristics of Chinese and Indian immigrants in Canada and their remittance patterns. Table 1 summarizes the group mean and standard deviation of

the explanatory variables of Chinese and Indian immigrants. The summary statistics also focus on whether the group means for the two groups are statistically significantly different from each other. The patterns of immigration from both China and India tend to be similar in terms of male-female composition and marital status. Most of the immigrants from both countries are married and although the numbers of married individuals are higher among the Chinese than the Indian immigrants, the difference is not significant.

There is no significant difference between the average ages of immigrants. However, once they are categorized in different groups, it turns out that more Chinese immigrants are younger than Indian immigrants. The proportion of immigrants in the 25-34 age category is higher among Chinese compared to Indians. Education is the key variable of this study. The education variable is divided into four groups: high school or less, college, undergraduate, and graduate. The level of education is higher among Chinese immigrants. In our dataset, at the time of landing, more than 68 percent of Chinese had either undergraduate or graduate degree, compared with 56 percent among Indians. The education level of Indians tends to be lower than the average level of all immigrants in Canada. Apparently, it seems that Canada has not been able to attract many immigrants from India in the skilled worker or business classes, while a high proportion of Indian immigrants arrived in the family class where educational qualification was not part of the admission criteria.

During the period under review, almost 49 percent of Indian immigrants came to Canada under the family class, compared with only 14 percent for Chinese immigrants. While, 76 percent of Chinese arrived as skilled workers, only 49 percent of Indians did. Notwithstanding the difference in educational background, Chinese immigrants in Canada earn statistically significantly less than Indian immigrants. The average family and personal incomes for Chinese immigrants are $22,279 and $8,685 respectively, while they are $35,456 and $12,143 for Indian immigrants. To some degree this may be explained by the fact that 53 percent of Indians in our dataset work full-time, while only 31 percent of Chinese immigrants do[11].

In the family reunification category, India seems to be one of the most important sources of immigrants to Canada. Taking advantage of the family reunification category, 74 percent of Indian immigrants have relatives in Canada, while this number is only 33 percent among Chinese immigrants. Chinese immigrants seem to be more interested in investing in their home country than do Indians. Twenty-eight percent of Chinese have investments in their home country compared with only 9 percent of Indians. The dataset represents a total population of 54,796, of which the total Chinese population is 29,352 and the Indian population is 24,344.

----------Table 1 here----------

[11] Employment characteristics are classified into two groups: i) full-time; ii) part-time and other. As the number of observations for part-time employed is small and does not qualify for the data disclosure threshold of Statistics Canada, therefore, this study merged part time, individuals who are unemployed and those not in the labour force into a single category.

4.2 Multivariate Analysis

Table 2 represents the results of the logistic regression. It estimates the likelihood of remitting based on the socio-economic characteristics of immigrants.

---------------Table 2 here----------

The sign of the coefficients of logistic regression represnets the relationship between regressors and regressand, however, the coefficients do not have any meaningful interpretation, therefore, the marginal effects of explanatory variables on migrants' decision to remit are also estimated. Marginal effects estimate the unit change of the explanatory variables on the probability of remitting[12]. Table 3 represents the results of the marginal effects estimation. Additionally, table 4 reports the results of the instrumental variable regression of the relationship between socio-economic characteristics of remitters and the amount remitted.

----------Table 3 here----------

----------Table 4 here----------

Marginal effect estimates indicate that gender does not have any influence on individuals' decision to remit. However, the relationship between marital status and the decision to remit varies between Chinese and Indian immigrants. Among Chinese,

[12] This study reports both logistic regression and subsequent marginal effects for readers' convenience.

there is no statistically significant relationship between the probability to remit and their marital status. However, married Indians have a higher probability of remitting compared to single, divorced or widowed counterparts. This may imply that Indian immigrants tend to remit more often to family members left behind in their home country. In terms of the amount remitted (table 4), the study suggests that, among Indians, singles and females remit 23% less compared to their married and male counterparts.

Age does not have a consistent impact on an individuals' decision to remit or the amount remitted. Younger immigrants from China have a higher probability of remitting than the older immigrants. Using the 15-24 age category as the reference group, the 25-34 age category has a 6 percent higher probability of remitting while the 35-44 age group has a 10 percent higher probability. The probability of remitting declines for the 45 and above age group. On the contrary, the probability of remitting for Indian immigrants is 11 percent higher among the 25-34 age cohort, while it is 1 percent and 6 percent lower for the 35-44 and 45-54 age categories respectively. However, the probability of remitting increases again for the 55 and above age category. In terms of the amount remitted, among Indians middle-aged remitters seem to remit more than both younger and older immigrants. Therefore, the amount of remittances and the age of immigrants exhibit an inversely *U*-shaped relationship.

This study finds a negative relationship between education and the decision to remit. Immigrants with higher educational degrees have a lower probability of

remitting. The likelihood of remitting by college graduates among Chinese immigrants is 5 percent lower than the high school graduates. A similar relationship is also evident among Indians. These results support the findings of Funkhouser (1995) on Nicaraguan and Salvadoran immigrants. The relationship between the amount remitted and the level of education at landing is, however, positively related. Among those who remit, higher educated immigrants tend to remit larger amounts compared to lower educated immigrants[13].

The category of migrants' variable indicates their underlying motivations behind migration. Further, motivation(s) to migrate may influence the decision to remit and the amount remitted. The majority of Chinese immigrants migrate as skilled/economic class immigrants. Broadly speaking, these immigrants are expected to have a better job and good earnings, which may lead to a higher probability of remitting. Contrary to common belief, this study observes that the probability of remitting is higher among family class immigrants as opposed to economic class immigrants.

To explain the reasons behind such an outcome, it may be argued that many of the economic class immigrants do not have any family members living in the host country. As a result, upon their arrival, economic class immigrants lack information about better jobs and may face difficulties initially getting established. Thus, their

[13] This study also includes an interaction dummy for level of education and language ability, but it did not find any significant impact of such interaction term on individuals' probability of remitting.

probability of remitting is low compared to family class immigrants. Having the advantage of family member(s) in the host country, the transition period for family class immigrants is expected to be shorter as opposed to that of the economic class immigrants. In the beginning, due to family connections, it is easier for family class immigrants to find a job, earn more money and remit to their home country. However, overtime, this relationship between those in the economic class and the probability to remit might change.

Marginal effect estimation also indicates that business class immigrants have the lowest probability of remitting. Business class immigrants are expected to have better financial conditions back home; therefore, the probability to remit is low among them. The results from table 4 indicate that, if economic class immigrants remit, they often remit more than family class immigrants. However, the proportion of remitters, or people intending to remit, is very low among economic class immigrants as opposed to family or business class immigrants.

Migrants' income has been found to have either a positive effect on the likelihood of remitting or no effect at all (Carling, 2008). Since income directly affects an individual's capacity to remit, a positive impact of income on the decision to remit is plausible. To illustrate the reason behind the positive relationship between income and the likelihood of remitting, one might simply argue that low-income immigrants are not able to remit. However, if the hypothesis of altruism is correct, the relationship between income and the likelihood of remitting is not necessarily

positive. This study does find a positive relationship between the likelihood of remitting and immigrants' income. Compared to the reference group ($10,000 or less), the probability to remit increases by 12, and 21 percent for the $ 45,000-$69,999 income group among Chinese and Indian immigrants respectively. However, the probability to remit declines for the top income groups ($70,000 and more). It could reasonably be argued that immigrants from the highest income category come from the rich class of their home country. Therefore, the necessity to remit is smaller for this group of immigrants. In terms of the amount remitted, a positive relationship is observed between remittances and income. Higher income leads to a higher outflow of remittances and vice versa.

Theoretically, self-interest could be an important determinant of immigrants' decisions to make remittances or not. Remittance senders could be driven by the aspiration to inherit. If this is true, remittances should be positively related with immigrants holding of assets in the country of origin. Further, migrants could remit money for acquiring assets in their home country and ensuring their maintenance. Often, one can relate the self-interest motive with temporary migrants, as they eventually return to their country of origin. However, the LSIC dataset does not provide any information regarding immigrants' assets in the country of origin, only their level of savings. As savings can be treated as assets, this study investigates whether the remitting behaviour of Chinese and Indian immigrants varies according to their savings left back home. For Chinese, having savings back home increases

their likelihood of remitting, but such a relationship is absent among Indian immigrants. Moreover, savings back home is positively related with the amount of remittances for Chinese immigrants.

Our results on Chinese immigrants differ with Houle and Schellenberg (2008), but support Unheim and Rowlands (2013). Using a regional sample of East Asian immigrants (including China), Houle and Schellenberg (2008) could not find any relationship between savings back home and the likelihood and amount remitted. On the other hand, Unheim and Rowlands (2013) using LSIC dataset support the positive link between savings back home and the amount remitted. This study may offer some tentative explanations behind such a differing outcome for Chinese and Indian immigrants. As the majority of Indians come as family class immigrants, the possibility to send money back home for investment purposes could be limited because of the absence of trustworthy agents in the country of origin. Osili (2007) argues that the level of savings or wealth of family members/agents back home may work as a determinant of remittances. If migrants' family/agent back home are wealthy, migrants may feel more comfortable to send remittances back home for investment purposes. Chinese immigrants may have more wealthy agents available back home, therefore, their likelihood of sending remittances may increase with the savings back home. However, without having further evidence on recipient households, it would be difficult to justify such a disposition.

Home ownership or planning to buy a house in the host country might negatively influence both the decision to remit and amount remitted. As most immigrants in the LSIC dataset are recent immigrants, the percentage of people who bought a house is low, so the study uses immigrants' declared intention to buy a house as a determinant of the decision to remit and the amount remitted. Supporting the general hypothesis, the study observes that planning to buy a house reduces the probability to remit by 5 percent and 7 percent for Chinese and Indian immigrants respectively. However, this relationship might not always be clear. If immigrants remit based on the needs of their family members back home (which could be due to altruism, self-interest or any other motive), immigrants remit notwithstanding plans they might have to buy a house. In some cases, they might borrow money to remit to their family members. The result is that the estimated relationship between planning to buy a house and the amount remitted is insignificant for both groups of immigrants.

Theoretically, there might be some association between individuals' decisions to remit and having immediate family in the host country[14]. The relationship could be two- fold. On the one hand, having close family in the host country might reduce the need and possibility to remit, as family members are living in the same country. On the other hand, however, having family members in the host country might influence

[14] The dataset also provide information about whether the immediate family that is in Canada is children, parent and/or grandparent. However, once we classify immediate family into different categories, we fail to qualify for the data disclosure threshold of Statistics Canada.

immigrants to remit more to their home country (Blue, 2004). This relationship might be similar to the peer effect/neighbourhood effect. The study observes the presence of such immediate family impact among Indian immigrants' likelihood of remitting. Having immediate family in Canada increases the likelihood of remitting among Indians; however, this relationship is negative in terms of the amount remitted. Further, the study could not find evidence of any such relationship among Chinese immigrants.

Family obligation influences individuals' decision to remit. Some immigrants live alone, whereas others live with their families. The number of people in each immigrating unit might influence the likelihood of remitting. Individuals living with their spouse are less likely to remit compared to individuals living alone. The study confirms the validity of such a hypothesis.

Close association with one's ethnic group influences the probability of sending remittances. Ethnic composition of the neighbourhood in which the household resides also determines the remittance behaviour of immigrants (Clark & Drinkwater, 2007). The neighbourhood effects on remittance behaviour of individuals might work through two channels (Durlauf, 2004). First, the behaviour of an individual in a neighbourhood may be affected by the characteristics and earlier behaviour of older members of their group. Second, the peer effect might also play an important role in the decision to remit. However, such effects could be

contemporaneous. Following the same line of argument, this study incorporates close association with the same ethnic group as a predictor of the likelihood of remitting.

This study could not find any statistically significant relationship between having association with the same ethnic group and the remitting behaviour of Chinese immigrants. Among Indian immigrants, however, such an association is strong. Similarly, the role model/peer effect is stronger among Indian immigrants. Having no association with the same ethnic group reduces the probability to remit of individuals by 7 percent. However, among Chinese, having a close association with the same ethnic group does not significantly influence the level of remittance[15].

Often studies test the remittance decay hypothesis, in which the number of years immigrants have lived in the host country is expected to be negatively associated with the decision to remit. Table 6 reports the determinants of immigrants' decision to remit after four years of arrival[16]. Evidence for the income group category is surprising. Contrary to the remittance decay hypothesis, after four years of arrival, the likelihood to remit increases for higher income groups compared to the two years of their arrival in Canada. It could be argued that the flow of remittances in China and India are motivated by strong kin ties or self-interest. Therefore, the presence of remittance decay may not be reflected until the gradual change or ending of those ties

[15] Additionally, this study also reports (in table 5 and 6) the results of the logistic regression and the likelihood of remitting by individuals after four years of their arrival in Canada.

[16] The outcomes related to most of the explanatory variables are similar for table 3 and 6.

with immigrating units occurs. The incidence of remitting may increase a few years after the arrival of immigrants and then decline. Four year is likely to be too short a period of time to justify the presence or absence of the remittance decay hypothesis.

5. CONCLUSION

Using recently available data from the LSIC, this study identifies a series of factors that tend to influence the transfers of remittances from the country of destination to the country of origin of migrants. Statistical analysis of socio-economic features provides information about how remittance behaviour of immigrants changes across countries. The study confirms that the remittance behaviour of Chinese and Indian immigrants is partly supported by standard economic theory. The results of logistic regression and subsequent marginal effect estimation assert that, consistent with the hypothesis, the probability of remitting increases with an increase in immigrants' income.

Though many of the explanatory variables influence the decision to remit in a similar fashion for both groups of immigrants, age, level of education, personal investment in home country, having immediate family members in the home country, and involvement with ethnic groups in the host country influence the decision to remit and the amount remitted in a different fashion for Chinese and Indian immigrants. The most striking outcome is that having investments in the home country increases the probability of remitting and the amount to remit by Chinese

immigrants. This outcome may support the self-interest motive of immigrants behind the decision to remit. However, such an outcome is not evident among Indian immigrants. Remittance sending patterns of immigrant groups thus varies greatly between ethnicity and national origin. The study reiterates the importance of contextual factors in explaining immigrants' decision to remit and the level of remittances. Variety in socio-economic factors: gender, marital status, education, motivation to migrate, and income cannot solely explain the differences in immigrants' remittance sending decision.

The use of such a comprehensive dataset helps to answer many unanswered questions related to the remittance behaviour of immigrants in Canada. The results of this study should be helpful for both host and home countries. Policy makers in host countries will have better information about the ability and integration of immigrants into the economy, whereas policy makers in home countries may try to influence potential migrants so that their remittance behaviour may work in the best interests of the country.

The empirical outcome based on this research enriches existing remittance literature in several ways. Using Canadian data, this study is the first of its kind to examine the determinants of remittances of two distinct groups; Chinese and Indian immigrants. The remitting behavior among nationals from different countries may vary across their socio-economic characteristics. The longitudinal nature of the LSIC dataset allows us to use the instrumental variable approach and control for the

endogeneity of the regressors and this is rare in the literature related to determinants of remittances. Based on the outcome of this study, policy makers from the host country (Canada) may understand more about the socio-economic status of recently arrived immigrants. Additionally, policy makers from the home countries may receive important insights about the determinants of remittances from their emigrants.

Generalizing the outcome of our regression findings might be inappropriate. The study covers a small part of the Chinese and Indian communities in Canada. Further, in some cases, immigrants' behaviour varies across cohorts. Immigrants who came to Canada in the 1980s and 1990s might have different characteristics (e.g. skills and economic opportunities) than recent immigrants, so any generalization could be misleading.

The issue of motivations to remit should properly involve a matching information from immigrants family and/or friends in their home country, which LSIC cannot do. Based on the LSIC data, this study looks only at the sending side of the remittance equation. However, having matching information from immigrants' family and/or friends would definitely provide better information about the reasons behind sending remittances. Such information about the recipients' side would help strengthen and refine the analysis. That could be an area of further research. Finally, despite many limitations, this study tries to illustrate the differences in remittance behaviour of Chinese and Indian immigrants based on their socio-economic

characteristics. It also reiterates the importance of contextual factors in explaining the unobserved variation among immigrants' remittance behaviour.

