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**MACROECONOMIC IMPACTS OF IMMIGRATION IN
MALAYSIA: TRADE, REMITTANCES AND UNEMPLOYMENT**

Nur Fakhzan Marwan

**Thesis Submitted in Fulfillment of the Requirements for the Degree of Doctor of
Philosophy at Durham University**

**School of Government and International Affairs
Institute of Middle Eastern and Islamic Studies
University of Durham, United Kingdom**

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ABSTRACT

Macroeconomic Impacts of Immigration in Malaysia: Trade, Remittances and Unemployment

by

Nur Fakhzan Marwan

The macroeconomic consequence of immigration is a disputable area among many interested parties as evidenced by the empirical studies. Most studies, however, employ Anglo-Saxon countries as their subjects, while there is an increasing demand for studies on the economic consequences of immigration in developing countries. As a developing country, Malaysia has attracted immigration over the years, and the population of migrant labour in Malaysia has reached more than two million in 2008, which makes up 7% of the total population and 20% of total labour force. Thus, such large presence has provided a rationale for an economic analysis on the impact of immigrations on the Malaysian economy.

This research, hence, aims to analyze the economic impact of immigration in Malaysia in the context of trade, remittance and unemployment in an interrelated manner. These topics are examined in detail in three separate empirical essays. Specifically, the first essay examines the link between bilateral trade and immigration, while the second essay explores the relationship between remittances of the Indonesian workers in Malaysia and the macroeconomic variables both in Malaysia and Indonesia. The last empirical essay analyses the relationship between unemployment and immigration in Malaysia. These empirical essays use quantitative research methodology in the form of panel and time series data analysis. However, each essay is based on a different theoretical framework, econometric methods, timelines and samples due to availability data and the nature of the study.

The findings of the first essay indicates that immigration increases both exports and imports through both preference and immigration-link mechanisms, implying that immigrants play a vital role in fostering trade between Malaysia and countries of origin. In the second essay, it is found that Indonesian labour in Malaysia take macroeconomic conditions in both countries into account in their remittance decisions and the findings demonstrate that the main motives to remit is altruism and portfolio investment, indicating the importance of the level of economic activities in both countries. The third essay reveals that there is a lack of evidence supporting the hypothesis of adverse employment effect of immigration in Malaysia, implying that the job-creation effect of immigration has taken place, which has resulted in further economic and employment growth in both public and private sectors.

In conclusion, immigration is vital for both host and home countries' economic developments as the findings of this research have demonstrated, thus refuting the claims that their presence brings more harms than benefits.

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List of Abbreviation

2SLS – Two-Stage Least Squares

ACHR – Asian Centre for Human Rights

ADF – Augmented Dickey-Fuller

AFTA – Asian Free Trade Agreement

AIC – Akaike Information Criterion

ARDL – Autoregressive Distributed Lag

ASEAN – The Association of Southeast Asian Nations

CGE – Computable General Equilibrium

CPI – Consumer Price Index

DfID – Development for International Development

ECM – Error Correction Model

EU – The European Union

FDI – Foreign Direct Investment

FEVD – Forecast Error Variance Decomposition

FTA – Free Trade Agreement

GAM – Free Aceh Movement

GDP – Gross Domestic Product

GMM – Generalized Method of Moments

GNP – Gross National Product

HQ – Hannan-Quinn Criterion

ICT – Information and Communication Technology

IFBWW – The International Federation of Building and Wood Workers

IFS – International Financial Statistics

IFS – International Financial Statistics

IMF – International Monetary Fund

IOM – International Organization for Migration

IRF – Impulse Response Function

IV – Instrumental Variable

K-Economy – Knowledge Economy

KPSS – Kwiatkowski-Phillips-Schmidt-Shin Test

LFPR – Labour Force Participation Rate

LM – Lagrange Multiplier

MIDA – Malaysian Industrial Development Authority

NDP – National Development Policy

NELM – New Economic of Labour Migration

NEP – New Economic Policy

NVP – National Vision Policy

OECD – The Organisation for Economic Co-operation and Development

PP – Phillips-Peron

RM – Ringgit Malaysia

SC – Schwartz Information Criterion

SURE – Seemingly Unrelated Regressions

UK – United Kingdom

UN – United Nation

US – United States

VAR – Vector Autoregression

VECM – Vector Error Correction Model

VIF – Variance Inflation Factor

DECLARATION

I hereby declare that no portion of the work that appears in this study has been used in support of an application of another degree in qualification to this or any other university or institution of learning.

STATEMENT OF COPYRIGHT

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Immigration is an integral part of the social fabric and with the increase in globalization and international trade, has become one of the most controversial and prominent issues. According to the United Nations (UN) (2008), in 2008, there were approximately 214 million people living outside their countries of residence, compare to only 75 million people in 1960.¹ Migration between developing countries accounts for nearly 40% of the global migrant stock, which was more than 74 million people in 2005 alone, where 80% of them migrate to neighbouring countries that share a border with their countries of origin (Ratha and Shaw, 2007).

The analysis of immigration flows - whether internal or international- has become a significant issue in the discussion of the labour market for many decades, as there are a series of questions on whether or not these flows assist the allocation of resources to be more efficient. As immigration has greatly altered the native labour's economic opportunities and continues to generate hot debates over their impact in the host countries, economic related concerns alongside social or political issues are always the predominant element when it comes to the public and intellectual discussions over immigration. In most cases, immigration constantly stirs old-fears and results in prejudices regarding the taking of jobs from the natives (Dustmann and Glitz, 2005), enjoying the welfare benefits without paying much, committing crimes and felony, as well as challenging the status quo of the society by imparting different cultural ideas and lifestyles (Borjas, 1999). Even when the immigrants have finally been integrated into the community, the anxiety over their demands for economic equity and social justice in the host country creates tensions, as they are always perceived as temporarily residing in the country by the native people. The magnitude of these grave subjects pales in comparison to the international movement of products, ideas and even firms. It is no wonder,

¹ See: <http://www.iom.int/jahia/Jahia/about-migration/facts-and-figures/lang/en>

therefore, that the violent hate crimes and racism against immigrants appear to be on the rise (Hate Crime Survey, 2007).²

However, most of the economic research shows that these fears are unsupported methodically. It could, for example, be argued that the increased demand for consumption due to the increase in population through immigration may lead to higher output production, thus boosting the host country's GDP. The perceived adverse economic impacts of immigration are indeed unfounded, particularly in a growing economy, as the consistent and robust conclusions from the empirical investigations have established that immigration affects both demand and supply sides and its overall macroeconomic impacts are neutral, or even positive (Foster, 1994). Among all the aspects of the immigration issue, including the determinants of the flow, the process of assimilation and the consequences for the labour market, the latter captures the most attention from the empirical economists. This is evident in the celebrated collection of (one hundred and two) papers in Zimmermann and Bauer's Handbook of Economics of Migration (2002), all of which have come to the conclusion that immigration, indeed, does not have any detrimental effects towards the host country, in fact, even the opposite. Nevertheless, several notable economists, particularly Borjas (1990, 1994, 1999) definitely disagree with these evidences of burden. It should be mentioned that the results are not always self-evident, due to the methodologies used (Friedberg and Hunt, 1995).

The increasing size in mass migration across international boundaries has attracted many researchers to study its impact on the host countries in the past decades and will continue to be the centre of attention for economists, social scientists and even politicians. Some central issues regarding the economic impacts of immigration, however, still remain under-developed until today. While the literature on the domestic labour market effects of immigration is abundant, the macroeconomic studies of the effects of immigration are rare in contrast. Thus, there is now a growing interest on the macroeconomic studies of immigration flow, particularly as economists attempt to link immigration with trade and

² See: <http://www.humanrightsfirst.org/our-work/fighting-discrimination/2008-hate-crime-survey/racism-and-xenophobia/executive-summary>

remittance. For example, immigrants have long been heavily involved in the exports and imports sectors; however, only recently the link between immigration and trade has been being empirically studied. Remittance flows, on the other hand, have increased significantly by 6% to USD\$325 billion in 2010, proving it to be resilient and unperturbed by the global recession (Issue Brief, The World Bank 2010)³, and therefore capturing not only the commercial and policy attentions but also the academic interest.

Nevertheless, the growing body of macroeconomic empirical studies on the effects of immigration on the host country mostly uses Anglo-Saxon countries as their scrutinized subjects. Thus, the generalization of their research conclusions could not be applied to every country as the effects of immigration may vary due to the diverse demographic features of immigrants and of the native labour as well as the labour market condition (Quibria, 1988). As a result, there is an increasing demand for empirical evidence and economic analysis on the economic consequences of international migration in every host country.

This research, hence, aims to explore and analyze the impact of immigration in Malaysia in the context of trade, remittance and unemployment in an interrelated manner. These topics are examined closely in three separate empirical essays, with the hope that the results obtained and the analysis conducted will contribute to a better understanding on the subject and can also fill the observed gap in the literature with regard to these controversial issues.

Situated at the centre of South East Asia, Malaysia is a multi-ethnic, multi-cultural and multi-religious country, where the population was estimated at 28.25 million in 2010; Malays constitute the largest percentage in the population, which are 60%, followed by Chinese (23%), Indians (10%) and others (7%). These statistics help demonstrate that the Malaysian total labour force is approximately 11.57 million while the Labour Force

³ See: http://siteresources.worldbank.org/TOPICS/Resources/214970-1288877981391/Annual_Meetings_Report_DEC_IB_MigrationAndRemittances_Update24Sep10.pdf

Participation Rate (LFPR) is at 61.7%. The average unemployment rate for the period 1998 to 2010 is 3.3 percent (Department of Statistics Malaysia).

The growth rates for the real Gross Domestic Product (GDP) in the 1980s and 1990s vary steadily between 8-9% per annum indicating robust and also high growth. During the 2000s, however, fluctuations observed in the real GDP resulted in a growth between 4-6%, which can be explained with the international financial crises, the global economic downfall and consequently slow global export demands. The main drivers of growth are the manufacturing and services industries with 7.5% and 5.2% growth rate respectively in 2010. The demand-led growth, on the other hand, is driven by strong private consumption (7.1%) and gross fixed capital formation (9.8%) (Press Release, 11/10/10).⁴ These expansions of domestic demand is due to a higher consumer confidence and flexible, positive labour market conditions, with acceleration in private investment being the result of an increase in domestic production amidst enthusiastic business sentiments and strong capacity utilization.

The rate of Malaysian economic expansion is also expedited by high levels of trade openness and a favourable external sector. Malaysia's top export destinations are Singapore, China, and ASEAN countries, while its top import sources are China, Japan and Singapore, indicating a shift away from the US and the EU and a preference towards East Asian countries (Statistical Release, 2010).⁵ This reflects the emerging economy of China in taking over the US position as the main engine of global growth.

It should be noted, also, that the weak global external demand has not adversely impacted upon the Malaysian economic performance, largely due to the growth of domestic-oriented industries such as consumer products, transport equipment and the resource-based sector, which cushions the contraction of Malaysian GDP. The Malaysian total trade reached RM96.4 billion in 2010, which indicates an increase of 5.6 percent from 2009. It should be noted that the trade surplus was RM 9 billion in 2010, demonstrating

⁴See: http://www.bnm.gov.my/view.php?dbIndex=0&website_id=1&id=807

⁵See: http://www.statistics.gov.my/portal/images/stories/files/LatestReleases/trade/bi/Nov10/External_Trade_Nov10BI.pdf

an increase in 1.3% over 2009. Prime export revenues are earned from electrical and electronic, palm oil and palm oil-based products and liquefied natural gas products. On the other hand, the major import products as secondary goods include machinery and transport equipment, manufactured goods and articles and mineral fuels, lubricants *etc.* (Economic Report, 2010/2011).⁶

The success of the economy should also be contextualized in the larger framework which is inclusive of the social issues and related social policies in the country. For example, domestic disturbances in the form of racial riots in 1969 paved the way for the 30 year social and economic engineering plan, starting from the New Economic Policy (NEP 1971), the National Development Policy (NDP 1991-2000) and the National Vision Policy (NVP 2001-2010), all of which aim to promote national unity and growth. The implementation of these policies has resulted in the Malaysian economic transition from an agriculture-based economy into an industrial economy, providing higher employment probabilities with higher wages and salaries.

Due to the strong economic performance, the growth rate of labour demand far exceeds the growth rate of labour supply, forcing the Malaysian government to import foreign labour to achieve the targeted economic growth. As local labour shuns certain jobs, sectors and niches due to the low-paid, degrading, dirty and dangerous conditions, more local firms now turn to migrant labour due to their cheap labour costs, greater flexibility in terms of working hours, diligence, obliging attitudes and the fact that they are being readily mobilized (Kanapathy, 2005).

Figures for the population of documented migrant labour in Malaysia has grown from more than half a million workers in 1997 to more than two million in 2008, while the number of undocumented immigrants is far higher, illegal Indonesian workers alone are estimated at 2 million people (Immigration Department of Malaysia). At present, migrant labour makes up over 20% of the total labour force, where the majority of them come from neighbouring countries such as Indonesia, Philippines and Thailand.

⁶See: <http://www.treasury.gov.my/pdf/economy/er/0102/chapter2.pdf>

It should be noted that the huge presence of immigration in Malaysia sparks a fierce debate that tends to polarize around the substantial reliance on their workforce on the one side, and rising unemployment insecurity of the domestic labour force on the other side. The large remittance flows and higher imports to satisfy the needs and preferences of immigrants have further become sources of anxiety for potential trade deficits and balance of payment deficits.

1.2 RESEARCH AIM AND OBJECTIVES

This research aims to explore, examine and analyse the economic impact of immigration in Malaysia by focusing on the labour market, international trade and remittances. However, since this research comprises of three different essays investigating three different topics, the research aim and objectives for each essay are discussed individually below:

- (i) The aim of first essay is to examine and analyse the link between bilateral trade and immigration in Malaysia. For this the following objectives are developed:
 - a) to quantify the effect of immigrants on Malaysian exports and Malaysian imports,
 - b) to determine which mechanism plays a dominant role behind the immigration and trade link, and
 - c) to examine the impact of immigration on trade across the types of products, trading partners' characteristics and occupational group of immigrants.

- (ii) The aim of the second essay is to examine and analyse the relationship between remittances of the Indonesian workers in Malaysia and the macroeconomic variables in both Malaysia and Indonesia. In doing so, the following specific objectives are developed:

- a) to identify the relevant macroeconomic determinants of remittances to Indonesia, and
 - b) to determine which motive dominate the migrant's remittance decision.
- (iii) The aim of the third essay is to examine and analyse the relationship between unemployment and immigration in Malaysia. In fulfilling this objective, the following objectives are developed:
- a) to explore the dynamic impact of immigrants on aggregate unemployment in the both the short run and the long run, and
 - b) to examine the relationship between these variables in the form of causality.

1.3 RESEARCH QUESTIONS

Following the research aim and objectives, the research questions for each essay are addressed below:

- (i) For the first essay concerning the immigration-trade nexus, the questions include:
 - a) Does immigration foster bilateral trade flow?
 - b) What are the estimated magnitudes of the elasticities of exports and imports with respect to immigration?
 - c) Which mechanism drives the migration-trade nexus?
 - d) Does the immigration-trade linkage vary based on the classification of products?
 - e) Does the immigrants' lingual and cultural similarity have an important impact on trade?
 - f) Do free trade agreements have a major role in immigration-trade linkage?
 - g) What is the impact of immigration on trade in terms of the occupational segmentation?

- (ii) For the second essay which explores the remittance determinants of Indonesian labour, the research questions are as follows:
 - a) Which macroeconomic variables play important roles in determining the worker remittance flows to Indonesia?
 - b) What motivates Indonesian labourers to remit in the first place?

- (iii) For the third essay, analyzing the impact of immigration on aggregate unemployment, the questions developed are:
 - a) What are the dynamic impacts of immigration on Malaysia's aggregate unemployment in the short run and long run?
 - b) Do changes in Malaysia's aggregate unemployment rate cause changes in the immigration?
 - c) Do changes in the number of immigrants lead to changes in Malaysia's unemployment rate?

1.4 SIGNIFICANCE OF THIS RESEARCH

In spite of tremendous interest with regard to the immigration issues in Malaysia, the literature and empirical research related to the subject is still limited. With regard to the immigration-trade nexus, however, there is only one known study that is by Hong and Santhapparaj (2006) which explores the link between immigration and Malaysian trade and the mechanisms behind it. However, their study focuses on the impact of skilled migrant labour, while this paper focuses on the effect of less-skilled labour. The findings derived from this study will conform to or contradict the theory and the empirical literature, and provides a scope for improvement in the long-term immigration policy to foster trade.