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APPENDIX

TABLE 1: Descriptive Statistics of Explanatory Variables by the Country of Origin

VARIABLES	CHINA: Population of 29352	INDIA: Population of 24344
	Proportion (%)	Proportion (%)
Gender		
Male	48	49
Female	52	51
Marital Status		
Married	87	80
Single & Other	13	20
Age		
Age 15-24	07	21
Age 25-34	52	36
Age 35-44	29	17
Age 45-54	05	16
Age 55 and Above	07	10
Education***		
High School or less	15	34
College	17	10
Undergraduate	46	38
Graduate	22	18
Motivation to Migrate***		
Family Reunification	14	49
Economic Opportunity	76	49
Business and Other	10	02
Households' Income/Financial Capacity		
<$10000	40	30
$10000 to <$24999	17	34
$25000 to <$44999	05	17
$45000 to <$69999	02	05
$70000 and above	34	14
Immigrant Characteristics***		
Working Full Time	31	53
Working Part Time & other	69	47
Immediate Family in Canada ***		
Yes	33	74
No	67	26
Investment/Saving in Home Country***		
Yes	28	09
No	72	91
Investment/Saving in Host Country		
Yes	36	51
No	64	49
Family Obligation***		
Lives Alone	16	31
Spouse Lives with Respondent	33	16
Spouse+Child	48	24
Spouse+Child+Others	06	29
Income		
Family Income***	22279.65	35456.37
Personal Income***	8685.48	12143.08
Amount Remitted***	$3111.49	$3687.89

Notes: ***,** and * indicates that two groups differ at 1,5, and 10 percent level of significance respectively.

TABLE 2: Logistic Regression of Immigrants' Decision to Remit: 2 Years After Arrival

VARIABLES	CHINA: Population of 29352	INDIA: Population of 24344
	Logit Coefficient	Logit Coefficient
Gender		
Male (Ref Group)		
Female	0.19	-0.48
Marital Status		
Married (Ref Group)		
Single & Other	0.94	-0.09***
Age		
Age 15-24 (Ref Group)		
Age 25-34	0.59**	0.69***
Age 35-44	1.13**	-0.04
Age 45-54	-0.77	-0.40
Age 55 and Above	-0.73	0.66**
Education		
High School or less (Ref Group)		
College	-0.62***	0.03***
Undergraduate	-0.94*	0.10
Graduate	-0.65	0.85
Motivation to Migrate		
Family Reunification (Ref Group)		
Economic Opportunity	-0.05***	-0.92***
Business and Other	-1.59***	-0.37***
Households' Income/Financial Capacity		
<$10000 (Ref Group)	0.83***	0.58***
$10000 to <$25000	1.21***	0.88**
$25000 to <$45000	0.86**	2.47***
$45000 to <$70000	-0.92**	-2.46**
$70000 and above		
Immigrant Characteristics		
Working Full Time (Ref Group)		
Working Part Time & other	-0.33**	-0.38**
Immediate Family in Canada		
Yes (Ref Group)		
No	-0.01	-0.44***
Investment/Saving in Home Country		
Yes (Ref Group)	0.55**	0.29***
No		
Investment/Saving in Host Country		
Yes (Ref Group)	-0.64***	-0.37
No		
Family Obligation		
Lives Alone (Ref Group)		
Spouse Lives with Respondent	-0.13**	-0.07**
Spouse+Child	-0.22	-0.16
Spouse+Child+Others	-0.35	-0.31
Relationship with Ethnic Group		
Very Close (Ref Group)		
Close	-0.07	-0.17
Somewhat Close	-0.30	-0.04***
Not Close at All	-1.24	0.85**

Notes: ***,** and * indicates the level of statistical significance at 1,5, and 10 percent level respectively.

TABLE: 3: Marginal Effects of Individuals' Decision to Remit: Two Years after Arrival

Variables	China: population of 29352	India: population of 24344
	Marginal Effects	Marginal Effects
Gender		
Male (Ref Group)		
Female	0.02	-0.07
Marital Status		
Married (Ref Group)		
Single & Other	0.08	-0.16***
Age		
Age 15-24 (Ref Group)		
Age 25-34	0.06**	0.11***
Age 35-44	0.10***	-0.01
Age 45-54	-0.10	-0.06
Age 55 and Above	-0.06	0.09***
Education		
High School or less (Ref Group)		
College	-0.06***	-0.11***
Undergraduate	-0.10**	-0.02
Graduate	-0.06	-0.01
Motivation to Migrate		
Family Reunification (Ref Group)		
Economic Opportunity	-0.06**	-0.14***
Business and Other	-0.11***	-0.06***
Households' Income/Financial Capacity		
<$10000 (Ref Group)		
$10000 to <$25000	0.11***	0.09***
$25000 to <$45000	0.11***	0.17***
$45000 to <$70000	0.12***	0.21***
$70000 and above	-0.14**	-0.19***
Immigrant Characteristics		
Working Full Time (Ref Group)		
Working Part Time & Other	-0.175	-0.077**
Immediate Family in Canada		
Yes (Ref Group)		
No	-0.00***	-0.07***
Investment/Saving in Home Country		
Yes (Ref Group)		
No	-0.09***	-0.01
Investment/Saving in Host Country		
Yes (Ref Group)		
No	0.05**	0.07***
Family Obligation		
Lives Alone (Ref Group)		
Spouse Lives with Respondent	-0.01**	-0.01***
Spouse+Child	-0.02	-0.03
Spouse+Child+Others	-0.02	-0.13
Relationship with Ethnic Group		
Very Close (Ref Group)		
Close	-0.01	-0.03
Somewhat Close	-0.03	-0.07**
Not Close at All	-0.09	-0.16***

Notes: ***, ** and * indicates the level of statistical significance at 1,5, and 10 percent level respectively.

TABLE 4: Instrumental Variable Regression of the Amount Remitted: Two Years after Arrival

VARIABLES	CHINA	INDIA
	Coefficients	**Coefficients**
Gender		
Male (Ref group)		
Female	0.106	-0.230*
Marital Status		
Married (Ref Group)		
Single & Other	0.445	-0.235**
Age		
Age 15-24 (Ref Group)		
Age 25-34	-0.061**	-0.172
Age 35-44	-0.097	0.028***
Age 45-54	-0.083	0.323***
Age 55 and Above	-0.274	-0.061
Education		
High School or Less(Ref Group)		
College	0.057***	0.089***
Undergraduate	0.053***	0.100
Graduate	0.357	0.032
Motivation to Migrate		
Family Reunification (Ref Group)		
Economic Opportunity	0.257***	0.148***
Business and Other	-0.186	-0.048
Households' Income/Financial Capacity		
<$10000 (Ref Group)		
$10000 to <$25000	0.041***	0.093*
$25000 to <$45000	0.214***	0.439**
$45000 to <$70000	0.678**	0.710
$70000 and above	0.001	1.777
Immigrant Characteristics		
Working Full Time (Ref Group)		
Working Part Time & Other	-0.0003***	-0.043
Immediate Family in Canada		
Yes (Ref Group)		
No	0.481**	0.222***
Investment/Saving in Host Country		
Yes		
No	0.336	0.183
Investment/Saving in Home Country		
Yes		
No	-0.045**	-0.211
Family Obligation		
Lives Alone (Ref Group)		
Spouse Live with Respondent	-0.026	-0.045
Spouse+Child	-0.016**	-0.058**
Spouse+Child+other	-0.004	-0.328
Relationship With Ethnic Group		
Very Close (Ref Group)		
Close	-0.039	-0.017
Somewhat Close	-0.073	-0.044
Not Close At All	-0.078	-0.170

Notes: ***,** and * indicates the level of statistical significance at 1,5, and 10 percent level respectively.

TABLE 5: Logistic Regression Of Immigrants' Decision To Remit: Four Years after Arrival

VARIABLES	CHINA	INDIA
	Logit Coefficient	**Logit Coefficient**
Gender		
Male (Ref Group)		
Female	0.079	-0.367
Marital Status		
Married		
Single & Other	1.459	-0.147***
Age		
Age 15-24 (Ref Group)		
Age 25-34	0.260***	0.220***
Age 35-44	0.229***	-0.254**
Age 45-54	-0.183	-0.430
Age 55 and Above	-0.923	0.317
Education		
High School (Ref Group)		
College	-0.631***	-0.639***
Undergraduate	-0.556***	-0.222
Graduate	0.545	0.372
Motivation to Migration		
Family Reunification (Ref Group)		
Economic Opportunity	-0.917***	- 0.171***
Business and Other	-2.874***	-0.201***
Households' Income/Financial Capacity		
<$10000 (Ref Group)		
$10000 to <$25000	0.803***	0.993***
$25000 to <$45000	1.755***	1.165***
$45000 to <$70000	2.518***	1.532***
$70000 and above	0.680***	1.738***
Immigrant Characteristics		
Work Full Time (Ref Group)		
Work Part Time & Other	-0.002***	-0.240
Have Relatives in Canada		
Yes (Ref Group)		
No	0.104	-0.153***
Investment/Saving in Home Country		
Yes (Ref Group)		
No	-0.212	-0.271***
Investment/Saving in Host Country		
Yes (Ref Group)		
No	0.162	0.666
Family Obligation		
Lives Alone (Ref Group)		
Spouse lives with Respondent	-0.180	0.249
Spouse+Child	-0.112*	-0.338
Spouse+Child+other	-0.293	-0.451
Relationship With Ethnic Group		
Very Close (Ref Group)		
Close	-0.268	-0.100
Somewhat Close	-0.575	-0.262
Not Close at All	- 0.476**	-0.820**

Notes: ***,** and * indicates the level of statistical significance at 1,5, and 10 percent level respectively.

TABLE 6: Marginal Effects on Immigrants' Decision to Remit after Four Years of Arrival

VARIABLES	CHINA	INDIA
	M.E.	**M.E.**
Gender		
Male (Ref group)		
Female	0.011	-0.064
Marital Status		
Married (Ref Group)		
Single & Other	0.147	-0.026
Age		
Age 15-24 (Ref Group)		
Age 25-34	0.038**	0.048**
Age 35-44	0.033***	-0.050**
Age 45-54	-0.025	-0.069
Age 55 and Above	-0.101	0.051***
Education[a]		
High School (Ref Group)		
College	-0.079***	-0.095***
Undergraduate	-0.079***	-0.038*
Graduate	0.071	0.060
Motivation to Migrate		
Family Reunification (Ref Group)		
Economic Opportunity	-0.152***	-0.035***
Business and Other	-0.198***	-0.0004***
Households' Income/Financial Capacity		
<$10000 (Ref Group)		
$10000 to <$25000	0.123***	0.186***
$25000 to <$45000	0.342***	0.234***
$45000 to <$70000	0.538***	0.338***
$70000 and above	0.118***	0.394***
Immigrant Characteristics		
Working Full Time (Ref Group)		
Working Part Time & Other	-0.0003*	-0.043
Immediate Family in Canada		
Yes (Ref Group)		
No	0.015*	-0.027***
Investment/Saving in Home Country		
Yes		
No	-0.030*	0.047
Investment/Saving in Host Country		
Yes		
No	0.024	0.128
Family Obligation		
Lives Alone (Ref Group)		
Spouse Live with Respondent	-0.026	0.045
Spouse+Child	-0.016**	-0.058**
Spouse+Child+other	-0.070	-0.152
Relationship With Ethnic Group		
Very Close (Ref Group)		
Close	-0.039	-0.017
Somewhat Close	-0.073	-0.044
Not Close at All	-0.078**	-0.170**

Notes: ***,** and * indicates the level of statistical significance at 1,5, and 10 percent level respectively.

CHAPTER 3

DOES HIGHER EDUCATION LEAD TO BETTER HEALTH? CANADIAN EVIDENCE

1.INTRODUCTION

Every year thousands of immigrants enter into Canada from different parts of the world. According to the Citizenship and Immigration Canada, 280,681 people (0.9% of the total population) arrived as permanent residents in Canada in 2001. As immigrants constitute a sizable proportion of the population in Canada, understanding the trends, patterns, and association of health and education among Canadian immigrants is important. Moreover, as the Canadian health care is publicly funded, knowledge of such links between health and education can help to improve the cost effectiveness of health care delivery as well as immigration policy.

In recent years, many issues related to health care provision have led to significant public policy debates in Canada. One of these debates has been focused on the importance of investigating the link between the health and education level of immigrants. If a direct causal relationship between education and health exists, then a transfer of resources to education may be an effective way of increasing the health status of the general population (Arendt, 2005). Any such intervention will not only make government policies more precise and effective, but will also improve the

welfare and wellbeing of the population. Hence, a step towards examining the link between health and education is warranted. Furthermore, it is also important to understand the extent of the causal relationship.

There are various channels through which education may affect health. First, education may help to increase the productive and allocative efficiency of individuals. In the former, education is treated as an input in the production of health and schooling raises the efficiency of the production of health. Allocative efficiency is related to the idea that those who are more educated are better informed about the true nature of the production process of health. Therefore, they choose a mix of inputs, such as not smoking and avoiding excessive drinking that improves their health outcomes. Second, education tends to reduce the cost of health care, lost earnings, and human suffering. Third, more schooling contributes to healthy lifestyle and positive choices, which ensure better health. More educated people do appear to be better informed and appear to make use of new health-related information. How information is used and the manner in which it is received matters. Finally, education influences individuals' choice about their place of work. More educated people are less likely to accept hazardous jobs.

Overall, the link between health and education is evident in many studies (Grossman, 2006, 2008; Cutler & Lleras-Muney, 2006). Most of the empirical evidence is based on native-born citizens. However, the link between education and health can be different among immigrants. Upon arrival into a new country,

immigrants are usually confronted with a very different culture, environment, and institutions than in their country of origin; some of these changes directly impact their health and the ways in which they receive health care. Education might influence health not just because of the specific knowledge one obtains in school, but also because education improves general skills, including those related to critical thinking and decision making. Empirical evidence about the health-education association among Canadian immigrants is not abundant in current literature. Most of the current evidence linking education with health is based on data from the United States, the United Kingdom, Germany, and Scandinavian countries. One of the important reasons for such a deficiency in the literature is the unavailability of a comprehensive micro-dataset on the socio-economic status of immigrants in Canada. Our study aims to address the gap in the existing literature using the Longitudinal Survey of Immigrants in Canada (LSIC). The LSIC dataset provides information about various socio-economic aspects of recent immigrants in Canada. The survey reports information about Canadian immigrants who landed during the period between October 2000 and September 2001. Moreover, the LSIC is a longitudinal survey, where the same immigrants were interviewed three times: six months, two years, and four years after their landing[17].

[17] One of the alternative sources of data related to the health issue is the Canadian Community Health Survey (CCHS). However, CCHS data is mainly cross-sectional. By pooling data from different years, we may conduct a pooled-cross section study. However, the LSIC dataset is longitudinal. Having the LSIC dataset allows us to compare the behavior of the same group of individuals over time, which is not possible using CCHS data.

The LSIC data facilitates an examination of the link between education and health among recent immigrants while controlling for important socio-economic variables, such as age, gender, marital status, ethnicity, and income. This paper uses all three waves of the LSIC to examine the relationship between the health and education of immigrants. We focus on three major objectives in conducting this research: i) examine the relationship between the health and education of immigrants; ii) ascertain whether this relationship is causal; and iii) investigate whether the health-education relationship varies across individuals' country of birth.

Using the *ordered probit* model and estimating marginal effects, this study observes that there is a positive association between education and health. More educated individuals are healthier than less educated individuals. However, the use of disaggregated data also reveals that the effects of education on immigrants' health do not vary in relation to individuals' country of birth. The study further extends to analyze the link between the change in health status over time and individuals' level of education. More educated individuals tend to improve the condition of their health over time. Examining the presence of this association between immigrants' health and their education might help policy-makers promote necessary policies to improve the health status of Canadians.

The rest of the paper is structured as follows: section 2 discusses the existing literature; section 3 introduces the data, describes the empirical model, and explains

the estimation strategy; section 4 analyzes the empirical findings; and section 5 concludes the paper.