It should also be mentioned that there are no empirical studies focusing on the macroeconomic determinants of Indonesian labour's remittance in Malaysia and the impact of immigration on Malaysia's aggregate unemployment. Thus, the findings are

expected to contribute significantly to our understanding of the respective contexts, recommend appropriate policies and pave the way to the future research. Specifically, the study on the determinants of remittances is significant in determining the explanatory power of the identified macroeconomic variables affecting remittance flows. On the other hand, immigration and aggregate unemployment study is important in producing quantitative research on how responsive the labour market is in Malaysia to immigration and on probing the causal relationship between immigration and unemployment.

1.5 RATIONALE AND MOTIVATION FOR THIS STUDY

This study is motivated by the large presence of immigrants in Malaysia, particularly from Indonesia. The immigrant population is, as stated previously, more than two million people, which makes up about 20% of Malaysian labour force. The benefits and harmful effects of immigration are always the subject of intense debates in many countries, including Malaysia, where the migration issues, particularly concerning low-skilled migrants, always stir the deep-rooted public and individual fears of, among others, rising native unemployment, the reduction of wages and salary, the straining of the public budget and thus leading further poverty among the local people.

Within this context, questions such as ‘Does the presence of immigration bring more harm than good?’, and ‘Will they contribute to the economy apart from selling their labour?’ could be studied in a broad spectrum by focusing on trade and the aggregate unemployment areas. If it is found that immigration induces job-creation effects via trade, entrepreneurship and their own private consumptions, these irrational fears among the Malaysians should be mitigated with the help of economic and social policies. Analysing the remittances, on the other hand, has an enormous potential to expand employment possibilities and to contribute to economic growth and development if understood accordingly and managed properly.

1.6 RESEARCH METHODOLOGY

The empirical essays, which constitute the main body of this research, employ quantitative research methodology and secondary data in fulfilling its own research aims and objectives. However, each essay in this study uses different theoretical frameworks, econometric methods, timelines and samples which are discussed and explained in the respective chapters and are briefly explained below.

The first essay uses the panel data for Malaysia's bilateral trade with ten trade partners during the 1997-2008 periods, which are Bangladesh, Cambodia, China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka and Thailand. The pooled Ordinary Least Square (OLS) is exercised using the STATA program to estimate the coefficients of both exports and imports models. Following the previous studies, the theoretical framework used in this essay is the augmented gravity model.

The second essay employs the time series annual data for Malaysia and Indonesia during the 1994-2007 period. The OLS estimations for the coefficients of the remittance model are carried out using the Microfit software package. The theoretical framework used is the model developed by Huang and Vargas-Silva (2005).

The last essay also uses the time series annual data for Malaysia for the 1997-2008 periods. Using the Eviews program, the VAR estimation, Granger Causality tests, Forecast Error Variance Decomposition (FEVD) and Impulse Response Function (IRF) are performed to investigate the dynamic relationship between immigration, the unemployment rate and the Malaysian GDP. The General Equilibrium Framework is the theoretical foundation for this essay.

1.7 OVERVIEW OF THE RESEARCH

This research comprises of five chapters, including this introductory Chapter, which briefly introduces the thesis background; lays the aims, objectives of, questions for and methodology employed in each essays; and provides a rationale alongside the motivations for the research and the organization of the thesis.

Chapter 2 is the empirical study on the linkage between trade and immigration, in which the essay studies the impact of immigration on the Malaysian trade flow. The contents include the immigration phenomenon and Malaysian trade, as well as the literature and empirical evidence concerning the immigration- trade nexus. The modeling framework used is the augmented gravity models. It is found that immigration increases both exports and imports via both preference and immigration-link mechanisms, indicating that immigrants foster trade between Malaysia and their home countries.

Chapter 3 presents the empirical research on the macroeconomic determinants of the remittances of Indonesian labour in Malaysia. The essay consists of a brief discussion on the Malaysian economic development and Indonesian labour movement to Malaysia. The theoretical literature on the determinants of remittances and the empirical literature of previous research are also discussed broadly. It is found that Indonesian labour in Malaysia considers the macroeconomic situations in both countries in their remittance decisions and their main motives to remit are altruism and portfolio investment, implying the importance of the level of economic activities in both countries.

Chapter 4 is the empirical analysis on the impact of immigration on Malaysia's aggregate unemployment rate. This essay is composed of the immigration phenomenon and Malaysia's unemployment rate, the literature and empirical evidence concerning relationship between immigration and unemployment rate. The empirical results demonstrate that there is no adverse employment effect of immigration in Malaysia in the long run, which is evidence that the job-creation effect of immigration has taken place,

resulting in the further economic and employment growth in both public and private sectors.

Chapter 5 concludes the thesis by providing a summary of the findings and an interpretative discussion through the contextualizing of results in the Malaysian case. The chapter also proposes policy recommendations and future research for respective topics.

CHAPTER 2

IMPACT OF IMMIGRATION ON TRADE FLOWS FOR MALAYSIA

2.1 INTRODUCTION

With an increase in the pace of globalization, trade liberalization and improvement and dissemination of technology, the movements of factor flows, particularly the international labour flows have increased to unprecedented levels, thus greatly affecting the flow of international trade.

Labour flows are also associated with trade flows, as the literature written on the subject suggests that immigration does indeed correlate with the trade flows. The relationship between immigration and trade can be examined from two dimensions: first, the impact of the flow of trade on the flow of immigration, and second, the impact of the flow of immigration on the flow of trade. The first dimension is in the interest of the Department of Immigration which focus mainly on the impact of foreign trade policies on immigration (Morrison, 1982). In contrast, however, trade economists are more concerned with the second dimension, namely the impact of immigration on trade (Wagner *et al.*, 2002). Between these dimensions, Parson (2005) argues that the studies of the second dimension present a far greater importance. He finds that there is “a robust and positive relationship between immigration and bilateral trade flow” (p.4), while Morrison (1982: 7) also boldly claims that the effect of trade on immigration is “indirect and insignificant”.

In the late 19th and early 20th centuries, most theoretical and empirical trade research concentrated on the demand for exports and imports, thus trade theories emerged in explaining the various aspects of trade. For example, the Hecksher-Ohlin Trade Theory, the Ricardian Models and the Specific-factors Model.

The tenets of these theories suggest that different factor endowments lead to specialization. Countries gain in trade and improve their welfare by exporting, and importing goods and services in which other countries specialize (Rosier, 2006: 3). By engaging in international trade, each country exploits its abundant resources most efficiently, concentrates on the economic activities in which it has a comparative advantage, and reaps substantial economies of scale. However, as Borjas (1989) and Blanes (2004) point out, none of these theories discuss the impact of immigration on the bilateral trade flows.

It should be noted that due to increased labour movements, the early 1990s witnessed the shifts of attention to this subject, where the gravity model is used to explore the link between international trade and immigration. Gould (1994) was the first researcher to use gravity model in estimating the impact of immigration on trade by using data from the U.S. One aspect of the impact of immigration on trade is the argument on whether their presence in the host countries is regarded as trade creation or trade diversion. Even though the empirical evidence regarding this issue is limited, all of the empirical studies so far establish the fact that immigration increases the volumes of trade.

The aim of this essay is to examine the linkage between trade and immigration in Malaysia, focusing not only on ten countries that Malaysia has trade relations with, but also from where Malaysia attracts labour. These countries are Bangladesh, Cambodia, China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka and Thailand. The objectives of this paper are, hence, first, to quantify the effect of immigrants on Malaysian exports and Malaysian imports, and second, to determine which mechanism plays a dominant role in the immigration and trade link.

The reminder of this paper is as follows: section 2.2 examines the immigration phenomenon and Malaysian trade. Both section 2.3 and section 2.4 discuss the literature and empirical evidence concerning linkages between immigration and trade flows respectively. Section 2.5 describes the modeling framework including the gravity models,

econometric specifications and data descriptions. Section 2.6 presents the empirical results. Section 2.7 is conclusion.

2.2 MIGRATION AND TRADE PATTERNS IN MALAYSIA

Located geographically in the heart of South East Asia, Malaysia is relatively young and it is one of the most diverse countries in terms of culture, ethnic demography, religion and language and owes its vibrant economy to its long-range economic planning, industrial growth and political stability. As one of the emerging second-wave ‘tiger economies’, the Malaysian GNP per capita is outranked only by wealthy Singapore and oil-rich Brunei (World Bank, 2010).

In order to contextualize the research in this paper, it might be useful to render some information on Malaysia. Gaining independence from the British Empire in 1957 as a country, and in 1963 forming a federation of states, the governance of the country is shared and divided between the federal and state governments. The official language is Malay, and the secondary languages are English and Mandarin, widely spoken as business languages. This multi-cultural, multi-ethnic and multi-religious society encompasses a majority Muslim population, political domination by the Malays and economic power in the hand of Chinese. Its population is about 27.7 million, where 60% of the total population are Malays, 23% are ethnic Chinese, while ethnic Indian and others are 10% and 7 % respectively (Census of Population and Housing Malaysia 2000, 2000: 5).

Due also to the ethnic mix of the country, Malaysia has a long history of immigration. In 1997 there were almost 630 thousands immigrants, while in 2009; this increased to 2 million migrant workers working primarily in the plantations, manufacturing, construction and domestic services (Buletin 4/2009).⁷ The undocumented migrants who work illegally were estimated at one million in 2005, where most of them are from nearby Southeast Asian countries such as Indonesia, Thailand and Philippines (ACHR

⁷ See: <http://www.imi.gov.my/>

Review, 2004).⁸ The figure is believed to be much higher today, however the research could not locate any estimates, official and otherwise.

The strong economic growth rate, stable political situation, harmonious community, higher wages, better working and living conditions are among the magnetic factors that have attracted the higher flow of international migration into Malaysia. In addition, since these immigrants are largely from Indonesia, Bangladesh, Thailand, China and India, they share the same racial roots, ancestors, cultures and languages with many citizens of Malaysia in the form of the Malays, Chinese, and Indians, making migration relatively easy. In conjunction with the economic reason, many other factors such as political problems, religious persecution, social disasters, and environmental degradation in their home countries also create strong pressures to push them into migration. Furthermore, the close proximity makes Malaysia an obvious choice for relocating abroad.

In understanding the increasing immigrant labour, one has to note the pursuance of aggressive development policies in Malaysia, which has provided high employment opportunities for both foreign and native labour. It has also opened the door for a higher flow of low skilled labour due to the chronic labour shortage in ‘3D jobs’, namely dangerous, degrading and dirty jobs. Many sectors are in a dire need of these workers due to the refusal of jobs by native workers.

As depicted in Table 2.1, Indonesian labourers constitute the majority of the documented migrant labour in 2008. This is followed by Bangladeshis and the Nepalese. Migrants from other countries are much smaller in percentage. As mentioned above, Indonesian labourers are also believed to be the highest number in term of undocumented migrant workers. Liow (2003) argues that the illegal Indonesian labour flow to Malaysia is the second largest flow after illegal Mexican labour to the U.S.

Factors contributing to Malaysia’s stunning economic growth are many, including the openness to international trade. As can be seen in Table 2.2, the ratio of total trade to GDP increased significantly in the last four decades, from 72.2% in 1970 to 191.9% in

⁸ See: <http://www.achrweb.org/Review/2004/53-04.htm>

2008. Malaysian trade increased from USD\$ 3,087 million in 1970 to USD\$ 180, 192 million in 2000, and further increased to USD\$ 374, 083 million by 2008 (World Development Indicator).

Table 2.1: Distribution of migrant worker population in Malaysia in Country of Origin, 2008

Country	Total Immigrants	Percentage
Bangladesh	316,401	17.289426
Cambodia	12,887	0.7041976
China	9,822	0.5367137
India	130,265	7.1182049
Indonesia	1,085,658	59.324731
Nepal	201,997	11.037931
Pakistan	21,278	1.1627157
Philippines	26,713	1.459706
Sri Lanka	3,940	0.2152975
Thailand	21,065	1.1510765
TOTAL	1,830,026	100

Source: Immigration Department of Malaysia (2010)

Even though the global demand and commodity prices have fallen due to the global economic recession in 2008, Malaysia's trade earnings have not been heavily affected as the Malaysian government was quick to intervene the market by two stimulus plans, an RM67 billion economic stimulus plan and the provision of loan guarantee facilities (Bank Negara Annual Report, 2008: 3).⁹

As demonstrated in Table 2.2, total exports increased tremendously from USD\$ 1,687 million in 1970 to a massive USD\$ 98,229 million in 2000, and further increased to USD\$ 209,673 million in 2008. Malaysia's biggest trading partners are ASEAN

⁹ See: http://www.bnm.gov.my/view.php?dbIndex=0&website_id=1&id=694

countries, followed by the US, the EU and Japan during the 1970-2000 period. Recently, however, Malaysia's exports have risen steadily to East Asia countries, particularly to China.

Table 2.2: Trade and Production data for Malaysia

Year	GDP (US\$mil)	Total Trade (US\$mil)	Trade (% of GDP)	Exports (US\$mil)	Imports (US\$mil)
1970	4,276.67	3,087.33	72.2	1,686.58	1,400.75
1990	44,024.18	58,710.10	133.4	29,452.30	29,257.80
2000	93,789.74	180,191.80	192.1	98,228.90	81,962.90
2008	194,926.58	374,083.00	191.9	209,673.00	164,410.00

Source: World Development Indicator, World Bank Online Database.

The compositions of Malaysia's exports have changed over time, due to the deliberate government economic restructuring policies which focus on an export-oriented development strategy since the 1990s and embracing trade openness by signing up to more free trade agreements. In the 1970s and the 1980s, most exports were made up of raw materials such as crude materials, mineral fuels and lubricants. The 1990s, however, marked the emphasis on the export of secondary or manufactured goods, particularly in the form of machinery and transport equipments, and conversely, low exports in raw materials (Rasiah, 2002). This condition continued throughout the 2000s, but electrical and electronic products have become the major component which constitutes 41.5% of the total export in 2009 (Malaysian External Trade Statistic, 2009).

A closer inspection of the Malaysian imports reveals that the total Malaysian imports was valued at USD\$ 1,401 million in 1970, increased to USD\$ 81,926 million in 2000, and by 2008, had reached USD\$ 164,410 million. The imports were mainly from the EU, ASEAN countries, the U.S, Japan and East Asian countries in the 1970s. However, the imports from EU countries have grown weaker over time, particularly from the U.K. The share of imports from other countries remains strong, particularly from Japan, Taiwan, South Korea, China and Hong Kong.

In the 1980s, due to the desire to achieve a higher economic growth based on the export-oriented strategies, Malaysia needed to import a higher amount of intermediate manufactured goods, machinery, and equipment to realise this objective, given its scarce natural resources. These goods can be categorized as producer goods. The imported producer goods continue to be accounted as the biggest share in the total import, which constitutes 68.6% of total imports in 2009. Consumption goods, however, account for only 7.2% of the total imports in 2009 (Malaysia External trade Statistic, 2009).

As stated above, Malaysia's external trade is further strengthened by adopting liberal trade policies, embracing trade openness by signing up to more free trade agreements. Malaysia has signed and implemented two bilateral free trade agreements with Japan and Pakistan, and four regional free trade agreements, that is with The Association of Southeast Asian Nations (ASEAN) countries, ASEAN and China, ASEAN and Korea, and ASEAN and Japan. The agreements have definitely boosted Malaysian trade. For example; exports to Japan have risen by 9.2% and foreign investment from Japan increases by 20% in the year 2006 (Economic Report 2005/2006).¹⁰

The ASEAN countries which consist of 10 members¹¹ signed a trade bloc agreement, the ASEAN Free Trade Area (AFTA) in 1992 with the objective of promoting the free flows of goods from within ASEAN and attracting higher foreign direct investment (FDI) to ASEAN. AFTA has played an important role in increasing Malaysia's external trade by providing a huge market access. In 2009 alone, Malaysia's share of the intra-ASEAN trade is at 26%, valued at USD\$ 72.1 billion.¹²

Table 2.3 shows Malaysia's imports with her trading partners which are the focus of this paper, which are Bangladesh, Cambodia, China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka and Thailand. From the table, it can be seen that Malaysia had the highest import for the period of 1997 to 2008 with China, being at 43% of the total import, followed by Thailand and Indonesia with 23% and 17% respectively.

¹⁰ See: http://www.btimes.com.my/Current_News/BTIMES/bt_ebooks/ecnrp0506.pdf

¹¹ These countries include Malaysia, Brunei, Indonesia, Philippines, Singapore, Thailand, Myanmar, Cambodia, Laos and Vietnam.