2. LITERATURE REVIEW

There is considerable international evidence of how education is linked to health. A wide range of scholarly work is available in the literature that uses US data to show the impact of education on health (Gilleskie & Harrison, 1998). Many researchers (Grossman, 1972; Grossman & Joyce, 1987; Berger & Leigh, 1989; Behrman & Wolfe, 1989; Kenkel, 1991, *cited at* Gilleskie & Harrison, 1998) have suggested that education has a direct causal effect on health. Studies of other countries have found similar results, including Bangladesh (Hurt, Ronsmans, & Saha, 2004), Canada (Mustard, Derksen, Berthelot, Wolfson, & Ross, 1997),[18] China (Liang et al., 2000), Europe (Shkolnikov, Leon, Adamet, Andreev, & Deev, 1998), Israel (Manor, Eisenbach, Peritz, & Friedlander, 1999), and Korea (Khang, Lynch, & Kaplan, 2004).

The positive association between socio-economic status and health is largely attributed to the effect of education, income, or occupation on health, but not vice versa (Doornbos & Kromhout, 1990; Fox, Goldblatt, & Jones 1985). The healthy behaviour of educated people explains the high impact of education on health.

[18] This study is limited to age-specific socio-economic differentials in mortality and morbidity for a single Canadian province.

Educated people are less likely to smoke, drink, be overweight, or use illegal drugs (Cutler & Lleras-Muney, 2006).

A number of studies estimate the impact of education on health in terms of gains in life expectancy, mortality, and/or status of health. In the US, in 1960, one more year of schooling increased life expectancy by 1.7 years (Lleras-Muney, 2005). Moreover, in the first half of the 20th century, many states in the US increased the numbers of years children were required to attend school. As a result, the mortality rate declined substantially. Enforcing minimum schooling laws also contributes to the improvement of the health of the population (Oreopolous, 2003; Arendt, 2005; Spasojevic, 2003). Using US data from 1998, Molla, Madans, and Wagener (2004) confirm that higher education is associated with higher life expectancy for both males and females. Similarly, using Swedish data, Spasojevic (2003) also reports the positive impact of mandatory schooling on reducing the risks associated with bad health.

Knowledge of existing health conditions, which may itself be related to education, could influence the relationship between health and education. Higher education may affect the health-related behaviour of individuals, such as smoking or obesity (Culter & Lleras-Muney, 2006). In the US, women who enroll in college and stay for a minimum of two years are 5.8 percentages less likely to smoke during pregnancy (Currie & Moretti, 2003). People with higher levels of education may be

better informed about the negative consequences of smoking and overeating (Kenkel, 1991; Nayga, 2000). Higher education has been shown to substantially reduce the rates of smoking and obesity in Germany (Mokdad, Marks, Stroup, & Gerberding, 2004).

Cowell (2006) reports strong evidence of high school education or greater as being a deterrent to smoking and excessive drinking. The estimated effects are large and statistically significant. Average predicted probability of smoking is reduced by 3.1 percentage points for people who have a high school degree. Analogously, levels of education also affect the frequency of binge drinking. One plausible explanation for the influence of level of education on healthy behaviour is that they reflect the future opportunity costs. Years of schooling may also influence the probability of smoking and drinking. Cowell (2006) also reports that an additional year of schooling reduces the probability of smoking by 4 percentage points and the probability of binge drinking by 0.8 percentage points.

Using economic conditions, social-psychological resources, and healthy lifestyle, Ross and Wu (1995) observe a positive association between education and health among US households. Well-educated people have a greater sense of control over their lives and health, which helps them remain healthy. The study observes that well-educated people are less likely to smoke and drink and more likely to exercise, which helps them remain healthy. Highly educated people are less likely to remain unemployed, which in turn helps them maintain better health (Linn, Sandifer, &

Stein, 1985). Schoeni, Martin, Andreski, and Freedman (2005) find that disability rates in the US have decreased more strongly within educated populations.

The link between health and education may differ along other dimensions. The relationship may vary across different age groups. For people of older ages, education has less of an impact on their health. The effect of education on health starts to decline sometime between the age 50 and 60 (Cutler & Lleray-Muney, 2006). A less substantial impact of education on health for older population is also documented by Elo and Preston (1996). Cohort effect also influences the education gradient: the impact of education on health is more prominent among younger cohorts. On the contrary, for older people the educational impact of health may matter less after retirement (Cutler & Lleras-Muney, 2006).

One of the major challenges of education-health studies is to isolate the impact of income on health. Education may affect income and health may determine income, therefore, it is difficult to disentangle the effect of income on health. Sometimes, it can be claimed that education and income are complementary in the production of health. This hypothesis is most likely to be valid when the focus of the education allows people to learn about a particular treatment and their income allows them to purchase the treatment. Moreover, more years of education/schooling tend to ensure healthier behaviour. A healthy lifestyle and positive choices can be ensured through education (Feinstein, Sabates, Anderson, Sorhaindo, & Hammond, 2006; Cutler & Lleras-Muney, 2010; de Walque, 2007).

Despite some of the effects of income that are channelled from education, the entire income effect cannot be subsumed under the heading of education. A large component of the income effect is independent of education. The effect of education on health is at least as great as the effect of income (Feinstein et al., 2006). In most cases, channels through which education may influence other factors are neither competing nor complementary.

Analogous to the independent influence of education on health, gender and ethnicity may influence the way individuals behave, the choices they make, and their health status. Some studies find indistinguishable effects for men and women in terms of the impact of education on health, while others support a greater positive effect of education on health for women. However, it is unknown whether this variation is due to biological or behavioural factors. The education gradient varies across race. However, the literature is not clear about the reasons for the distinguishable effects of education on health across race. One possible reason could be that the quality of education is lower for blacks compared to whites. This argument is consistent with a lower return of education for blacks. However, there is no evidence that explains why the gradient varies across other races.

Is the outcome for education on health the same across individuals from different countries? Specific social or historical contexts may moderate both individuals' behaviour and the effects of education on their health. Immigrants are a heterogeneous group differing by place of birth and other socio-economic factors.

Incorporating country specific factors would help policy-makers better understand the effects of education on health across individuals from different countries. Feinstein et al. (2006) suggest that a longitudinal dataset for a greater range of countries and modeling and testing between country differences would enable greater assessment of the relative importance of national level and individual level processes in the formation of health outcomes. Further, such assessments would ensure a testing of the importance of specific features of national level educational provision in terms of their effects on health. Using the US National Health and Nutrition Examination Surveys (NIHNES), Seo and Senauer (2009) observe that more educated immigrants are healthier. The study also indicates that education has a greater beneficial impact on US citizens who are Mexican-born compared to US citizens born elsewhere.

Unobserved factors, such as family background, genetic traits, or other individual differences (such as the ability to delay the gratification), could also explain why more educated people are healthier. For example, richer parents are more likely to invest more in their children's health and education. Smarter individuals are more likely to obtain more schooling and also take better care of themselves (Cutler & Lleras-Muney, 2006).

Despite a voluminous work in this area, the relationship between education and health is still not conclusive. Many of these conflicting outcomes can be attributed to data limitations, use of poor instruments, and narrow samples. Moreover, few studies apply datasets from outside of the US to allow for individual specific

heterogeneity over time. To the best of our knowledge, none of the existing studies have examined the causal link between health and education in the context of Canadian immigrants. Further, none of the studies examine whether the education-health nexus depends on individuals' country of birth. Presuming health and education are two important attributes of human capital, this study uses the LSIC dataset to investigate whether there is any association between health and education among recent immigrants.

3. DATA AND METHODOLOGY

3.1 Data and The Model

Our empirical model is designed to identify the relationship between health and education. The dataset includes Self-Reported Health (SRH), graded as poor/fair, good, very good, and excellent, which will be our main health outcome and will be treated as the dependent variable. The choice of the vector of regressors includes variables intended to capture the key influences suggested by the literature on the determinants of individuals' health. Grossman (1972) argues that health can be viewed as a durable capital stock that produces an output of healthy time. Individuals' health may change due to their demographic characteristics and their level of investment for the production of health. Following the same line of argument, this study examines the relationship between education and health among newly arrived immigrants in Canada.

Self-reported health and education are the key variables in this analysis[19]. Self-reported health is correlated with morbidity, mortality, and the use of health services (Hoeymans, Feskens, Kromhout, & Bos GA, 1997; Miilunpalo, Vouri, Oja, Pasanen, & Urponen, 1997; McDonald & Kennedy, 2004; Kaplan & Comacho, 1983). To capture the gender impact on health, we create a dummy variable for gender. Several researchers (Idler, 1993; Seo & Senauer, 2011; Bjorner et al.,1996) examine the link between age and self-reported health. The outcomes based on the previous research on the relationship between age and health is not consistent. Based on a review, Bjorner et al. (1996) showed that roughly one third of the studies claim older people evaluated their health negatively, one third assessed it positively, and one-third showed no relationship. The variation in outcome could be attributed to the variation in samples. Following existing literature, this study includes age as an explanatory variable for individuals' health. In the LSIC survey, there are very few individuals those who are more than 70 years old; therefore, this study excludes anyone older than 70 years.

Immigrants are coming into Canada from different regions of the world. The causes of health disparities may emerge from differences in culture, diet, access to health care, environmental exposures, social marginalization, and other factors (Collins, 2004). Such variation can be partially captured by including regional

[19] The health variable (in the LSIC survey) that is used in this research is the perception of self-rated health. This variable takes both physical and mental health into account.

dummies in the health equation. This study includes six different regions of the world: Europe, Latin America, Caribbean, Africa, Middle East, and Asian countries and tries to examine health disparities across regions.

Among various socio-economic indicators, income improves health substantially and continues to do so past the point where basic materials needs are satisfied (Backlund, Sorlie, & Johnson, 1996; Kitagawa & Hauser, 1973). Several other studies also support the positive influence of income on health (Doornbos & Kromhout, 1990; Seo & Senauer, 2011). To examine the link between health and income, this study includes five different levels of income as a predictor of immigrants' health.

It is important to learn whether the education gradient on health is the same across different levels of education. Moreover, it is important to determine whether higher education demonstrates a greater benefit as compared to elementary education. Grossman (1972) interprets the education effect on health as an efficiency effect, whereby more educated people tend to be more efficient producers of health. Kenkel (1991, 1995) argues that by using higher levels of knowledge, more educated people are expected to choose better allocations of health inputs. Most of the current studies are based on estimating the effects of the number of years of schooling on health; however, such estimations produce simple linear outcomes of education and fail to distinguish between the relative benefits of education participation at different stages. As such, this study includes education at different stages. It excludes individuals

under 25 years of age. The reason for focusing on people aged 25 and above is that this section of the population is more likely to have completed their education (Seo & Senauer, 2011).

The health variable in our regression model is categorical health. Our general form of the linear regression model is:

$$H_{it}^{*} = X_{1it}\beta + \alpha E_{it} + \varepsilon_{it}$$

Where, H_{it}^{*} is the latent health variable for individual i at t period, H_{it} is the self-reported health category, which is changing value when H^{*} crosses the unknown threshold d_j, E_{it} is the level of education, X_{1i} is the exogenous regressors in the health equation, and ε_{it} is the error term, which is expected to be random.

To estimate the link between education and health, this study employs the general specification of Grossman (1972) and an extension of the model and empirical work discussed by Grossman (2000). This study models health with an ordered discrete response, where, the general form of the model can be depicted as:

$$H_{it} = \alpha + \beta_D D_{it} + \beta_E E_{it} + \varepsilon \quad \ldots \quad (1)$$

Where, H_{it} = individual i's health status at t period;

D_{it} = vector of demographic (socio-economic) variables for ith individual at t period;

E_{it} = individual's level of education at t period, and;

ε_{it} = error term.

For D_{it}, the study includes a number of socio-economic factors, including gender, age, income, marital status, and region.

3.2 Estimation Strategy

Using the LSIC dataset, this study uses the *ordered probit* model to estimate the health equation (1). Health status of immigrants is the dependent variable. Level of education at landing is the key independent variable. This study creates three dummies for education: less than high school (LTH), high school (HS), and more than high school (MTHS). The other independent variables are gender (male=1 and female=0), age (in years), annual household income (coded),[20] marital status (married=1 and single, divorced, and separated=0), and region where immigrants lived prior coming to Canada (Europe, Latin America, Caribbean, Middle East, Africa, Asia).

The estimated relationship between health and education using equation (1) may not necessarily reflect a causal link due to the endogeneity of the regressors. The presence of reverse causality between education and health at the same time period may indicate the presence of endogeneity. The standard econometric procedure to deal with the endogeneity is to use the instrumental variable (IV) approach. As such

[20] Codes are as follows: Income 1: $0– $9,999; Income2: $10,000–$24,999; Income3: $25,000–$44,999; Income4: $45,000–$69,999; Income5: $70,000 and over.

one must find variables that are correlated with education, but not with health (Grossman, 2008). Researchers have used different variables as an instrument for education.

To avoid the issue of endogeneity, Berger and Leigh (1989) use per capita income and per capita expenditures on education in the state of birth as instruments for education. Lleras-Muney (2004) uses the change in compulsory school attendance and child labour laws in 30 US states from 1915 to 1939 to identify the education effects on mortality. Chou, Liu, Grossman, and Joyce (2007) use parental education as an instrument for child health in Taiwan. The outcomes based on the above mentioned IV estimates suggest strong causal relationship between an individual's level of education and health. Unfortunately, the LSIC dataset does not provide us sufficient information to use one of its variables as instruments for education. However, to avoid the problem of endogeneity, we modify the dependent variable in equation (1). Instead of using the health status of immigrants, we use the *change in health status* variable (Ross & Wu, 1995) and estimate the following model:

$$(H_{it} - H_{it-1}) = \beta_0 + \beta_D D_{it} + \beta_E E_{it-1} + u_{it} \qquad (2)$$

Where, $(H_{it} - H_{it-1})$ = Change in individual's health status at t period;

E_{it-1} = individual's level of education at landing, and;

u_{it} = error term.

For D_{it}, the study includes many of the socio-economic factors similar to equation (1).

Change in health status in equation (2) is generated by observing the change of health of immigrants from LSIC web1 to LSIC web3[21]. As a result, the time periods for the dependent and independent variables are different. Such time differences help to avoid the issue of endogeneity while determining the association between education and health. Additionally, we modify our econometric specification by including the change in employment status (coded as unemployed/not in labour force to employed, remains in same status, and employed to unemployed/not in labour force)[22].

The health variable in this study is self-reported health on a scale of poor/fair, good, very good, and excellent. Despite the subjective nature of self-reported health, numerous studies document that it as a good measure of health (Davies & Ware, 1981; Mossey & Shapiro, 1982; Idler & Kasl, 1991). Moreover, it is a summary measure of individuals' health that captures various dimensions of health that are difficult to capture using an objective measure of health (Case & Deaton, 2002). Auld and Sidhu (2005) use various measures of health and report nearly identical results of education on health. Currie and Madrian (1999) observe a high correlation between objective and subjective measures of health. However, measurement error could be an

[21] Web 1 means LSIC survey 1 which is based on the interview of immigrants after six months of their arrival whereas web 3 means LSIC survey 3 which provides information about same group of immigrants after four years of their arrival.

[22] This study also includes language instruction and attendance in school since in Canada, but no significant impact on change in health is observed. Such an insignificant relationship could be attributed to the very small samples of immigrants attending school or taking language courses.

important issue as the errors are not randomly distributed across samples (Butler, Burkhauser, Mitchell, & Pincus, 1987). To avoid such a problem, we dichotomize the health variable into a binary variable, which assumes a value of 1 if an individual reports excellent or very good health and 0 otherwise. Instead of the *ordered probit* model of equation 1 and 2, we use a simple (binary choice) *probit* model and test whether the health-education relationship changes due to the change in the category of the health variable. Such estimation is expected to strengthen the validity of the hypothesis of this study.

To examine whether the health-education link varies across the individual's country of birth, the study estimates the health equation (1) including country-specific dummies for different groups, i.e. Chinese, Indian, and Filipino. This is to see how education and country of birth interact with the measure of health. The regression includes interaction terms between education and the country of birth. Statistically significant interaction terms would indicate different outcomes from education on health based on the individuals' country of birth.

4. RESULTS AND ANALYSIS

4.1 Descriptive Analysis

Table 1 presents the descriptive statistics of education across four categories of health (excellent, very good, good, poor and fair). Years of formal education at the time of landing correlates positively with the health status of immigrants. The average years of schooling is lowest for immigrants with poor or fair health. As years of schooling increases, respondents with better health are increasing. Finally, respondents with excellent health have the highest level of education.

----------Table 1 here----------

4.2 Estimated Outcomes

To examine the possible link between education and health status, this paper employs the panel dataset available from the LSIC survey. Table 2 reports the estimation outcomes based on the *ordered probit* model. We include a very basic set of controls: a set of education dummies, gender, marital status, region, and income. The sign of the ordered probit coefficients reflects the relationship between regressors and regressand. However, it should be noted that the coefficients of the probit estimation do not have any meaningful interpretation. Hence, we estimate the marginal effects,

which are reported in table 3[23]. The sign of the *ordered probit* estimation reflects the positive relationship between education and health.

----------Table 3 here----------

The highlighted parts of table 3 indicate that level of education has a significant impact on the health status of immigrants. Based on the outcome of marginal effects, it can be predicted that the probability of being in poor health declines with increased levels of education. Assuming individuals with less than high school as a reference group, the probability of being in excellent health increases by 9% for individuals who have more than high school education. Analogously, the likelihood of being in very good health increases by 5% for individuals who have more than high school education compared to those with less than high school. Generally speaking, individuals with higher education are less likely to live with poor health compared to individuals with lower levels of education.

The estimated outcomes of education on health also differ along other dimensions. These effects vary significantly with the individuals' age. The marginal effect estimates reflect that as age increases the probability of being in poor health increases. By contrast, the marginal effects of age for the excellent and very good

[23] This study reports the results of both probit regression and subsequent marginal effects estimation for readers' convenience.

health category are negative. As age increases, immigrants' probability of being in excellent/very good health declines. This relationship is found to be true after controlling for the individuals' level of education.

There are important differences in immigrants' health status based on gender and region but not on marital status. Results suggest that men are in an advantageous position in terms of health. The probability of being in poor health is lower for men than women. In addition, men have a higher probability of being in excellent health than women. There is no discernible difference between the health status of different groups of immigrants based on their marital status. Additionally, survey participants who are European, Latin American, and Caribbean people are found to have a higher probability of being in excellent health compared to individuals from the three other regions. To a certain extent, this could be explained by the cultural diversity and childhood upbringing of those participants. There is, however, no direct evidence on this.

Health status varies across income groups. Survey participants with higher incomes have a better chance of being in excellent health than their low-income counterparts. After controlling for education, health status improves monotonically

with the increase in income for all categories but the highest income group. However, the marginal effect for the highest income group remains insignificant[24].

The perception of health status might vary among individuals. That is one of the most important problems for using a subjective measure of health. The measurement error may not be randomly distributed across the sample. To avoid such difficulties, we generate a 'binary health' variable, which assumes a value of 1 if an individual reports excellent or very good health status and 0 otherwise. The results based on the relationship between the binary health variable and education are reported in table 5[25].

----------Table 5 here----------

Using the 'binary health' variable confirms the presence of a positive relationship between health and education. Having a high school education or greater reduces the probability of being in poor or fair health. In other words, this reinforces our previous results that higher education levels increase the probability of being in good, very good, or excellent health. For example, assuming individuals with less than high school as a reference group, the probability of being in excellent or very

[24] To examine the presence of multicollinearity between the income and education variables, this study follows stepwise regression where we drop the income variable from the regression equation and observe whether the coefficient for education changes or not and vice-versa. However, such dropping of the income variable does not significantly change the coefficient for education variable and vice-versa. As such, we may argue that there is no strong multicollinearity between the education and income of respondents.

[25] This study also creates a binary variable for individuals reporting excellent, very good, or good, as 1, otherwise 0, and finds similar outcomes, where more education leads to better health.

good health increases by 14% for individuals who have more than high school education. Analogously, individuals who have high school education are 8% more likely to have better health than individuals who have less than high school education.

The estimated relationship between education and health may not be causal. There may be an issue of simultaneity between health and education. It may be difficult to observe whether increased education levels cause better health or vice versa. To avoid such an issue, this study intends to lay out a mechanism that estimates the relationship between 'education' and 'change in health status over time'. By doing so, the study creates a difference in the time period between dependent and independent variables. Such a technique would help to avoid the issue of simultaneity.

Table 6 reports the transition dynamics of individual health across different waves of surveys. It provides a clear picture of how the health status of immigrants has changed over time. The numbers on the diagonal represent individuals whose health status did not change across time. By contrast, the numbers on the off-diagonal report the change in the health status of immigrants since their arrival in the year 2000.

---------Table 6 here----------

What happened to individuals' health over time? The following table demonstrates the dynamics of individuals' health, i.e., whether individuals' health status improved, deteriorated, or remained constant over time.

----------Table 7 here----------

Table 7 clearly demonstrates that from survey 1 to survey 3, the health status of 30 percent of immigrants deteriorated, while it remained the same for 61 percent. At the same time, the health status improved for 9 percent of immigrants. Is there any relationship between the change in health status of immigrants and their level of education? The following table illustrates the relationship between change in health status and level of education.

----------Table 9 here----------

The change in individuals' health has a positive relationship with their level of education. The results of subsequent marginal effects estimation is reported below:

In the above model, the change in health status over time is a function of education and a set of socio-economic variables. We also incorporate health at time period 1 as an explanatory variable. By doing so, we confirm the causal order issue of whether education and other control variables affect health or health simply shapes educational attainment and other socio-economic variables (Ross & Wu, 1995). The results clearly demonstrate that as the education level increases, the probability of

health deteriorating declines. The probability of declining health reduces by 10 percent for people with a high school education or greater compared with those with less than a high school education. By contrast, the probability of health improving over time increases by 3 percent for people with a high school or more education. Further, the probability of remaining at a consistent health status is greater for higher educated people compared to those with less than a high school education[26].

There may be various reasons behind this positive causal relationship between education and health among recently arrived immigrants in Canada. Higher educated immigrants may be better informed about the health consequences of smoking, drinking, and overeating. It may be because they either learned about those consequences in school or because they find it easier to obtain and evaluate such information than less educated people do (Kenkel, 1991; Nayga, 2000; de Walque, 2007).

Higher educated immigrants may gather health-related information more easily and get access to health care upon their arrival. It is also plausible that higher educated people avoid more hazardous jobs and ensure healthy lifestyles. Health literacy is also an important factor for better health. Upon their arrival, immigrants are confronted with how to obtain, understand, and use health-related information (Rootman, Frankish, & Kaszap, 2007; Rootman & El-Bihbety, 2008). Health literacy

[26] The coefficients for change in employment status on immigrant's health are insignificant.

is a function of education. The greater a person's ability to learn about health, the better that person's health is. Based on a survey on 23,000 Canadians, the International Adult Literacy and Skills Survey (IALSS) reports that 60% of Canadian adults lack the capacity to obtain, understand, and act upon health-related information and services and make appropriate health decisions (Canadian Council on Learning, 2007).[27] This ratio is expected to be higher among recently arrived immigrants. The impact of education on health is also observed among Canadian-born individuals. Among Canadians, less educated people are 1.5 to 3 times more likely to experience negative health outcomes (Rootman et al., 2007).

Generally, immigrants arrive in Canada with variable degrees of knowledge of health issues and health care experiences. Initial settlement experiences produce new health-related challenges as well as new opportunities for knowledge exchange about health in the context of family life, schools, neighbourhoods, and workplaces. Ensuring further education/training opportunities may ease some of the initial challenges related to integration and increase access to health-related information for recently arrived immigrants.

Low levels of education may cause more problems for managing chronic disease. The management of chronic disease depends on patients' ability to understand written medical information, follow instructions, ask questions about

[27] The survey mainly assessed individuals' health literacy skills in the areas of health promotion, health protection, disease prevention, health care maintenance, and system navigation.

treatment and communicate about ongoing health concerns. Low levels of education may negatively influence patients' ability to understand the level of risk, treatment options, and how to access health care (Simich, 2009). For example, when chronic disease such as asthma requires more intensive interventions, the lack of education can put individuals at greater risk due to their inability to understand relevant information (Poureslami et al., 2007; Canadian Public Health Association, 2006). Also, minority and ethnocultural groups may not be aware of health promoting behaviour and may face more barriers to accessing preventive health care. Moreover, low levels of education may hinder immigrants' access to information about health care and capacity to communicate with health care providers. As such, the level of education may influence immigrants' health.

Education influences many other social factors that contribute to health disparities. Dunn and Dyck (2000) report that social determinants of health, such as education, poverty, and social networks, are more critical for minority, immigrant, and refugee populations. Many studies have found that recent immigrants have less knowledge of preventive and primary health care services and information. Quan et al. (2006) report that visible minorities visit physicians and access cancer screening less frequently than white people. The study further suggests that access to health information is crucial for immigrant communities.

Does the link between education and health vary across immigrants from different countries? In essence, the beneficial impact of education on health may vary

across countries depending on the nature and quality of learning provision and number of hours spent learning. We estimate the interaction term of Chinese, Indian, and Filipino people. The *ordered probit* model has been estimated for all of the groups. It reveals that the education variables have a positive relation with overall health status. However, the interaction term for education with the Chinese, Indian, and Filipino subsamples is statistically insignificant.

Finally, this study examined a large number of controls as determinants of health for recently arrived immigrants. However, the study could not establish any association between area of residence, language proficiency, employment, work place, or peer effects as important factors in determining health status of immigrants[28].

5. CONCLUSIONS

Using LSIC data, this study examines if there is any association between education and health among recently arrived immigrants in Canada. The impact of education on health is found to be substantial and substantive. Based on self-reported measures of health and education, results suggest that immigrants with higher education are more likely to have better health than other immigrants. We also

[28] This study initially includes area of residence, language proficiency, employment, and work place as a control variable to determine health status of immigrants. However, none of these variables (associated parameters) are statistically significant. Moreover, the inclusion of these variables does not affect the coefficient estimates of the rest of the included variables in the regression model, therefore, we dropped them from the estimated equation.

investigate whether the level of education can influence future health of immigrants. After a few years of arrival, immigrants' health status changes significantly. Improvement of immigrants' health is highly associated with higher levels of education. Immigrants with tertiary education tend to report improvement of health over time, while deterioration of health is mostly associated with individuals with less than a high school education.

As the health measure is subjective, the validity of the result may be under scrutiny. To overcome this limitation, this study re-categorized the health variable as a binary variable and still found a strong positive association between education and health. Further, we could not find any significant variation in the beneficial effect of education on health among different groups of immigrants, including Chinese, Indian and Filipino individuals. Immigrants from one particular country do not have any incremental effect of education on health compared to that of other foreign born residents.

The purpose of this study is to increase our understanding of determinants of health in Canada among recently arrived immigrants. The level of education of these immigrants may hinder their ability to obtain better health. Immigrants with less than a high school education perceive themselves as being in poor or fair health more often than those with higher levels of education. This relationship holds even after controlling for gender, age, region, and income. Understanding immigrants' health requires considerably more attention from policy-makers than it has hitherto received.

Based on the possible causal relationship between education and health, education policies can be thought of as health policies to a certain extent. Policy-makers may re-emphasize the importance of education policies to improve health status of immigrants. Moreover, the effect of education on health is stronger for immigrants than for non-immigrants (McDonald & Kennedy, 2004).

Upon arrival in a new country immigrants may face difficulties learning and gathering information regarding access to health care. Health literacy has a strong positive relationship with level of education. Immigrants' health care can be improved by ensuring the health literacy of immigrants. Access to information regarding health care for immigrants should be policy-and community-driven. Community-based health care development and delivery could be a possible way to ensure better health for immigrants.

This study contributes to the literature in several ways. This is one of the few studies that examine the nature of the relationship between education and health of immigrants in Canada. The study accounts for a number of possible problems that might render estimates inconsistent. Due to the lack of data, many of the existing studies could not take care of the issue of endogeneity, which may create biased estimates. Using longitudinal data, this study creates a new health variable based on the dynamics of health (i.e., change of health status over time) among immigrants. Upon examining the dynamic health variable and its relationship with the level of education of immigrants at landing, this study reports that improved health conditions

of immigrants are associated with higher education. Immigrants with higher levels of education are highly likely to claim better health over time compared to immigrants with lower levels of education. The study argues that policy makers can ensure better outcomes in health care in Canada by ensuring access to higher levels of education and training and by promoting health literacy programs.

Lack of education and health literacy could be treated as an important explanation of the gradual deterioration of immigrants' health that is correlated with increased duration of residence in Canada (Pottie et al., 2008). Relatively little research has been undertaken in the area of immigrants' education, training, and health literacy. Further research may shed light on how education, training, and health literacy can improve the health status of immigrants. These could be challenging issues as they entail the need to accommodate different cultural views of the world, science, and health (e.g., differing interpretations of risk). On the other hand, attaining the goals related to improved health of the immigrant population involves understanding "different realities" among service providers and immigrants (Zanchetta and Poureslami, 2006)

This study can be extended to compare whether there is any difference in the education gradient for native-born and foreign-born Canadians. Information regarding a comparable group of native-born people could be obtained from the Survey of Labour Income Dynamics (SLID). This could be tested alongside that pertaining to a similar group of immigrants, to investigate whether the magnitude of the relationship

between education and health varies between these two groups. Moreover, two separate health equations could be estimated for foreign-born and Canadian-born individuals.

While the evidence from this study is intriguing, it cannot be all of the explanation. It is intended to highlight the essential mechanisms that have been identified and tested in quantitative data. It would be useful for future cross-national longitudinal data collection to incorporate more measures of health, personal development, and well-being, along with measures of learners' self-concepts, personal circumstances, wider contexts, skills and attributes, and personal resilience in order to test the mechanisms through which education affects health.

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APPENDIX

Table 1: Descriptive Statistics of Health and Education

Health Status	**Education**
Fair/Poor Health	
Population Size	10,565
Mean	13.73
Std. Error	0.18
Good Health	
Population Size	41,211
Mean	14.92
Std. Error	0.08
Very Good Health	
Population Size	46,718
Mean	15.56
Std. Error	0.07
Excellent Health	
Population Size	27,942
Mean	15.76
Std. Error	0.09

Table 2: Health equations: ordered self-rated overall health status

Variables	***Estimate***	***P>|t|***
Male	0.2634	0.000
Married	-0.0078	0.875
Age	-0.0216	0.000
European	0.3175	0.000
Latin	0.4116	0.000
Carribean	0.3808	0.000
Middle Eastern	0.1810	0.034
African	0.2599	0.000
HS	0.2062	0.011
MTHS	0.3571	0.000
Income 2	0.1315	0.001
Income 3	0.1636	0.002
Income 4	0.2099	0.020
Income 5	0.0262	0.478

Table 3: Marginal effects for overall health status in relation to education (web 3)*		
Variables	***Estimate***	***Pr > |Z|***
Fair/Poor(=1)		
Gender		
Male	-0.0372	0.000
Marital Status		
Married	0.0011	0.874
Immigrant's age		
Age	0.0030	0.000
Region from where Immigrated		
European	-0.0384	0.000
Latin	-0.0410	0.000
Carribean	-0.4102	0.000
Middle Eastern	-0.0224	0.016
African	-0.0313	0.000
Level of Education		
HS	-0.0261	0.000
MTHS	-0.0585	0.000
Level of Income		
Income 2	-0.0176	0.001
Income 3	-0.0208	0.001
Income 4	-0.0255	0.007
Income 5	-0.0036	0.475
Good (=2)		
Male	-0.0649	0.000
Married	0.0019	0.875
Age	0.0053	0.000
European	-0.8099	0.000
Latin	-0.1059	0.000
Carribean	-0.0980	0.000
Middle Eastern	-0.0461	0.037
African	-0.0665	0.000
HS	-0.0523	0.012
MTHS	-0.0822	0.000
Income 2	-0.0330	0.001
Income 3	-0.0415	0.003
Income 4	-0.0537	0.023
Income 5	-0.0065	0.479

Very Good (=3)		
Male	0.0268	0.000
Married	-0.0007	0.873
Age	-0.0022	0.000
European	0.0212	0.000
Latin	0.0144	0.000
Carribean	0.0152	0.000
Middle Eastern	0.0133	0.001
African	0.0172	0.000
HS	0.0162	0.000
MTHS	0.0475	0.000
Income 2	0.0119	0.000
Income 3	0.0130	0.000
Income 4	0.0144	0.000
Income 5	0.0026	0.000
Excellent (=4)		
Male	0.0752	0.000
Married	-0.0022	0.875
Age	-0.0062	0.000
European	0.0982	0.000
Latin	0.1349	0.000
Carribean	0.1238	0.000
Middle Eastern	0.0553	0.045
African	0.0805	0.000
HS	0.0623	0.015
MTHS	0.0932	0.000
Income 2	0.0387	0.001
Income 3	0.0494	0.004
Income 4	0.0647	0.030
Income 5	0.0075	0.480

*Reference group: female, single and other, Asian, Less than high school, income less than $10,000.