¹² See: http://www.miti.gov.my/cms/content.jsp?id=com.tms.cms.section.Section_8de83760-7f000010-72f772f7-f5047602

Table 2.3: Malaysia's total imports with trading partners, 1997-2008

Country	Total Import (USD\$)	Percentage
Bangladesh	244,186,339	0.10
Cambodia	181,080,868	0.07
China	105,038,624,780	42.82
India	13,365,469,720	5.45
Indonesia	41,710,345,810	17.00
Nepal	4,549,033	0.00
Pakistan	693,394,910	0.28
Philippines	27,376,697,578	11.16
Sri Lanka	166,192,393	0.07
Thailand	56,504,205,421	23.04
Total	245,284,746,852	100

Source: United Nations Commodity Trade Statistics Online Database

The deepening of Malaysia-China ties in recent years has improved the Malaysian-China bilateral trade, as China is also the top destination for the Malaysia's export. As can be seen from Table 2.4, from 1997 to 2008, Malaysia's exports to China amounted to USD 88.9 billion, followed by Thailand at USD 63.7 billion and India at USD 38.2 billion.

Table 2.4: Malaysia's total exports with trading partners, 1997-2008

Country	Total Export (USD\$)	Percentage
Bangladesh	3,661,514,467	1.40
Cambodia	1,021,989,231	0.39
China	88,885,777,016	33.95
India	38,183,597,809	14.58
Indonesia	32,486,426,062	12.41
Nepal	110,450,182	0.04
Pakistan	9,173,594,692	3.50
Philippines	21,012,971,479	8.03
Sri Lanka	3,558,319,239	1.36
Thailand	63,744,802,823	24.34
Total	261,839,443,000	100

Source: United Nations Commodity Trade Statistics Online Database

These countries, with the exception of India, have signed free trade agreement (FTA) with Malaysia; thus the exporters and importers from the respective countries receive preferential treatments and bigger market access. Reduction in custom duties, less hassle in custom procedures, and the elimination of cumbersome regulations enable both exporters and importers to enjoy cost savings, improve efficiency, develop competitiveness, and reap the benefits of technology transfer, joint ventures and partnerships, thus expanding trade activities (Malaysian Free Trade Agreement).¹³

The Malaysia-China trade relationship is marked by a trade deficit, where the major contributing factor is the fall in commodity prices, especially palm oil, in 2008 and 2009. However, it is also postulated that China's dependence on the Malaysian exports is growing weaker due to China's expansion on its wide ranges of manufactured goods (Hui, 2010).¹⁴ However, this is refuted by Li (2006: 8) who argues that this threat is baseless as there is enough heterogeneity in Malaysian and Chinese goods. Furthermore, China is one of the world's most populous countries, thus its consumer market presents high diversity and high potentials in growth.

Malaysian trade with India has also been burgeoning for the past 6 years, implying the importance of India as the leader of growth in emerging markets. India is focusing on improving and expanding its manufacturing industries, and therefore its increasing demand for natural resources, particularly in commodities and raw materials, has been supplied by Malaysia, among others (Malaysian Free Trade Agreement, 2003).¹⁵

Indonesia, on the other hand, was the 10th and 7th Malaysian largest trading partner in 2006 and 2009 respectively (Malaysian Trade Statistic, 2009),¹⁶ reflecting increasing bilateral trade between these countries. This expanding cross border trade has been fuelled by many factors, for example bilateral trade cooperation, the implementation of the Asian Free Trade Agreement (AFTA) and intensive investment cooperation.

¹³ See: http://www.matrade.gov.my/cms/content.jsp?id=com.tms.cms.section.Section_e6b0d410-7f000010-13c913c9-ccfb4170

¹⁴ See: <http://www.thejakartaglobe.com/opinion/india-china-and-asean-economic-growth/365812>

¹⁵ See: http://www.matrade.gov.my/cms/content.jsp?id=com.tms.cms.section.Section_e6b0d410-7f000010-13c913c9-ccfb4170

¹⁶ See: http://www.matrade.gov.my/cms/content.jsp?id=com.tms.cms.article.Article_424bd28a-7f000010-7c117c11-bd5b4635

It should be stated that numerous factors are believed to affect the size of trade volumes. These include political, institutional, economic and social factors. The postulated determinants that contribute to the trade growth between Malaysia and these trading partners are many, and one of the objectives of this paper is to investigate whether immigration is one of these contributing factors.

Given that many Indonesians, Indians and Chinese in Malaysia are the descendants from Indonesia, India and China respectively, and also considering that the new flow of immigrants labourers are mostly with these countries, it is important to investigate whether the immigrants and local firms take advantage of the home -country-knowledge and network links to increase the trade activities between countries. The following section will discuss both theoretical literature and empirical evidence on the link between immigration and trade.

2.3 LINKAGE BETWEEN IMMIGRATION AND TRADE

The scarcity of theoretical literature on how immigrants affect trade patterns is attributed to the fact that only recently has progress in this area been developed. Gravity models are a frequent method employed in investigating the impact of immigration on trade flows in the existing body of knowledge.

The origin of gravity models can be attributed to Newton's *Law of Universal Gravitation* in the 17th century. Experts in other areas such as geography and physics have long used these principles before economists began to apply it directly to the international trade areas. Ravenstein (1885) is one of the earliest academics who blended the gravity principles with migration issues, resulting in his formulation of the 'Law of Migration', which highlights that the motives of migration are mostly based on economic reasons. These laws are still remarkably relevant today.

Another scholar who successfully attempted in applying Newton's gravitational principles into their models include Zipf (1946) who investigated the determinants of migration between major cities, and Lowry (1966) who merged the gravity-and-wage-based principles to predict the flow of migration. Since then, Head (2002) notes there are increasing numbers of studies that use the gravity models to test 'social interactions' (p.2).

Tinbergen (1962) and Poyhenen (1963) are among the first economists to employ the gravity principles in modeling the international trade where trade is a function of pull factors such as Gross Domestic Product (GDP) and push factors such as trade obstacles and trade distance. These two economists, however, did not provide a comprehensive econometric gravity modelling for trade, thus Linnemann (1966) fills in the gap by incorporating more variables and applies a Walrasian general equilibrium model (Parsons, 2005: 3).

It is Gould (1994), however, who first applied the gravity model in the study of the impact of immigration on trade flows. Gould's biggest contribution to immigration literature is that the impacts of immigration on trade flows can now be properly quantified. Gould argues that the existence of the immigrant population stimulates a stronger trade link, as immigrants are the ties between their host countries and their original countries, and their presence have substantial impacts on the host-countries' exports and imports values.

Gould (1994), inspired by Min's (1990) case study on trade between Korea and U.S, notes that immigrants are generally able to identify market niches in which they trade profitably, and these human capital externalities act as a catalyst for trade enhancement between host and home-countries. It is Gould's insight that instigates subsequent studies in this area, which are covered in many geographical regions worldwide.

The understanding of the link between immigration and trade involves the identification of the mechanisms on how immigration affects both imports and exports. Gould

proposes two mechanisms, namely the preference mechanism and the immigrant-link mechanism. Many additional mechanisms are supplied by later researchers such as Wagner *et al.*'s (2002) information mechanism, Rauch's (2001) network effect, Dunlevy and Hutchinson's (1999) uncertain trade diverging effects, to name a few. However, all of these relate to Gould's (1994) original second mechanism. The following part will discuss on how immigration may affect the trade volumes and patterns through these two main mechanisms.

2.3.1 Preference Mechanism

Immigrants, having grown up developing fond tastes of their home-countries' products, are more likely to have a demand bias towards products of their country due to emotional attachment (Poot and Cochrane, 2005: 24). This mechanism implies that the desire of consuming unavailable home-country products in the host country environment will have a direct impact on import. As immigrants present different demand patterns from local people, owing to their different lifestyles, cultures and cuisines, it is assumed that they will increase the volume of imports of host-countries from the home-countries (Mundra, 2005: 66). Moreover, Combes *et al.* (2003: 10) claim that there is a high possibility of local people acquiring a taste for these new unfamiliar products, thus affecting the volume of imports. The study on the U.S by Dunlevy and Hutchinson (1999) also provides empirical evidence on the U.S imports that are strongly influenced by the immigrants' presence.

Mundra (2005: 73), however, suggests that due to the assimilation process, immigrants might change their tastes and preference over time, and come to resemble more of the local people's habits, customs and attitudes, adapt to the new cultures and languages, and develop new identities. Consequently, their original preference for the home-country's products will gradually fall, which results in the decrease of the host-countries imports from the respective countries of the immigrant communities.

In conclusion, as the discussion so far indicates, the impact of the preference mechanism on the trade flows is rather ambiguous in determining whether immigration is a trade creation or a trade diversion.