Table 4: Health equations: ordered self-rated overall health status (Web 3, Binary Health)

Variables	***Estimate***	***P>|t|***
Male	0.2390	0.000
Married	-0.0173	0.766
Age	-0.0239	0.000
European	0.2276	0.000
Latin	0.3962	0.000
Carribean	0.3412	0.000
Middle Eastern	0.1151	0.243
African	0.1045	0.086
HS	0.2071	0.030
MTHS	0.3625	0.000
Income 2	0.0697	0.143
Income 3	0.1477	0.028
Income 4	0.3503	0.002
Income 5	0.0643	0.150

Table 5: Marginal effects for overall health status in relation to education (Binary Health)

Variables	***dy/dx***	***P>|z|***
Male	0.0927	0.000
Married	-0.0067	0.766
Age	-0.0092	0.000
European	0.0866	0.000
Latin	0.1443	0.000
Carribean	0.1256	0.001
Middle Eastern	0.0441	0.235
African	0.0401	0.082
HS	0.0789	0.026
MTHS	0.1428	0.000
Income 2	0.0270	0.141
Income 3	0.0564	0.025
Income 4	0.1288	0.001
Income 5	0.0249	0.149

Table 6: Transitional Matrix of Health Status (using 4 categories of health)

(Population size = 127673)

	Health Status (t+2)			
Health Status(t)	Fair or Poor	Good	Very Good	Excellent
Fair/Poor	0.44	0.35	0.15	0.06
Good	0.16	0.46	0.28	0.10
Very Good	0.08	0.35	0.41	0.16
Excellent	0.05	0.24	0.37	0.34

Table 7: Health Dynamics (Change in Health Status from t to t+2 period)

Health Status (t+2)	Proportion
Deteriorated	30.3
Same	60.5
Improved	9.2

Table 8: Change of Health Status: Ordered Probit

Variables	***Estimate***	***P>|t|***
Male	0.180	0.000
Married	-0.135	0.000
Age	-0.0185	0.000
Europe	0.2821	0.000
Latin	0.3962	0.000
Carribean	0.3548	0.000
Middle East	0.109	0.258
African	0.2673	0.241
ES better	-0.006	0.921
ES nchage	0.021	0.731
HS	0.091	0.426
MTHS	0.0214	0.000
Income 2	-0.032	0.653
Income 3	0.258	0.000
Income 4	0.125	0.050
Income 5	0.183	0.000
H1	-0.9020	0.000

Table 9: Marginal Effects based on change of health status

Variables	*dy/dx*	*P>|z|*
Deteriorated (=1)		
Male	-0.0712	0.000
Married	0.054	0.000
Age	0.0073	0.000
Europe	-0.1090	0.000
Latin	-0.1029	0.000
Carribean	-0.1340	0.000
Middle East	-0.0505	0.253
African	-0.1029	0.000
ES better	0.0024	0.927
ES nchage	-0.008	0.731
HS	-0.0035	0.301
MTHS	-0.0692	0.040
Income 2	0.0124	0.650
Income 3	-0.097	0.000
Income 4	-0.050	0.05
Income 5	-0.072	0.000
H1	0.355	0.000
Remained Same(=2)		
Male	0.0405	0.000
Married	-0.028	0.000
Age	-0.0041	0.000
European	0.0550	0.000
Latin	0.0639	0.008
Carriben	0.0598	0.000
Middle East	0.0267	0.130
African	0.0507	0.000
ES better	-0.0014	0.843
ES worse	0.004	0.658
HS	0.0198	0.410
MTHS	0.0510	0.040
Income 2	-0.087	0.654
Income 3	0.051	0.000
Income 4	0.027	0.041
Income 5	0.039	0.002
H1	-0.2024	0.000

Improved(=3)		
Male	0.0307	0.000
Married	-0.024	0.011
Age	-0.0031	0.000
European	0.0540	0.000
Latin	0.0846	0.000
Carribean	0.0742	0.002
Middle East	0.019	0.281
African	0.047	0.000
ES better	0.001	0.927
ES nchage	0.003	0.853
HS	0.016	0.440
MTHS	0.033	0.028
Income 2	-0.005	0.645
Income 3	0.046	0.000
Income 4	0.023	0.071
Income 5	0.032	0.006
H1	-0.153	0.000

Table 10: Descriptive Statistics

Variables	N (%)	Mean
Dependent Variables		
Overall Health		
Fair and Poor=1	10%	
Good=2	32%	
Very Good=3	36%	
Excellent = 4	22%	
Independent Variables		
Education		
LTHS	5%	
HS	20%	
MTHS	75%	
Gender		
Male	49%	
Female	51%	
Marital Status		
Married	14%	
Single/Divorced /Widowed	86%	
Age (in years)		37.20
Region		
European	22%	
Latin	4%	
Caribbean	3%	
African	10%	
Middle Eastern	4%	
Asian	57%	
Households' Annual Income (coded)		
<$10000	7%	
$10000-<$25000	13%	
$25000-<$45000	21%	
$45000-<$70000	24%	
$70000 and above	36%	

CHAPTER 4

DOES FINANCIAL DEVELOPMENT INFLUENCE THE REMITTANCE-GROWTH NEXUS? EVIDENCE FROM DYNAMIC PANEL ESTIMATION

1.INTRODUCTION

One of the major changes observed since the last quarter of the 20th century has been the accelerated growth in remittance flows to developing countries. Remittance flows constitute the second largest source of external finance after foreign direct investment (Glytsos, 2005). Globally, total workers' remittances went up from US$1.5 billion in 1975 to US$400 billion in 2012 (World Bank, 2013). This increase in remittances has motivated researchers to explore the potential significance of remittance flows as a tool for economic development (Chami, Fullenkamp, & Jahjah, 2003; Ratha, 2005).

Despite an abundance of work in the area of exploring the relationship between remittances and other macroeconomic variables (such as consumption, investment, and economic growth), the results are inconclusive. One set of studies found that remittances have a positive impact on economic growth in developing countries (Das & Chowdhury, 2011; Pradhan, Upadhaya, & Upadhaya, 2008; Loxley & Sackey, 2008; Ziesemer, 2006). As opposed to this optimistic view of the remittance-growth nexus, another set of studies argue that the growth effect of

remittances is either negative or, at best, zero (Barajas, Chami, Connel, Gapen, & Montiel, 2009; Rajan & Subramanian, 2005; Chami et al., 2003). Such conflicting outcomes is puzzling. It should be noted, however, that many studies limited the remittance-growth link within a very restricted neoclassical framework (Glytsos, 2005).

The financial sector of a country could play a significant role in explaining that country's capacity to take advantage of remittances to influence economic growth. Massey, Alarcon, Durand, and Gonzalez (1987) argue that 68 to 86 percent of Mexican migrants' remittances are used for consumption. However, migrants may spend part of the remittances for investment purposes. Using data from 13 Caribbean countries, Mishra (2005) argues that private investment rises by 0.6 percentage points of GDP in response to a 1 percentage points GDP increase in remittances inflows.

Workers' remittances may also contribute to long-run sustained increases in domestic savings (Loxley & Sackey, 2008). Moreover, due to limited access to international capital markets by developing countries, the flow of remittances may work as an important source of amortizing debt, financing capital flight, and accumulating foreign reserves (Serieux, 2009; Rahman, 1967; Brown, 1992a, 1992b). Taylor (1999) argues that remittances may serve as insurance policies against risks associated with new production activities. After examining the flow of remittances from France to Mali, Martin, Martin, and Weil (2002) claim that remittances are used to build schools and clinics. Lucas (1987) observes that the flow of remittances (from

South Africa to Botswana, Malawi, and Mozambique) enhanced cattle accumulation and crop productivity in the long run.

Remittances may help to ease credit constraints in the economy. Giuliano and Ruiz-Arranz (2009) point out that remittances boost growth in countries with less developed financial systems by providing an alternative way to finance investment and by helping countries to overcome liquidity crises. On the contrary, while more developed financial systems may attract more remittances, the growth impact of remittances could be minimal. Under a developed financial system, access to the credit market may not be an issue for remittance recipient households. Therefore, remittances may go towards subsidizing recipients' consumption and may weaken their incentive to work.

In the late 80s and early 90s, many developing countries made significant policy shifts in their financial sectors. Based on the suggestions of the International Monetary Fund (IMF) and the World Bank, most developing countries switched from financial repression to financial liberalization.[29] If the depth of the financial system has any impact on the remittance-growth nexus, this policy shift may have had some impact on the remittance-growth relationship. However, none of the existing studies have looked at the association of remittance-growth under different financial regimes.

[29] The underlying assumption was that financial liberalization would develop the financial sector which would stimulate growth. Lawrence (2006) has challenged this simplistic view of the causal relationship between financial development and growth.

This study examines the link between remittances, financial development, and economic growth in four steps. First, we construct a panel dataset of 33 countries[30] over the period from 1979 to 2011. The selection of these countries is based on the fact that these countries have experienced a major increase in remittance flows over the last decade. In the second step, we conduct unit root tests to investigate the stationarity of the series. In the third step, the study uses the two step-generalized method of moments (GMM) estimator as described in Baum, Schaffer, and Stillman (2003, 2007) to extract consistent and information efficient estimates of the impact of financial development on remittance-growth dynamics. This GMM procedure allows for a dynamic specification of the dependent variable and controls for endogeneity of all the explanatory variables.

Finally, the study investigates whether financial liberalization plays a significant role in explaining the relationship between remittances and growth over time. While these questions are intriguing, no study has applied correct time series econometric techniques to examine them. To overcome the limitation of the restrictive neoclassical model, the study includes a large number of control variables that could influence the economic growth of the countries considered.

Better understanding of the relationship between remittances and economic growth under different levels of financial development could help policy makers to

[30] The list of countries is given in table 2 in the appendix.

design appropriate policies pertaining to the flow of remittances. Understanding the channels through which remittances affect economic growth is important in formulating appropriate policy to enhance the growth impact of remittances.

The rest of the paper is organized as follows. Section 2 presents the literature review. Section 3 outlines the estimation strategy. The results and analysis are presented in section 4. Finally, section 5 concludes the paper.

2.LITERATURE REVIEW

Despite the conventional belief that remittances are highly beneficial to output, the role of remittances in enhancing economic growth is ambivalent in the literature. Empirical literature on the nexus between remittances and economic growth can be divided into three broad categories: (i) positive association between remittances and economic growth; (ii) negative association; and (iii) no association at all. Moreover, researchers have used different empirical models and estimation strategies to examine the relationship between remittances and economic growth over time.

Theoretically, remittances can be beneficial to promote economic growth in developing countries through various channels. Remittances can finance much needed consumption expenditures for individuals. This foreign income can quickly increase the demand for goods and services, and stimulate production in the

economy. Many industries may benefit from this increase in demand through the "multiplicative effect," which increases economic growth (Stahl & Habib, 1986; Taylor & Dyer, 2009). Using time series data from Turkey on a Keynesian simultaneous equation model, Tansel and Yasar (2010) claim that the impact of remittances on consumption, and income are positive. Through the multiplier process, remittances have substantial positive impact on income. Taylor (1992) argues that, among Mexican households, remittances had a large direct effect on household's farm incomes as well as an indirect effect by influencing household's farm incomes from other sources. Nishat and Bilgrami (1991) used data from the Pakistan economy for 1959-60 to 1987-88 and found a strong positive impact of remittances on GNP, consumption, investment and imports. The multiplier effects of remittances were the strongest during that time period.

Using internal and external remittance data on Pakistani households, Adams and Richard (1998) observe that by raising the marginal propensity to invest for migrant households, remittances help to increase investment in rural areas. Moreover, external remittances have a significant impact on accumulation of rural assets compared to labour income (Adams, 2002). Such differences are attributed to the transitory nature of external remittances and transitory income has a higher marginal propensity to invest.

The positive impact of remittances on economic growth is also supported by Pradhan, Upadhaya, and Upadhaya . (2008), Jongwanich (2007), and the IMF (2005).

Using data from 39 developing countries, Pradhan et al. (2008) find a positive contribution of remittances on economic growth, but the contribution is not large. They argue that not all remittances are spent on consumption but a fraction of them is saved and invested leading to some positive impact on long-term growth. Using panel data for 1993-2000 on selected Asian and Pacific countries, Jongwanich (2007) suggests that remittances have a small positive impact on growth but a significant favorable impact on poverty reduction. An IMF (2005) study on 101 developing countries observes a positive impact of remittances on poverty reduction but no impact on economic growth. As the official estimates of remittance flows underestimate the actual flow, the use of more accurate data is likely to produce a more pronounced relationship between remittances and economic growth (Pradhan et al. 2008).

Remittances can also play an important role as a source of financing investment. For conventional sources of funding, individuals have to pay interest, while for remittances they do not. If allocated to the financial sector, remittances can expand the pool of financial resources, thereby reducing the costs of financial investment opportunities (Aggarwal, Demirguc-Kunt, & Peria, 2011). Remittances can also serve as collateral for the poor by loosening the credit constraints faced by potential entrepreneurs (Dustmann & Kirchamp, 2001; Amuedo-Dorantes & Pozo, 2006; Woodruff & Zenteno, 2007). Such an increase in financial resources may induce more investment and promote economic growth.

The relationship between remittances and economic growth may not necessarily be productive in terms of the overall economy. Chami, Fullenkamp, and Jahjah (2003) cast doubt on the positive effects of remittances on growth by developing a model in which labour force participation is abridged by the presence of remittances. Remittances are not necessarily profit-driven, rather they are compensatory transfers (Chami et al., 2003). Due to their compensatory nature, income from remittances allows receiving families to decrease their own work and productivity, which then translates into a reduction in the labour supply and a negative impact on economic growth for the developing country. Moreover, as remittance recipients purchase leisure and reduce their participation in the job market, the labour force may shrink or the reservation wage may increase (Mishra, 2007). Therefore, the impact of remittances on economic growth could be negative.

If the flow of remittances leads to an appreciation of the real exchange rate, then it could reduce a country's export prospects compared with the baseline scenario, i.e. the Dutch-disease effect (Acosta, Baerg, & Mandelman, 2009). Therefore, the flow of remittances may hinder economic growth. However, the adversity of the appreciation of the real exchange rate depends on the proportion of such flows spent on domestic goods, in particular, non-tradables (Gupta, Powell, & Yang, 2006).

Theoretically, an increase in disposable income due to a surge of remittances, may initiate an expansion of aggregate demand. Such an increase in income may

increase the relative prices of non-tradables, assuming that the prices of tradables are determined exogenously, which is most commonly known as the *spending effect.* The higher relative prices of non-tradable goods compared to tradable goods would eventually cause a resource movement from the tradable to the non-tradable sector, known as *resource movement effect*. Such a shift in price and resource reallocation in favor of non-tradables erodes the competitiveness in export oriented sectors and hurts import competing sectors, which may lead to currency appreciation. (World Bank, 2006a; Acosta, Baerg, & Mandelman, 2009).

However, empirical support for the Dutch Disease impact of remittances is mixed. Using data from 13 Latin American and Caribbean countries, and employing an instrumental variable technique, Amuedo-Dorantes and Pozo observe that a doubling of remittances would cause the real exchange rate to appreciate by 22%. Similarly, Acosta, Baerg, and Mandelman (2009), find supports for currency appreciation due to remittance flows. However, Acosta et al. (2009) suggest that in the presence of a more efficient financial system, the impact of Dutch Disease could be minimized.

As remittances are small transfers dispersed over a large number of households, the impact on the real exchange rate may not be significant (World Bank, 2006b). Moreover, the effect of remittances on the real exchange rate could be self-correcting. People send fewer remittances if the exchange rate is overvalued.

Empirical evidence indicates that the flow of remittances is less to countries with overvalued exchange rates (Rajan & Subramanian, 2005).

Upon investigating data on a set of Sub-Saharan African (SSA) countries, Mongardini and Rayner (2009) observe the presence of currency depreciation due to remittance inflows. They explain this by the fact that remittances and grants were used to remove supply side bottlenecks thereby boosting the output of this sector and actually reducing pressure on prices. As such, where remittances expand the capacity of, and thereby lower the prices in, the non-traded goods sector, the scaling up of remittance flows would not cause exchange rate appreciation.

To investigate their own theoretical framework, using panel data on 113 countries, Chami et al. (2003) confirm a negative relationship between remittances and economic growth. In addition, the emigrant worker cannot observe the "work effort" among his or her family members left behind. Therefore, a potential moral hazard problem might arise between the remitter and the receiver. The latter might purchase more leisure and reduce work effort in the presence of remittances (Hanson, 2007; Acosta, Lartey, & Mandelman, 2007). Chami et al. (2003) argue that remittances may manifest moral hazard problems in several ways.

"Recipients can decrease their labour force participation, limit their job searches, reduce labour effort, or invest in riskier projects, among other actions. But

no matter how the moral hazard manifests itself, its effort is to induce the recipients to act in ways that tend to decrease expected output." (Chami et al. 2003, p.5)

Due to the lack of business or investment experience among remittance recipient households, remittances may not act as a source of capital for economic development. Moreover, there are obstacles to transferring remittances into a significant source of capital. Sofranko and Idris (1999) examine the role of the extended family in the use of remittances from transnational migrants. The research asks whether family influence is more or less important in determining business investments using remittance money. Using data from 173 Pakistani remittance receiving families, and employing an Ordinary Least Square (OLS) estimation of the relationship between the use of remittances and family pattern (whether extended family is aware of business opportunities or have prior experience or have helping behavior) Sofranko and Idris (1999) claim that due to negative family influence remittances are unlikely to generate desired savings to promote growth. A major portion of remittances is spent on basic family needs, participation in social ceremonies or buying luxury goods. A small fraction of families (i.e. those who have prior experience in business) may use remittance money for further investment. These authors also claim that the outcome is not surprising as many remittance recipient households do not have sufficient knowledge about business opportunities and therefore the use of remittance money for business is limited.

There is another set of literature that could not find any conclusive evidence in terms of the remittance-growth nexus. Estimating a growth equation with valid instruments, Rajan and Subramanian (2005) could not find any robust and positive impact of remittances on long-term growth. Using data from 101 developing countries, an IMF study (2005) finds no statistical link between remittances and growth of per capita income. Such an inconclusive result is attributed to measurement difficulties arising from the fact that remittances may behave counter-cyclically with respect to growth. Using a panel of 114 countries, Catrinescu, Leon-Ledesman, Piracha, and Quillin (2009) could not discern any impact, positive or negative, of remittances on long-run growth.

Remittances may influence economic growth through financial channels. The literature on this issue is not abundant, as this topic has only begun to receive attention recently. If remittances affect financial development positively and, if the financial system causes economic growth, then remittances can reasonably be seen as an opportunity to promote economic growth in developing countries. To understand the role of remittances on the financial and economic development of remittance receiving countries, it is essential to identify the link between financial intermediation and economic growth. Upon receiving remittances, households may deposit their money into the financial system (e.g., banks), as a result of which, more funds become available in the financial system and the credit market in the economy may

expand. In such a case, remittances entering into the financial system may trigger growth in the economy.

Alternatively, remittances may not affect the depth of the financial system in receiving countries. In such a case, remittances are not saved in the form of deposits in the financial system, but rather are held in cash or used by the recipients immediately. Such a flow of remittances would not increase financial depth. However, if remittances are invested in the productive sectors of the economy, growth in the economy may still improve. On the contrary, if remittances are devoted to non-growth generating activities such as conspicuous consumption or discouragement of labour supply in the economy, the growth effect may be trivial or none existent.

Giuliano and Ruiz-Arranz (2009) argue that the relationship between remittances and growth may vary depending on the nature of financial markets. If the financial market is well-functioning, the domestic economy may experience complementarity between remittances and the financial sector to promote economic growth. In such markets, the flow of remittances may reduce the cost of conducting transactions and financially constrained entrepreneurs may have access to more funding through remittances. On the contrary, in an economy with an inefficient financial sector, remittances and the financial sector may have substitutability in fostering economic growth. Local entrepreneurs may use remittances as a substitute

for accumulating financial resources or human capital investment in an economy where the financial system is inefficient or the credit market is almost non-existent.

Using data for 73 developing countries from 1975 to 2002 and employing the generalized method of moments (GMM) developed by Arrelano and Bover (1995), Giuliano and Ruiz-Arranz (2009) include an interaction term of remittances and financial development in their growth equation. The use of GMM addresses the problem of reverse causality in the growth equation. The results of the standard growth model indicate that remittances have a positive effect on growth in countries with small and limited financial sectors, which supports the view that remittances could serve as a substitute for formal credit markets.

On the other hand, using data from 39 Latin American and Caribbean countries and employing the GMM estimator proposed by Arellano and Bond (1991), Mundaca (2009) observes the complementarity of remittances and financial development in enhancing economic growth. Estimating the growth equation, this author finds that remittances not only affect growth by themselves, but also work together with financial intermediaries. Moreover, both remittances and financial development have a positive impact on fostering growth, and the inclusion of finance and remittances on the same growth equation leads to a larger effect of remittances on growth. One of the major limitations of Mundaca's study is the use of the very restrictive neoclassical model. She restricts her growth equation to investment, remittances, and finance.

In a recent study, Aggarwal et al. (2011), using data from 109 countries and applying the system GMM approach (Arrelano & Bover, 1995) claim a positive, significant, and robust link between remittances and financial development in developing countries. These authors also control for country size, defined as the log of GDP in constant dollars, and the level of economic development, measured by GDP per capita. Moreover, they also control for inflation and openness of the economy. Focusing on the relationship between the ratio of bank deposit and credit to GDP and remittances, these authors conclude that the financial sector could be a potential channel through which remittances may influence the economic growth of developing countries.

To examine the effects of remittances on growth, GDP volatility, investment, and exchange rates, Chami et al. (2008) conduct a rigorous and extensive empirical study. Their work includes 84 countries during the period of 1970-2004 and uses a more accurate measure of remittances than previous studies[31]. Using several control variables on growth regression, the study focuses on the interactive effects of

[31] Until recently, a common practice in remittance literature (World Bank, 2006; IMF, 2005 and many others) is to use the sum of the three variables (workers' remittances, compensation of employees, and migrants' transfers) as a measure of the remittance variable. However, Chami et al. (2008) argue that the inclusion of migrants' transfers and employee compensation in remittance statistics is likely to pose a problem. Such transfers are fundamentally different from remittances and may not involve actual flows. Therefore, redefining the remittance variable after the exclusion of compensation of employees and migrants' transfers is expected to reflect more accurate statistics for the remittance variable. For further details, see, Chami et al. (2008).

financial deepening and remittances on economic growth; however, their results are inconclusive.

For many of these remittance receiving countries, the liberalization of the financial sector is one of the most important neoliberal policy recommendations of international organizations. Most developing countries made the important national policy decision of liberalizing their financial sectors in the late 80s or early 90s. The proponents of financial liberalization argue that financial repression distorts the optimal allocation of financial funds and impedes the development of financial markets. Financial repression usually refers to a high degree of state involvement in the financial system. The arguments against financial repression, or in other words, arguments in favor of financial liberalization, were first justified by Ronald McKinnon (1973) and Edward Shaw (1973) in their independent work published in the same year. McKinnon (1973) conceived the idea of the *conduit effect of money balance*, which suggested that developing countries were characterized by underdevelopment of the capital market. With limited access to capital, firms were required to hold quasi money in the form of savings prior to physical capital accumulation. Therefore the accumulation of money balances and physical capital were complementary to each other (Serieux, 2008). The low rate of interest in a repressed economy would be unlikely to generate higher levels of financial savings required for physical capital accumulation. McKinnon (1973) therefore suggested

policies to liberalize financial sectors in order to achieve market-determined high real deposit rates to encourage the accumulation of real money balances.

The idea of the *intermediation* effec*t* of financial liberalization came from Shaw (1973), who emphasized the importance of a high real interest rate not only to enhance the demand for savings, but also to allow increased financial intermediation. In a liberalized system, an integrated financial sector would lead to a rise in the savings rate, investment rate, and economic growth.

As part of liberalization initiative, the governments of those countries allowed and encouraged private commercial banks to operate in their domestic financial sectors. In some cases, these governments went a step further and disinvested government owned commercial banks. Although the financial sectors of many of the remittance receiving countries have gone through significant changes, the relationship between remittances, financial liberalization, and economic growth has not been investigated for these groups of countries. This may be attributed to the unavailability of a sufficient number of time series observations for remittance recipient developing countries. Since time series data for most of the variables are now available, the aim of this paper is to fill the gap in the existing literature by identifying whether financial development has played a significant role in the remittance-growth nexus.

It is clear from the above discussion that the findings are far from unanimous. The ambiguous results may be due to several factors, including different types of

countries in the same panel and mis-specified econometric models. Inconclusive results on remittance-growth dynamics warrant further examination.

3. DATA AND METHODOLOGY

3.1 Data Issues

Since the time series data on macroeconomic variables are available from 1979 for most of the top remittance receiving countries, this study uses the most updated dataset from 1979-2011[32]. The annual data on real GDP growth (*gdpg*) has been collected from the World Development Indicators published by the World Bank (2013).

There is no single definition of financial variables in the literature. To measure financial development, four major financial indicators are commonly used in the literature: First, domestic credit to the private sector to GDP (*pcredit*), which measures the extent to which the private sector relies on banks to finance consumption, working capital, and investment. Second, total domestic credit provided by the banking sector to GDP (*tcredit*) to the whole economy (private as well as public). This measures the strength of financial intermediation in the economy by the banking system. Third, the degree of monetization in the economy is measured by the M2 to GDP ratio (*m2gdp*). This measure includes the currency plus demand and the

[32] Top remittance receiving countries are the developing countries that have a 1% remittance-GDP ratio for several years and the countries which have experienced a tremendous increase in their remittance-GDP ratio in recent decades.

interest bearing liabilities of banks and non-banks financial intermediaries to GDP. It is designed to show the real size of the financial sector of a growing economy. Fourth, M3 to GDP (*m3gdp*) or liquid liabilities to GDP, which is the sum of demand, time, saving and foreign currency deposit. This measures the size of the banking system relative to the economy.

Each of these measures has strengths and weaknesses. Private sector credit is probably the best financial sector indicator to measure the opportunities of investment by new and existing firms (Law, 2008). It has the ability to scrutinize unviable projects. According to Law (2008), total domestic credit is the least suited measure of financial development because, in some cases, credit to the public sector could be based on political consideration rather than the viability of a project. Abu-Bader and Abu-Qarn (2008) argue that in developing countries, a large part of M2 consists of currency held outside banks; therefore, an increase in M2 to GDP may reflect extensive use of currency rather than an increase in bank deposits. As a result, M2 to GDP could be a less indicative measure of financial intermediation by the banking institutions. Analogously, as liquid liabilities are not necessarily indicative of financing new projects, there may be some limitations on the use of this measure as a perfect proxy for financial development. As none of the aggregate measures are a perfect indicator of the financial development in the economy, many studies (on

linking financial development and growth) use all of them interchangeably[33]. This study also observes that the correlation matrix (table 1) for all four financial variables is high, therefore, we proceed to use them interchangeably.

----------Table 1 here----------

Data on liquid liabilities to GDP ratio is obtained from the Financial Development and Structure Dataset, which was originally published by Beck, Demirguc-Kunt, Levine, Cihak, and Feyen. (2013) and subsequently updated by the World Bank (2013b). Data on three other measures of financial development are collected from the WDI online (World Bank, 2013a). Table 2 provides the list countries considered.

----------Table 2 here----------

3.2. Model and Methodology

The basic neoclassical Solow model assumes that production in an economy is a function of capital, labour and technology. However, due to its very restrictive framework, the basic neoclassical growth model fails to explain international differences in income across countries (Mankiw, Romer, & Weil, 1992). In addition

[33] Number of bank branches per 1,000,000 population or number of automated teller machines (ATM) could be an interesting financial indicator of the economy; however, due to the availability of time series data, we are unable to use it.

to capital and labour, empirical evidence supports the importance of foreign aid, human capital, remittances, and the financial sector in explaining growth across countries (Hansen & Tarp, 2001; Mankiw et al., 1992; Pradhan et al., 2008; IMF, 2005; Aggarwal et al., 2011; Giuliano & Ruiz ,2009). As such this study uses the modified version of the neoclassical model to accommodate the impact of remittances, foreign aid, other capital flows, and level of development of the financial sector on economic growth[34].

It has long been argued that the output variable in growth equations has a persistent characteristic. In other words, growth in the current period may depend on the past year's growth (Alesina, Ozler, Roubini, & Swagel, 1992; Bond, Hoeffler, & Temple, 2001). To capture such a "memory effect" or the persistent characteristic of the growth variable, this study includes lagged growth rate of GDP as an explanatory variable. Inclusion of the lagged dependent variable as a regressor makes the specification dynamic in nature.

We first consider the following AR(1) model with unobserved country-specific effects:

$$y_{i,t} = \beta y_{i,t-1} + x_{i,t} + c_i + \varepsilon_{it} \qquad (1)$$

Where $i = 1,2,....N$ *and* $t = 2,.....T$

[34] The average secondary school enrollment rate could be treated as a measure of human capital. However, due to the lack of availability of time series data, this study could not include human capital as a regressor.

$y_{i,t} = Growth\ \ rate\ \ of\ \ GDP\ \ at\ \ t\ \ period$

$y_{i,t-1} = Growth\ \ rate\ \ of\ \ GDP\ \ at\ \ t-1\ \ period$

$x_{i,t} = Matrix\ \ of\ \ control\ \ \text{var}iables$

$c_i = Time-in\text{var}iant\ \ country\ \ specific\ \ effects$

$\varepsilon_{i,t} = Time-\ \text{var}iant\ \ error\ \ component$

$\varepsilon_{i,t}$ has the standard error component structure, which follows strict exogeneity,

$$E[\varepsilon_{i,t}] = 0,\ E[c_i] = 0,\ E[\varepsilon_{it} \mid x_{i,t}, c_i] = 0$$

The GMM dynamic panel estimator makes two assumptions: (1) transient errors are serially uncorrelated,

$$E[\varepsilon_{i,t}, \varepsilon_{i,s}] = 0 \quad for \quad i = 1,2,.....N \quad and \quad s \neq t$$

And (2) the explanatory variables are not correlated with future realizations of the error component. This GMM procedure allows us to use the lagged levels dated t-2 and earlier as instruments (Bond et al., 2001).

As we are primarily interested to explore the relationship between remittances and economic growth, therefore, we estimate the following behavioral model:

$$y_{i,t} = \beta_0 + \beta_1 y_{i,t-1} + \beta_2 inv_{i,t} + \beta_3 lfg_{i,t} + \beta_4 rem_{i,t} + \beta_5 goecd_{i,t} + \beta_6 oda_{i,t} + \beta_7 ocf_{i,t} + c_i + \varepsilon_{i,t} \quad (2)$$

The list of control variables includes the investment (inv) and labour force growth (lfg). Since the data for the labour force is not readily available for most of the

developing countries, this study uses the number of people belonging to 15-64 age group as a proxy variable for labour force[35].