2.3.2 Immigration-link Mechanism

Gould's (1994: 307) second hypothesis on how immigration influences the trade flows involves immigrants affecting trade via the immigrant-link mechanism, in which, unlike the first mechanism, it affects both the imports and exports flows through a reduction in the transaction costs. In this, the decrease in transaction costs can lead to greater values of imports from the home-countries and exports to the home-countries from the host-countries.

The transaction costs, according to McCallum (1995), are the distortions to the bilateral trade flows, which reveal that the values of trade among Canadian provinces are 22 times higher compared to the trade between Canadian provinces and the U.S states which are of equal distance. This provides empirical support for the impediment threat of the transaction costs to the cross-border trade. The identification of market information, distribution channels, and potential trading partners as well as awareness with the ever-changing government's trade policies, rules and regulations, are examples of the cumbersome components of transaction costs (Abdel-Latif and Nugent, 1996: 2). If the transaction costs act as hindrances to the trade flows, immigrants may act as trade intermediaries (Gould, 1994; Head and Ries, 1998).

2.3.2.1 Communication barriers

Gould (1994: 303) presents three ways of how immigrants may reduce the transaction costs. First, the communication barrier, which presents a significant threat to the trade flows, is lower as many immigrants and local people become familiar with each other's

languages. Min (1990: 22) found that Korean exports to the U.S increased substantially since the early 1970s due to the start of the massive influx of the Korean immigration. He explains this by arguing that ‘by virtue of the advantages associated with their language and ethnic background, many Korean immigrants have been able to establish import business dealing in Korean-imported merchandise’ (Min, 1990: 22).

Gould (1994: 312) also finds the immigrants from countries in which English is not their first language have larger impact on exports and imports, compared to those who originally migrated from English speaking countries. Wagner *et al.* (2002: 511) find that the ability of immigrants to speak both languages of the home and host-countries fluently enables them to enhance trade flows. These bilingual immigrants are accustomed with both countries’ market conditions and are aware of rising trading opportunities; therefore, they effectively facilitate trade creation between the host and home-countries. Evidence is provided by Hutchinson (2002) who finds that the greater the difficulty encountered by English speaking traders in the US in learning the immigrants’ first language, the lower the value of trade between US and that country.

Over time, it is expected that trade will be further enhanced through language assimilation that reduces the ‘language distance’ of the immigrant population (Chiswick and Miller, 1994 and 1996). Thus, the easing of communication problems and the implementation of better trading agreement will then help to reduce transaction costs (Light and Rosenstein, 1995; Light and Bonaich, 1988). Dunlevy (2006: 183) finds that the greater the ‘language distance’ of immigrants from English language, the higher the volume of U.S export to their home-countries.

In addition, commonality of language often reflects sharing a similar cultural tradition (Tadesse and White, 2010: 238). Cultural distinctions are generally linked to social and institutional dissimilarity as well as information asymmetries, situations favourable for immigrants to stimulate higher trade volume through exploiting their greater knowledge on their home economic, social, judicial and political institutions; market opportunities; and cultural norms and values. These exploitations in turn will reduce the cost of

informational barriers (Gould, 1994; Girma and Yu, 2002). Therefore, the higher the cultural distinctions between trading countries are, the larger will be the trade volume.

2.3.2.2 Informational barriers

The second mechanism postulated by Gould (1994: 303) in modelling the trade and immigration nexus is that the superior knowledge of, and greater access to, the home-countries heterogeneous products, business practices and laws give immigrants certain advantages over local producers, thus lowering transaction cost of informational barriers and stimulate bilateral trade. To conduct trade in the foreign countries, familiarity with certain information is required, especially concerning patent and contracting enforceability, broad understanding of the judicial function, and the protection of property rights (Herander and Saavedra, 2005: 327). Immigrants are in a better position of obtaining information on the quality, characteristics and the availability of the home-products, as well as home-consumer preferences, which reduces the local producers' cost of searching for trading partners. Thus, these advantages are heightened if the immigrants maintain active connection with the business network in their home-countries (Rauch 2001: 1178).

Rauch (1999: 7) further expands on the second mechanism developed by Gould (1994) as a network effect or an ethnic network mechanism. Literature surveyed by Rauch (2001) and Wagner *et al.* (2002) suggest that the network effect may reduce the transaction costs associated with the information barriers, thus stimulating trade flows. For example, the immigrants' network may promote trade through facilitating the exchange of information on business opportunities. The network, Rauch (2001: 1184) suggests, 'can help producers of consumer goods to find appropriate distributors, assemblers to find the right component suppliers and investors to find join-partners'.

Close proximity plays an important role in developing the immigrants' network. Many empirical works show that immigrants have a tendency to cluster in specific locations, usually in areas with a large existing immigrant population (see, for examples, Bartel,

1989; Bauer *et al.*, 2002; Jaeger, 2003). Furthermore, the existing social capital within the networks, such as ample available capital, business expertise and pools of labour resources will be of valuable assistance to the new immigrants in adjusting to the new environments, as well as strengthening the ties with the business contacts in the home-countries (Mundra, 2005: 71). The social capital also generates trust and reciprocity (Putnam, 2000: 67), which are important elements in generating the efficiency and efficacy of business transactions.

The network also, according to Rauch (2001: 1180), acts as an alternative way of better contract enforcement by discouraging the costly behaviour of opportunism. The reciprocal knowledge of trade partners helps to reduce the danger of business opportunism, and the network monitors and enforces the contract agreements. In addition, owing to the repeated interactions and high-speeds of the exchanged information, the reputation effects are likely to be enhanced inside a network. Rauch and Trindade (2002: 116) report the possibility of exercising the sanctions by the entire network against the cheating member. Thus, the threat of being excluded not only from engaging in further trade transactions, but also from political involvement and social associations, is powerful enough to deter opportunistic behaviour and the violations of contracts and obligations. Therefore, Rauch and Trindade (2002) posit that the enforcement effect reduces the transaction costs by fear of social retaliation. Their study on the ethnic Chinese shows that co-ethnic Chinese network boosts their shares of trade volumes, as evident in Southeast Asia, where there is an increase of at least 60% in the trade values of the differentiated products. Clearly, the network effect is a dynamic tool in influencing the bilateral trade flow.

2.3.2.3 Trust barriers

Low levels of trust and the weak enforcement of international trading contracts may distort the bilateral trade flows. Immigrants, therefore, may facilitate trade as they help lower the costs of negotiation and enforcement of the contracts by building mutual trusts

as traders rely on the contracts for prompt payments and fast delivery. This can be considered as the third way on how immigration may decrease the transaction cost, as argued by Gould (1994: 303).

The matching process between sellers and buyers depends crucially on trust as an essential ingredient; therefore, the business dealings often involve parties that share similar cultures, beliefs and ethnicities. Dunlevy (2003: 10) labels these cultural and trust elements brought by the immigrants as a 'cultural bridge' which plays a vital role in the trade enhancing effects of immigration. Since most Malaysian trading partners share similar cultures, ethnicities and languages, it is important to explore whether the immigrants from the neighbouring countries positively affect trade flows as they, theoretically, may reduce the transaction costs because they have advantages on the issues of mutually understood culture and of trust in dealing with their business contacts in their original home-countries.

2.3.3 Reversed Movement of Goods

It has already been hypothesized that the existence of an immigrant population generates a significant demand for their unavailable home-products, thus affecting the import of host-countries positively, as discussed previously in section 2.3.1. However, Mundra (2005: 73) claims that if the immigrant population becomes larger, they may establish their own entrepreneurial activities and start producing home-products in the host-countries. Consequently, the imports of the host-countries for certain goods from home-countries will fall. Diaz-Alejandro (1970) has found empirical support for the involvement of immigrants in the import-substitution activities, specifically in the manufacturing sector in Argentina, who observes that 'there are many examples of immigrant merchants, especially in the import business, gradually becoming manufacturing entrepreneurs using their commercial profits' (p. 216).

Further empirical support for the trade substitution effect of migration is provided by Girma and Yu (2002) for the U.K data. They initially hypothesized that a 10% increase in the immigrants stock from commonwealth countries would increase the U.K imports from those countries by 1%; instead, they found that the imports were reduced by 1%. The immigrant population in the UK from commonwealth countries is bigger than those from non-commonwealth countries, thus, the findings established the fact that many of these commonwealth immigrants become manufacturers due to the economies of scale.

It should be noted that Dunlevy and Hutchinson (1999: 1045) further argued that the development of import-substitution activities is deeply influenced by the acquired knowledge that immigrants possess concerning the production methods and technology, which enables them to produce the home-products efficiently. Similarly, local producers may produce the home-products to accommodate for the immigrants' tastes and preferences. The amassed wealth that immigrants bring into the host-countries may speed up this process of entrepreneurship.