The basic equation also includes the rate of GDP growth in high income OECD countries plus China (g_{OECDC}). This variable will investigate the impact of a rise in income in OECD countries (plus China) on the growth of income of the top remittance recipient developing countries. The inclusion of the growth in remittances as a regressor will allow us to measure the impact of remittances on economic growth. As mentioned earlier, the study also includes the growth of four major financial indicators (*pcredit*, *tcredit, m2gdp*, *m3gdp*) alternatively. To examine the impact of foreign aid on economic growth, the study also includes growth in Official Development Assistance (oda) (that includes both loans and grants) as a control variable. Finally, growth of all external flows but ODA (ocf) is included to avoid any omitted variable bias.

The nonstationarity of time series in relatively long time series data is a real possibility (Nelson & Plosser, 1982). The selection of appropriate estimation strategy relies on the nature of the data. To determine the level of stationarity, this study

[35] According to the International Labour Organization (ILO), the labour force refers to the economically active population who supply the labour for production of goods and services. However, data for that particular group is not available. Therefore, this study uses a proxy measure which is the total number of people who belong to the 15-64 age cohort. It is possible that many individuals, especially those who are in the 15-30 age group are attending schools or not supplying the labour for production of goods and services. Thus the size of the economically active population is likely to be less than the population in the 15-64 age group. As such, this is only a proxy measure of the labour force.

employs three different panel unit root tests (the Im, Pesaran, and Shin W-test; the ADF-Fisher chi-square test; and the PP Fisher Chi-Square test) on the nonstationarity of all the panels for all variables. The null hypothesis of these tests is the nonstationarity of all the series, while the alternative hypothesis is the stationarity of at least some of the series in the panel.

Equation (2) can be estimated using the Ordinary Least Square (OLS). However, due to the dynamic nature of the equation, any estimation using the OLS would produce inconsistent estimates of the relevant coefficients (Greene, 2003). Concomitant to the dynamic nature of the growth equation, the presence of investment to GDP ratio as a regressor causes the endogeneity of regressors in the growth equation. An instrumental variable is called for, and, as a result, a two-step Generalized Method of Moments (GMM) approach (Baum, Schaffer, & Stillman, 2003, 2007) is employed. This approach will control for any potential endogeneity that may arise from explanatory variables and also provide an information efficient means of obtaining coefficient estimates. This estimation also outperformed the two stage least square technique, even with robust standard errors[36].

To examine the impact of financial development on the remittance-growth nexus, in addition to the control variables in equation (2), the study includes financial development indicators as regressors of the growth equation. To measure the separate

[36] The outcomes based on the GMM technique are more consistently significant.

impact of remittances and financial indicators on economic growth, the study estimates the following behavioural model:

$$y_{i,t} = \beta_0 + \beta_1 y_{i,t-1} + \beta_2 inv_{i,t} + \beta_3 lfg_{i,t} + \beta_4 rem_{i,t} + \beta_5 goecd_{i,t} + \beta_6 oda_{i,t} + \beta_7 ocf_{i,t} + \beta_8 f_{i,t} + c_i + \varepsilon_{i,t} \quad (3)$$

where $f_{i,t}$ indicates financial depth, which is measured by four different financial variables (*pcredit*, *tcredit*, *m2gdp*, *and m3gdp*).

Based on equation (3), our estimated outcome reports the impact of each control variable separately. However, to examine the significance of remittances on economic growth at different levels of financial development, the study employs an interaction term for remittances and financial development (Giuliano & Ruiz-Arranz, 2009). The study extends the interaction term for all four financial variables. A significantly negative interaction term indicates the substitutability of remittances and financial development in economic growth. By contrast, a positive interaction term indicates the complementarity of the variables in growth estimation. As such, the behavioural model that we estimate is:

$$y_{i,t} = \beta_0 + \beta_1 y_{i,t-1} + \beta_2 inv_{i,t} + \beta_3 lfg_{i,t} + \beta_4 rem_{i,t} + \beta_5 goecd_{i,t} + \beta_6 oda_{i,t} + \beta_7 ocf_{i,t} + \beta_8 f_{i,t} + \beta_9 (rem *_{i,t} f_{i,t}) + c_i + \varepsilon_{i,t} \quad (4)$$

Where, β_9 measures the interaction effect of remittances and financial development to trigger economic growth. This study cannot ascertain any type of relationship a priori. Depending on their characteristics, the financial sectors of the top remittance receiving countries might have either a positive or negative impact on the remittance-growth relationship or no relationship at all.

Remittances might have a positive impact on credit market development if, as individuals receive sizable transfers from abroad, banks become more willing to extend credit to remittance recipients and/or others. Moreover, even if increased bank lending to remittances recipients does not materialize, overall credit in the economy might increase if banks' loanable funds surge as a result of deposits linked to remittances flows. Because remittances are typically lumpy, recipients might have a need for financial products that allow for the safe storage of these funds. In the case of households that receive their remittances through banks, the potential to learn about and to demand other financial products is even larger.

On the other hand, because remittances can also help relax individuals' financing constraints, they might lead to a lower demand for credit and have a dampening effect on credit market development. Also, a rise in remittances might not translate into an increase in credit to the private sector if these flows are instead

channelled to finance the government. Moreover, remittances might not increase bank deposits if they are immediately spent on imported goods consumed or if remittances recipients distrust financial institutions and prefer other ways of saving these flows (Peria, Mascaro, & Moizeszowicz, 2008).

As mentioned earlier, most of the remittance recipient developing countries adopted financial liberalization policies during the late 80s and early 90s. If the hypothesis of substitutability between remittances and financial development is true, the impact of remittances on economic growth for developing countries in the financial repression era is expected to be high. On the contrary, if financial development works as a complement to the remittance-growth nexus, the impact of remittances on economic growth would be high only during the liberalized era. To test the validity of such a hypothesis, this study creates a subsample panel of countries based on different time periods: liberalization, and repression period and re-estimates the growth equation (3). To our knowledge, this investigation, using a recently developed panel estimation approach for top remittance receiving countries, is the first of its kind.

The financial variable will capture the impact of credit expansion on economic growth, while the interaction term will measure the effect of growth through credit allocation, resulting from Shaw's efficient financial sector intermediation effect. If the increase in financial depth enhances the effect of remittances (the interaction term), we can claim that financial development helps

make remittance flows more productive. By measuring separate regressions for before and after liberalization, we may directly address the liberalization argument. The issue is whether both the remittance coefficient and the interaction term change from before to after liberalization.

4. RESULTS AND ANALYSIS

Table 3 presents the results of unit root tests for all variables based on panel unit root tests.

----------Table 3 here----------

The results of the unit root tests suggest that all of the variables are stationary at different levels. Given these results, an approach that does not presume nonstationarity, as described above, remains valid.

Table 4 reports four different specifications of the growth equations. Specification (i) is the empirical outcome of equation (2). Specification (ii), (iii), (iv), and (v) are the empirical outcomes of equation (3). However, the differences in specifications are based on the inclusion of a different financial variable as an indicator. Specification (ii) is an extension of equation (2) where *pcredit* is included as a regressor. Analogously, specifications (iii), (iv), (v) considers *tcredit*, *m2gdp, and m3gdp* as a financial variable respectively.

The study supports the "memory effect," where, the GDP growth in the last period affects the GDP growth in this period. Further, as anticipated, the growth rate is positively (and significantly) related to the rate of investment. The outcome based on labour force growth is insignificant. As the data on labour force for top remittance recipient developing countries are not available, the rate of growth in the population between 15-64 age cohort is used as a proxy for labour force growth. As we are using a proxy variable for labour force growth, the outcome based on regression estimation should be considered cautiously. The impact of economic growth in OECD countries on the growth of remittance receiving countries is insignificant. In most of the cases, ODA and other capital flows significantly influence economic growth.

Our main focus is on the link between remittances and GDP growth. Specification (i) establishes a positive and significant relationship between remittances and GDP growth. The top remittance receiving countries benefit from the flow of remittances from destination countries. The inclusion of financial variables is meant to test the Shaw (1973) proposition that private credit would have a significantly positive impact on the economic growth of the countries. The estimated outcome of *pcredit* on growth is insignificant. This does not support Shaw's (1973) contention that the increased provision of private credit through the formal financial sector was growth enhancing (Serieux, 2008). Moreover, the estimated outcome on the growth equation is insignificant for all other financial indicators.

----------Table 4 here----------

In table 5, the remittance variable interacts with the financial development indicators. A positive coefficient of the interaction term would indicate the complementarity of the financial variables on the remittance-growth nexus (e.g. a deeper financial system would induce a stronger economic impact of remittance on growth). Conversely, a negative coefficient of the interaction term would imply a substitutability of financial development in the remittance to growth relationship (e.g., under a shallower financial system, remittances would have a stronger impact on economic growth). This study creates an interaction term for all three financial variables with remittances.

----------Table 5 here----------

In table 5, specifications (vi), (vii), (viii), and (ix) report the empirical results of equation (4) with different financial variables. The estimated outcome of the interaction term is insignificant for all financial variables.

Most developing countries undertook financial liberalization policies based on the suggestions of the International Monetary Fund (IMF) at different times. The proponents of financial liberalization argue that such policies increase the rate and quality of investment in the economies. If remittances work as a substitute for financial development in promoting growth, the impact of remittances is expected to

be higher under repressed regimes. Analogously, the impact of remittances would be lower under liberalized regimes.

In particular, this study tries to ascertain whether financial liberalization had any effect on the remittance-growth nexus (e.g., whether regime switching would have any impact on the growth trajectory of developing countries). The exact date of transition from a repressed regime to a liberalized regime varies across countries. Our sample period for repressed regimes started from 1979 and ended the year preceding the implementation of a program of financial liberalization. For many of the developing countries, the process of complete liberalization is still ongoing. However, for our purpose, we assume liberalization when some directed credit programmes were eliminated or, at the least, some interest rates were liberalized (Serieux, 2008). Moreover, during that period many policies under repressed regimes are discontinued or phased out[37].

To investigate the remittance-growth nexus under liberalized and repressed regimes, this study runs separate regression under different regimes. Table 6 reports the outcome of the full sample, repressed, and liberalized period with and without this interaction term.

----------Table 6 here----------

[37] The liberalization period for different developing countries is reported in table 7.

Our investigation reports that the coefficient for the lagged growth is very significant at the 1 percent level in all specifications. These results strongly support the hypothesis of the persistence characteristics of economic growth as suggested by Alesina, Ozler, Roubini, and Swagel (1992). The coefficient for investment varies between repressed and liberalized regimes. The impact of investment on GDP growth is stronger under liberalized regimes, which supports Shaw's (1973) hypothesis. The results of the coefficient of labour force growth and average growth of OECD countries are similar to our regression results from equation (4). Despite liberalization, the impact of private credit on economic growth is not significant. However, remittances have a stronger impact under repressed regimes than under liberalized regimes. This may indicate the substitutability of financial development in the remittance-growth nexus. Surprisingly, the coefficient of remittances on economic growth is insignificant under liberalized regimes. The interaction term[38] of private credit and remittances remains insignificant. As the coefficients of financial variables and their interaction terms with remittances remain insignificant before and after financial liberalization, we cannot claim that the change in the remittance coefficient is attributed to the change in financial regimes.

There could be various reasons behind the insignificant impact of remittances on economic growth in liberalized regimes. Despite financial liberalization, the use of

[38] We only report the interaction term of private credit and remittances. However, the interaction term based on other financial variables is also insignificant under both liberalized and repressed regimes.

financial institutions by remittance recipients could still be small. According to the Inter-American Development Bank report (2006), banks in many of the remittance receiving countries operate as a payment agent only. A very small percentage of remittances paid by banks actually enter the financial system through existing or new accounts.

Moreover, remittances might not spur as much deposit or growth if access to physical banking outlets is limited in those countries. Distance to the nearest financial outlets could be an obstacle for remittance recipients to demand further credit from the banking system. In many cases, remittance recipients in those countries are less likely to receive remittances via banks. In countries where individuals receiving remittances through banks are more likely to open or maintain bank accounts and use other financial services, banks can play a larger role for credit expansion using remittance money. Moreover, banks can sell other financial products, which may spur economic growth.

The high cost of maintaining a bank account could be another reason for remittances not being used for expansion of credit in remittance recipient economies. Beck, Demirguc-Kunt, and Martinez (2006) observe that in many of the countries of South Asia, Sub-Saharan Africa, and Latin America, maintaining a bank account and fees associated with loans are comparatively higher than in developed countries. Further, sluggish growth of credit under financial liberalization may be attributed to the weaker creditor protection and poor contract enforcement (Peria et al., 2008).

5. CONCLUSION

Remittances are a key source of external financing for many developing countries; this has led to a growing concern about their effect on economic growth. Despite a number of micro-studies suggesting that remittances reduce poverty, increase consumption, and inject fresh dynamics into the productive sectors of the economy, the evidence is inconclusive and puzzling at the macro-level (Pablo, Calderon, Fajnzylber, & Lopez, 2008). Moreover, the channels through which remittances may influence economic growth are intriguing.

This paper re-examines the relationship between remittances, financial development, and economic growth for major remittance recipient developing countries. Further, the study continues the investigation of the effects of remittances on economic growth by exploring the types of relationship between remittances and financial variables. We went beyond the direct effects of remittances on growth by estimating the interactive effects of remittances and financial variables. To do so, the study introduces several interaction terms between remittances and financial indicators and tests their relationship with GDP growth.

Traditionally, the financial development of an economy is measured by the deposits and credits to the GDP ratio. As families receive remittance money periodically, a need for financial instruments arises to store the excess cash for some period of time. If individuals receive remittances through financial intermediaries,

especially banks, individuals' potential to learn about financial product increases, therefore, the demand for financial product (e.g., credit) may increase. Remittances may enhance activities in the credit market. Banks or financial intermediaries could be interested in extending their credit facilities to remittance recipient individuals as long as the transfers received by them are significant and stable. Upon receiving remittances, borrowers would be able to repay the loan. Moreover, due to deposits linked to remittances flows, banks' loanable funds may surge and the overall credit in the economy may increase. On the contrary, remittances may act as a substitute for credit since they relax individuals' financial constraint, and as a result, the growth impact of remittances could be minimal.

Mitigating the issue of endogeneity in growth equations is an empirical challenge; nonetheless, most growth studies try to resolve it using some form of instrumentalization. Using panel estimation of the method of moments is expected to solve this issue. Specifically, the GMM technique allows us to control for simultaneity bias. By using valid instruments, this study takes care of the problem of endogeneity for all explanatory variables.

Existing literature provides mixed evidence on the remittance-growth nexus. However, using a basic growth equation, this study confirms the positive association between remittances and economic growth for top remittance recipient developing countries. Such a selection of countries increases the chance of producing statistically unambiguous results. Despite the inclusion of financial variables in the basic growth

equation, however, the positive association between remittances and growth is still valid. The inclusion of financial variables in growth equations asserts that none of the financial development indicators have any impact on the remittance-growth nexus. Moreover, all of the financial indicators are insignificant.

When we consider the impact of remittances on growth for the full sample period, we find that remittances have a positive and significant impact on GDP growth. Under financial liberalization policies, developing countries intended to deepen their financial sector relative to output to increase private and overall saving and investment and improve the quality of investment. Such an increase in volume of formal finance is expected to have a direct positive effect on output growth.

The most striking result is that under different regimes, the impact of remittances on economic growth is different. Under repressed regimes, remittances spur economic growth, whereas such a relationship does not exist under liberalized regimes. None of the financial variables have significant impact on economic growth. Upon considering interaction terms, we cannot claim any impact of financial development on the remittance-growth nexus.

This essay is expected to enrich the existing literature in several ways. First, among the scholars who have examined the remittance-growth nexus, none has examined such a relationship among top remittance recipient developing countries. However, as remittances are a significant source of external financing for that group

of countries, this study provides an important understanding about the remittance-growth nexus at different levels of financial development. Second, this study brings new insight into the remittances-growth nexus under different financial regimes, which is unique in the remittance literature. This study suggests that policy makers in top remittance recipient developing countries should formulate policies for financial development such that these countries can reap the potential benefits of remittances on economic growth.

This study could be improved in various ways. The quality and coverage of data could be an issue. For many countries, due to the weakness of data collection, many types of formal remittance data remain unrecorded. Moreover, the flow of remittances through informal channels, such as unregulated money transfers by firms or families, remains unaccounted for. The World Bank (2006) reports that if remittances through informal channels are included in data, total remittances could be as much as 50 percent higher than the official record. Having better data could enrich our results. Understanding the distinctive nature of different countries/regions /income groups and the ways in which remittances are used and channelled might also shed more light on the nature of the relationship between remittances and financial indicators.

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APPENDIX

Table: 1: Correlations Matrix of Financial Indicators

Variables	*pcredit*	*tcredit*	*m2gdp*	*m3gdp*
Pcredit	1.0000	-	-	-
Tcredit	0.8816	1.0000	-	-
m2gdp	0.7594	0.7546	1.0000	-
m3gdp	0.6908	0.7063	0.9144	1.0000

Table 2: List of Countries

Algeria	Dominican Republic	Mexico	Sri Lanka
Bangladesh	Egypt	Morocco	Swaziland
Benin	El Salvador	Niger	Syrian Arab Republic
Bolivia	Fiji	Nigeria	Thailand
Botswana	Guatemala	Pakistan	Togo
Burkina Faso	Honduras	Paraguay	Tunisia
Colombia	India	Philippines	-
Costa Rica	Kenya	Rwanda	-
Cote d' Ivore	Mali	Senegal	-

Table 3: Stationarity Tests for Relevant Variables

Variables	Im, Pesaran and Shin W-test	ADF-Fisher Chi-square	PP-Fisher Chi-square
Gdpg	-12.572***	449.381***	449.381***
Inv	-15.240***	670.137***	670***
Rem	-19.441***	836.364***	775.364***
G_{oecdc}	-16.625***	355.377***	355.376***
Oda	-18.793***	1022.751***	1023.700***
Ocf	-18.169***	893.029***	893.029***
Lfg	1.674	196.04***	182.666***
Pcredit	-16.498***	748.121***	748.121***
Tcredit	-15.713***	714.546***	714.546***
m3gdp	-17.703***	932.215***	932.215***
m2gdp	-13.460***	625.494***	589.871***

Notes: ***,**,and *indicate significance at the 1% level, 5%, and 10% level respectively.

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Table 4: Determinants of GDP growth

Dependent Variable: GDP growth rate (annual %)					
Independent Variables	(i)	(ii)	(iii)	(iv)	(v)
gdp(t-1)	0.328*** (0.085)	0.318*** (0.078)	0.339*** (0.087)	0.326*** (0.090)	0.360*** (0.091)
Inv	0.338*** (0.068)	0.335*** (0.063)	0.343*** (0.069)	0.338*** (0.069)	0.311*** (0.708)
Lfg	1.193 (1.021)	1.141 (1.039)	1.352 (1.063)	1.171 (1.041)	0.965 (1.113)
g_{OECDC}	0.002 (0.002)	0.003 (0.002)	0.003 (0.002)	0.002 (0.002)	0.003 (0.002)
Rem	0.033** (0.015)	0.036** (0.016)	0.033** (0.016)	0.033** (0.015)	0.034*** (0.017)
Oda	0.013* (0.007)	0.013* (0.007)	0.012 (0.007)	0.011 (0.007)	0.012* (0.007)
Ocf	0.004** (0.002)	0.004** (0.002)	0.004* (0.002)	0.004** (0.002)	0.005** (0.002)
Pcredit	-	0.067 (0.041)	-	-	-
Tcredit			0.016 (0.002)	-	-
m2gdp	-	-	-	0.034 (0.040)	-
m3gdp	-	-	-		0.008 (0.051)
Hansen J Statistic (Over identification test of instruments)	4.216(p value: 0.647)	5.337(p value: 0.612)	4.068(p value: 0.771)	4.750(p value: 0.576)	3.381(p value: 0.759)
Number of Observations	745	742	724	748	652

Notes: Endogenous variables: lag GDP growth, investment. Instruments: L2 GDP growth, lag investments, food production index, lag remittances, lag labour force growth, 1 lag of financial variable.

***,**,and *indicate significance at the 1% level, 5%, and 10% level respectively

Table 5: Effects of remittances and financial development on GDP growth Equation (including interaction term)

Dependent Variable: GDP growth rate (annual %)				
Independent Variables	(vi)	(vii)	(viii)	(ix)
gdp(t-1)	0.315*** (0.086)	0.339*** (0.087)	0.318*** (0.088)	0.351*** (0.089)
Inv	0.340*** (0.067)	0.347*** (0.069)	0.343*** (0.067)	0.312*** (0.066)
Lfg	1.134 (1.048)	1.370 (1.067)	1.267 (1.063)	1.019 (1.122)
g_{OECDC}	0.002 (0.002)	0.003 (0.002)	0.002 (0.002)	0.003 (0.002)
Rem	0.034** (0.017)	0.034** (0.002)	0.030** (0.013)	0.033** (0.017)
Oda	0.013* (0.007)	0.011 (0.007)	0.011 (0.007)	0.011* (0.007)
Ocf	0.004** (0.002)	0.003* (0.002)	0.004* (0.055)	0.005** (0.002)
Pcredit	0.066 (0.041)	-	-	-
Tcredit	-	0.019 (0.032)		-
m2gdp	-	-	0.023 (0.004)	-
m3gdp	-	-	-	0.008 (0.051)
Remfin	-0.041 (0.119)	0.029 (0.079)	-.128 (0.113)	-0.057 (0.084)
Hansen Test of Overriding Restrictions	5.332 (p value: 0.502)	4.028(p value: 0.672)	4.778(p value: 0.572)	3.426(p value: 0.752)
Number of Observations	745	727	748	652

Notes: Endogenous variables: lag GDP growth, investment. Instruments: L2 GDP growth, lag investments, food production index, lag remittances, lag labour force growth, 1 lag of financial variable.

***,**,and *indicate significance at the 1% level, 5%, and 10% level respectively

Table 6: Determinants of Growth with repressed and liberalized period

Dependent Variable: GDP growth rate (annual %)						
Explanatory Variables	Full Sample Period		Repression Period		Liberalized Period	
	Equation 3	Equation 4	Equation 3	Equation 4	Equation 3	Equation 4
gdp(t-1)	0.318*** (0.052)	0.315*** (0.086)	0.266** (0.115)	0.243** (0.112)	0.138** (0.059)	0.150** (0.064)
Inv	0.335*** (0.063)	0.340*** (0.067)	0.333*** (0.095)	0.360*** (0.090)	0.420*** (0.032)	0.429** (0.031)
Lfg	1.141 (1.039)	1.134 (1.048)	1.569 (1.963)	1.455 (1.960)	-1.562 (2.423)	-0.840 (2.375)
g_{OECDC}	0.003 (0.002)	0.002 (0.002)	0.008** (0.004)	0.008* (0.004)	-0.001 (0.002)	-0.002 (0.002)
Rem	0.036** (0.016)	0.034** (0.017)	0.058*** (0.021)	0.057** (0.027)	0.026 (0.019)	0.036 (0.025)
Oda	0.013* (0.007)	0.013* (0.007)	0.055** (0.028)	0.052* (0.028)	0.006* (0.004)	0.007* (0.004)
Ocf	0.004** (0.002)	0.004** (0.002)	0.001 (0.003)	0.001 (0.003)	0.007*** (0.002)	0.007*** (0.004)
Pcredit	0.067 (0.041)	-0.066 (0.041)	0.088 (0.058)	0.074 (0.058)	0.030 (0.055)	0.029 (0.055)
Remfin	-	-0.041 (0.119)	-	0.014 (0.145)	-	-0.158 (0.338)
Hansen Test of Overriding Restrictions	5.337(p value: 0.612)	5.332(p value: 0.502)	5.280 (0.502)	6.083 (0.413)	8.073 (0.326)	8.821 (0.265)
Number of Observations	742	742	364	364	361	361

Notes: Endogenous variables: lag GDP growth, investment. Instruments: L2 GDP growth, lag investments, food production index, lag remittances, lag labour force growth, 1 lag of financial variable.

***,**,and *indicate significance at the 1% level, 5%, and 10% level respectively

Table 7: The Record of Financial Liberalization in Selected Countries

Country	Liberalization Period
Algeria	1995
Bangladesh	1991
Benin	1993
Bolivia	1995
Botswana	1991
Burkina Faso	1993
Colombia	1991
Costa Rica	1995
Cote D Ivore	1993
Dominican Republic	1995
Egypt	1997
El Salvador	1990
Fiji	1987
Guatemala	1996
Honduras	1990
India	1992
Kenya	1991
Mali	1989
Mexico	1989
Morocco	1990
Niger	-
Nigeria	1995
Pakistan	1991
Paraguay	1991
Philippines	1991
Rwanda	1995
Senegal	1989
Sri Lanka	1992
Swaziland	1995
Syrian Arab Republic	2004
Thailand	1987
Togo	1993
Tunisia	1994

Sources: Abiad and Ashoka (2003); Ahmed (2006); Demetriades and Hussein, 1996; Thornton, J. (1996); Bekaert, Harvey, and Lundblad (2005); Elek and Tabor (1993); Ghirmay, (2004); Gulde, Catherine, Christensen, Cary, and Wagh (2006); IMF(2006); Ndebbio (2004); Quispe-Agnoli and McQuerry (2001); International Monetary Fund, 2006; Reinhart and Tokatlidis, 2003; Serieux, 2008; Domirguc-Kunt and Detragiache (1998); Chinn and Ito (2002); Fowowe (2008); Angkinand, Wanvimal, and Whilborg(2010); Noy (2004); Greenidge and Milner (2006); Aizenman (2005); Hassan, Sanchez, Ngene, and Ashraf (2012); Lee (2002); Nielsen, Uanguta, and Ikhide (2005); Nyawata and Bird (2004); Mougani, G. (2012); Serieux (2008); Saidi, N. (2002); Ahmed (2006); Ndebbio (2004).

CHAPTER 5

CONCLUSION

This dissertation comprises three essays with the common theme being immigrants and remittances. Each essay of this dissertation makes an empirical contribution to the literature on immigrants and remittances. Immigrants make up a sizable proportion of the population in Canada. Learning about their socio-economic characteristics may provide important information for policy planners. In many cases, immigrants contribute to the economic development of both their country of origin and country of destination. By integrating into the labour market, immigrants contribute to the economic development of their destination country (DeSilva, 1992). On the other hand, immigrants send money-remittances to their country of origin. Such remittances are an increasingly significant source of external financing for many countries, especially developing ones (Maimbo & Ratha, 2004). Despite the significance of remittances for many developing countries, relatively little is known about the characteristics of sender households. As such, our first essay is an overview of the remitting behaviour of Chinese and Indian immigrants in Canada.

In the first essay, after controlling for many demographic characteristics, we analyze the factors that can influence remitting behaviour of recently arrived (October 2000 to September 2001) Chinese and Indian immigrants in Canada. We find that individuals' decisions to remit vary across their country of origin. Moreover, there are

commonalities and differences in the factors that can influence Chinese and Indian immigrants' decisions to remit. For both groups, the propensity to remit is higher for richer households. Chinese immigrants are highly likely to remit more based on a self-interest motive compared to Indian immigrants. The higher the investments in their home country, the greater the remittances sent by Chinese immigrants. However, such a relationship is absent among Indian immigrants. Another noteworthy finding from the first essay is that though many of the control variables influence the decision to remit for both groups of immigrants in a similar fashion, involvement with their ethnic group in their host country positively influences Indian immigrants' decision to remit, while such an influence is absent among Chinese immigrants.

The findings of this essay provide a distinct contribution to the existing literature in several ways. First, this study is the first of its kind to use Canadian data. Second, employing panel data, this study uniquely compares the remitting behaviour of two distinct groups of immigrants in Canada. Third, the endogeneity of regressors is a common problem in econometric studies, yet the longitudinal nature of LSIC data allows us to control for the issue of endogeneity and it is rare to be able to do so in the literature related to estimating remitting behaviour. Finally, this study provides information that could be helpful for both host and home countries. Based on this research, policy makers in the host country (Canada) can better understand the socio-economic conditions of recently arrived immigrants. Additionally, policy makers in

home countries can identify factors that influence immigrants to send remittances to their countries of origin.

In the second essay, we examine the link between education and health of recently arrived immigrants in Canada. Using data from the three waves of the LSIC, our study observes a positive association between the education and health of immigrants. To avoid the issue of measurement error related to the subjective measure of health, the study re-categorizes the health variable and finds the validity of a positive association between education and health. In particular, higher education leads to better health for Canadian immigrants. However, the study could not find any differences in the association between health and education across immigrants' countries of origin. Using the dynamics of health over time, our study also reports that higher educated immigrants are more likely to report improved health over time compared to lesser educated immigrants.

Our second essay contributes to the literature in several ways. First, our study is one of the few studies that examine the nature of the relationship between education and health of immigrants in Canada. Second, the study accounts for a number of possible problems that might render estimates inconsistent. Due to the lack of data, many of the existing studies could not take care of the issue of endogeneity, which may create biased estimates. Using longitudinal data, this study creates a new health variable based on the dynamics of health (i.e., change of health status over time) among immigrants. Upon examining the dynamic health variable and its

relationship with level of education of immigrants at landing, this study reports that improved health conditions of immigrants are associated with higher education. Immigrants with higher levels of education are highly likely to claim better health over time compared to immigrants with lower levels of education. The study argues that policy makers can ensure better outcomes in health care in Canada by ensuring access to higher levels of education and training, promoting health literacy, and adopting community driven and culturally tailored linguistic health care programs.

The first two essays of this study are based on the data from the Longitudinal Survey of Immigrants in Canada (LSIC). LSIC is the first extensive nationwide survey on recent immigrants. Using LSIC data, this study provides important insights about immigrants' remitting behavior and the link between their health and education. However, Statistics Canada has stopped collecting data for the LSIC survey. Without having detailed information about immigrants, policy makers in host and home countries will face difficulties to formulate policies. As such, this study suggests the need for an extended survey similar to the LSIC using different cohorts of immigrants. However, a future survey could be designed to incorporate more specific information about immigrants' remittance sending behavior. The senders could be asked about the nature of recipients (friends, relatives, or community organizations) and the reasons for sending remittances (i.e. for consumption, investment etc, that would throw light altruistic, self-interest, and/or tempered-altruism motivations). The survey questions may also focus on the mechanism used to transfer funds (formal

and/or informal) and the cost in terms of both money (% of transfer charged) and time (to obtain and pick up transfers). Having more detailed information along these lines would help close the knowledge gap about Canadian immigrants and remittances.

The third essay explores the importance of financial sectors in the remittance-growth nexus for top remittance recipient developing countries. Moreover, the essay examines two important issues associated with the relationship between remittances and growth. First, it considers whether the financial sectors of remittance recipient developing countries have any significant impact on the influence of remittances on economic growth. Second, it determines whether a change in financial regime from financial repression to financial liberalization has any significant impact on the remittance-growth nexus. The study observes that despite a positive relationship between remittances and growth, the financial sector of developing countries neither works as a substitute for, nor complements, the affect of remittances on economic growth. The relationship between remittances and economic growth are different under the two different financial regimes. Remittances positively influence economic growth during financial repression, but such a relationship does not exist during financial liberalization.

The outcome based on the third essay is expected to enrich existing literature in several ways. First, among the scholars who have examined the remittance-growth nexus, none have examined such a relationship among top remittance recipient developing countries. However, as remittances are a significant source of external

financing for that group of countries, such a study would provide an important understanding about the remittance-growth nexus at different levels of financial development. Second, this study brings new insight into the remittances-growth nexus under different financial regimes, which is unique in the remittance literature. Such a unique observation asserts that policy makers in top remittance recipient developing countries should formulate policies for financial development such that these countries can reap the potential benefits of remittances on economic growth.

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