With regards to the exports activity, on the other hand, Mundra (2005: 72) posits that the immigrants who return to their original home countries bring with them the information on the host-countries' products, thus initiating the exports activity from host to home countries. All these will result in an increase in the value of the host-countries' exports. Tsuda (2003) reports evidence of the return migration of Japanese immigrants from Brazil to Japan. The value of Japanese Brazilian's remittance is approximately US\$2 billion each year, which is equivalent to 6% of Brazil's exports value.

Mundra (2005: 72) also claims that the returned migrants, armed with the information of the host-countries' products and their new acquired technology, may set up production in their home-countries to produce host-products, and therefore the host-countries' exports to the home-countries will fall. In principle, therefore, the effects of immigration on trade are ambiguous.

After discussing the theoretical conceptualization, the next section will discuss the finding of empirical research on the impact of immigrants on trade flows.

2.4 SURVEYING THE EMPIRICAL STUDIES ON IMMIGRATION AND TRADE NEXUS

Table 3.5 shows the results from the earlier studies of trade and immigration linkage which employs the gravity-trade models. Gould (1994) studied the United States data and found a positive link between immigration and trade flows. Other influential studies by Dunlevy and Hutchinson (1999, 2001) explored the impacts of immigration on U.S exports and U.S imports separately. Following studies are by White (2007a, 2007b) who also included the categories of the income of home countries as variable, Rauch (1999) and Mundra (2005) who incorporated product types, and found that the U.S trade-immigrant links differed considerably. Nonetheless they arrive at the similar conclusion that immigrants boost the trade volumes.

More studies document the linkages between trade and immigration for Canada (Helliwell, 1997; Head and Ries, 1998; Wagner *et al.*, 2002), the United Kingdom (Girma and Yu, 2002), Spain (Blanes 2003, 2004, 2006), France (Combes *et al.*, 2003), New Zealand (Bryant *et al.*, 2004), the European Union (Parsons, 2005), Portugal (Faustino and Leitão, 2008) and Malaysia (Hong and Santhapparaj, 2006). Among these, Rauch and Trindade's (2002) approach of study is very interesting as they investigate the impact of Chinese Networks on bilateral trade, proxy by the product of ethnic Chinese population shares. Covering 63 countries for both 1980 and 1990, they found that the ethnic Chinese Network increased bilateral trade in differentiated goods by nearly 60% in Southeast Asia.

Co *et al.* (2004), Bardhan and Guhathakurta (2005), Herander and Saavedra (2005), and Dunlevy (2006) further examined the linkage between immigration and trade using US state-level export data cover the time span between 1990 to 1996. Co *et al.* (2004) have

found that the presence of immigration increases the U.S exports to developed countries by 2.9% and to developing countries by 2.7%. Bardhan and Guhathakurta (2005), on the other hand, found that ethnic migration networks increased exports by 0.6% to 2.6% between west coast states and east coast states in the U.S. Herander and Saavedra's (2005) findings include the fact that state's immigration population increases its exports to the home country by 1.8%. Employing the U.S average exports to 87 countries, Dunlevy (2006) found that the ethnic network elasticity of exports ranged from 0.24 to 0.47, further supporting the notion that immigration fosters bilateral trade between host and home countries.

All the studies discussed so far use recent data, apart from Dunlevy and Hutchinson (1999, 2001) who observed the U.S data from the period of 1870-1910. Some studies use non-linear statistical models thus the model is in its original multiplicative form, while others use linear model by taking logs of both side. Most researchers use cross-sectional data and find a larger impact of immigration on bilateral trade, while Gould (1994) who used time series estimation find a smaller impact. Fixed effect estimation tends to be smaller due to less information and bigger measurement errors, while cross-sectional studies' estimations tend to be larger due to the unobservable variables effects. Remarkably, most studies focus on the developed countries as host countries in examining the linkage between immigration and trade. Thus, this study attempts to shed light on immigration-trade literature for a developing country, namely Malaysia.

All studies mentioned in the literature are based on a gravity model. The summary of these studies are presented below in the Table 2.5.

Table 2.5 replicates Bryant *et al.*, (2006) comparison table, with additions from several studies.

Researchers	Sample Period	Export Elasticity	Import Elasticity	Method
Gould (1994)	U.S and 47 trading partners; 1970-1986	0.02	0.01	nonlinear least squares
Head and Ries (1998)	Canada and 136 trading partners;	0.10	0.31	Tobit regressions

	1980 – 1992			
Dunlevy and Hutchinson (1999, 2001)	U.S and 17 trading partners; 1870 – 1910	0.08	0.29	semi-log Tobit relationship
Girma and Yu (2000)	U.K and 48 trading partners; 1981 – 1993	0.16	0.10	cross-sectional techniques
Combes et al (2005)	94 French department; 1993	0.25	0.14	fixed-effects or the basic odds specifications,
Rauch and Trindade (2002)	63 countries; 1980, 1990	0.21/0.47	0.21/0.47	Tobit regressions
Wagner, Head and Ries (2002)	5 Canadian regions and 160 foreign countries; 1992 – 1995	0.16	0.41	OLS and country fixed effects
Blanes- Cristobal (2003)	Spain and 40 trading partners; 1991-1998	0.23	0.03	OLS estimations
Mundra (2005)	U.S and 47 trading partners; 1973 – 1980	a	a	Semiparametric fixed effect instrumental variable
Parsons (2005)	EU- 15 countries and 15 EU-expansion countries; 1994-2001	0.12	0.14	pooled OLS and fixed effects estimation
Hong and Santhapparaj (2006)	Malaysia and 16 trading partners; 1998-2004	0.53	0.88	pooled OLS, both with and without fixed effects and both dynamically modeled.
Fautino and Leitão (2008)	Portugal and 15 European countries (EU15); 1995-2003	0.598	0.56	a static and dynamic panel data analysis
Bryant et al (2004)	New Zealand and 170 trading countries; 1981 – 2001	0.09	0.15	maximum simulated likelihood methods
White (2007)	US and 73 trading partners ; 1980 – 2001	0.11	0.13	pooled Ordinary Least Squares.
White (2007)	Denmark and 170 trading partners ; 1980 - 2000	0.23 - 0.57	0.19 - 0.33	Tobit specification
Insel et al (2010)	Turkey and 14 trading partners ; 1980-2007	0.077	0.116	Fixed effects dynamic panel estimation, and the Least Squares
Helliwell (1997)	Trade among OECD	0.34	0.06	OLS

	countries, Canada and the US ; 1990			
Co et al. (2004)	US state exports and 28 countries ; 1993	0.27 - 0.30		Both ordinary least squares and Tobit estimation.
Bardhan and Guhatkakarta (2004)	US state exports and 51 countries; 1994-1996	0.24-0.26	0.06-0.09	The fixed effects estimation
Herander and Saavedra (2005)	US state exports and 36 countries; 1993-1996	0.18		Tobit model,
Blanes and Martín-Montaner (2006)	Spain and 48 trading partners; 1988-1999	0.47	0.47	A logit transformation of the Brühlhart index - OLS estimation
Dunlevy (2006)	US state exports and 87 countries, 1990-1992	0.24 - 0.47		Tobit procedure.
White and Tadesse (2007)	Australia and 101 trading partners; 1989-2000	0.47	0.18	Feasible Generalized Least Squares
Bandyopadhyay <i>et al.</i> (2008)	US state exports and 29 countries; 1990 – 2000	0.14		Pooled Cross Section and Fixed-Effect Estimates
Tadesse and White (2008)	US state exports and 75 countries, 2000	0.11		Tobit specification and the OLS technique
Tadesse and White (2007)	US state exports and 75 countries, 2000	0.05		Tobit specification
White and Tadesse (2008)	US state exports and 75 countries, 1998-2001	0.12		(i) OLS), (ii) Tobit, and (iii) Poisson models

a – As Mundra (2005) adopts semiparametric estimation, the elasticities are not estimated.

Table 2.5 shows the magnitudes¹⁷ of exports and imports elasticities with respect to immigration as well as the applied econometric methodologies by the respective authors. These elasticities indicate how much the trade increases when the size of the immigrant stock increases. For example, Gould (1994) observes that an increase of 10% in the

¹⁷ See Wagner et.al. (2002) for the calculation of these estimations.

immigrant stock will increase U.S exports by 0.2% and U.S imports by 0.1%, *ceteris parabus*. Observations from the Table 3.5. indicate that overall, a 10% increase in the migration population will increase host-country exports by 0.1 - 6%, with imports ranging in between 0.1 – 8.8%. All empirical papers demonstrate that there is a statistically significant relationship between immigration and trade flow; immigrants do increase the volumes of both exports and imports. However, their results vary significantly as the researchers employ different time periods, econometric specifications and geographical areas.

Even though it is feasible to draw some conclusions on the relative strengths of the two mechanisms discussed above, to identify them separately in a precise manner is an essential but formidable task. Gould (1994) raises the concerns about the challenges to differentiate the effects of these two mechanisms as both can indicate that immigration stimulates higher trade volumes, since it is evident that it is what most empirical studies are constantly attempting to accomplish. The dominance of one mechanism over another can be identified through the magnitudes of the export and import elasticities. Gould (1994: 307) then postulates that the preference mechanism will only affect the imports of the host-country, whereas the immigrant-link mechanism would affect both imports and exports. Therefore, if the immigration has a positive impact on the imports, only the preference mechanism accounts for the relevant explanation. Similarly, if the impact of immigration on imports is greater than on exports, once more the preference mechanism is the relevant justification. However, if the immigrants influence both exports and imports significantly, these will evidence the prevalence of both mechanisms (Parsons, 2005: 4).

Interestingly, on one hand, some studies report the dominance of the immigrant-link mechanism over the preference mechanism as the exports coefficient is larger than the imports coefficient. These are the evidences provided by Gould (1994), Girma and Yu (2002), Blanes (2003) and Fautino and Leitão (2008). On the other hand, other studies such as Head and Ries (1998), Dunlevy and Hutchinson (1999), Wagner, Head and Ries (2002) and Parsons (2005) provide contradicting results. It is found that, from their

studies, migration does have a greater impact on imports than on exports, thus supporting the empirical importance of the preference mechanism.

These contrasting results which show that the identification of mechanisms through which immigration influences and affects bilateral trade flow are rather ambiguous and depend on the mentioned factors. A further factor is the rigid definition of the preference mechanism. Parsons (2005: 4) argues that the preference mechanism fails to incorporate the taste of immigrants for other foreign products apart from their original home-countries. He proceeds by giving an example such as French immigrants no doubt prefer French products, but may also prefer other European products such as Belgian chocolates or German wines. In addition, Tai (2007: 6) claims that the preference mechanism effect also disregards the cultural transmission, which can possibly reach the entire host-countries population. Over time, the locals might be influenced by the immigrants' preference taste for their original home-products, which will affect the volume of trade tremendously, especially on imports. These effects, however, are difficult to capture due to the impossibility of the available data.

Tai (2007:4) also postulates the contrasting results are due to the bias nature of the sample size in their studies. Both Gould (1994) and Girma and Yu (2002), for examples, find that immigration is pro-trade exports, while Head and Ries (1998) and Wagner *et al.* (2002) find that immigration is pro-trade imports. In Gould's (1994) study, 25 out of 47 U.S trading partners are ranked as 'high-income economies', while in Girma and Yu's (2002) study, 22 out of 48 sample countries are the U.K's richest trading partners. Conversely, Head and Ries (1998) include a larger sample of Canadian trading partners, 138 countries, and Wagner *et al.*'s (2002) study which comprises of 160 countries. These two last papers suggest that with the inclusion of enough sample representatives, migration may have a greater effect on imports than on exports.

2.4.1 The Application of the Mechanism

Many empirical studies suggest that the relevance of the preference mechanism and immigration-link mechanism will be different for various types of products and for different classes of immigrants. In addition, the effects of these mechanism also differ depending on the home-countries' traits. These differences are useful in the identification of underlying mechanisms via which immigrants affect trade.

2.4.1.1 Different types of products

The immigrants' preference for the home-countries' product is postulated to increase trade in differentiated products more than in homogenous products, which is supported by the evidence found in the Canadian study by Head and Ries (1998). Differentiated products are unobtainable locally and thus call for higher imports from home countries. Evidently these goods are imported to satisfy the immigrants' specific taste and preferences. Further support is provided by Dunvely and Hutchinson (1999), which shows the stronger immigrant-preference effect on the finished and semi-finished goods than on crude or semi-manufactured goods. They find a 10 % increase in the migrant stock increases imports of the consumer goods and processed foodstuff by over 4%. Their study lends additional weight to the prevalence of the immigration-preference mechanism.

The costly information concerning the foreign products specification hinders bilateral trade flows; therefore immigrants may play a salient role in closing the information trade gaps, mostly on consumer goods rather than on producer goods, as consumer goods are more diverse and differentiated. If the immigrants' effect on consumer goods is higher than producer goods, the immigrants-link mechanism is the relevant hypothesis as it is postulated that the immigrants bring with them valuable information about the foreign goods. This is proved empirically by Gould (1994) who observes that immigration has a stronger effect on the exports of the consumer manufactured goods and least effect on the imports of the producer goods. Gould (1994) believes the findings demonstrate that the

additional information on the foreign market is irrelevant for the producer goods due to its homogenous nature.

Rauch and Trindade (2002), who studied the effect of the Chinese network on trade, divide products into three classes of groups which are organized exchange (homogenous products), reference priced and differentiated. Reinforcing Gould's (1994) conclusion, they find that the differentiated products demand the most information, and the organized exchanged requires the least, indicating that the Chinese network effects become weaker as products become less differentiated. However, they also find that Chinese network promotes trade in the homogenous products, thus supporting the hypothesis of the network as an alternative way for contract enforcement. White (2007a) who examined Danish' immigration and trade data also obtained similar conclusions.

White's (2007b) U.S study took on the different path in which he examined the impact of immigration on IIT trade. He reported that immigration increases both vertical IIT and horizontal IIT, however, the latter's coefficient is found to be larger. Horizontally-traded products exhibit more differentiated characteristics than vertically-traded products, thus the findings demonstrate the dominance of the preference mechanism over the information-link mechanism in this respect. But White advises caution in making a generalized conclusion as it is difficult to separate the effects of mechanisms for the types of products.

2.4.1.2 Different home-countries' features

It is noted that a greater dissimilarity between host and home-countries enables immigrants to exploit their knowledge about home countries information in reducing the transaction costs and hence increase the trade values (Girma and Yu, 2002). Classifying the countries into two categories, commonwealth countries and non-commonwealth countries, they found that a 10% increase in the immigrants from non-commonwealth countries increased U.K imports by 1% and U.K exports by 1.6% while no statistically

significant effects were found for immigrants from commonwealth countries. As legal, business and communication systems in non-commonwealth countries are fundamentally different from the U.K's systems, the findings highlight that the immigrants' familiarity with and knowledge on the home-countries products and socio-economic institutions are more relevant than the immigrants' network effect or business contacts in fostering bilateral trade flows. Hong and Santhapparaj (2006) who followed Girma and Yu's (2002) approach also found that immigrants from non-commonwealth countries affect Malaysian trade flows more than immigrants from commonwealth countries.

Another study that supports the notion of a great degree of countries heterogeneity enhancing trade is by Blanes (2004) who examined the link between OECD and non-OECD immigrants and Spanish IIT trade. His results demonstrated that Spain trades more with non-OECD countries, especially in manufacturing goods. Since manufacturing products are varied and heterogeneous, it shows that non-OECD immigrants take full advantage of their knowledge on their home-countries information to reduce transaction costs, compared to the OECD immigrants.

Considering that their conclusion is accurate, the influence of immigration on bilateral trade flow is diminished if immigrants share similar systems. However, the findings of Combes *et al.*, (2005) who studied intra-trade in France, are exactly the opposite of the studies mentioned above. All the immigrants in every French region share the same language, legal system, culture, and *etc*, yet they still positively influence trade. Combes *et al.*, (2005) find that the presence of immigrants from other French regions increases the value of the interregional French trade by twofold compared to the absence of migration. In addition, they found that the effects of migration on the French intra-trade system are within the range of 73.3% and 102.3%, a stronger outcome than the effect of the ethnic Chinese population found by Rauch and Trindade (2002). Furthermore, the immigrants' effect is the greatest on exports; apparently the network effect plays a major role in facilitating the trade within and between French regions.

Another dimension on how immigration affects trade flows is through the levels of home-countries economic development. White (2007a), on the Danish study, segregates 170 trading countries into four different ranks: high, upper-middle, lower-middle and low income, and finds that the immigrant- trade link is the strongest with high-income countries and the weakest with the low-income countries.

His findings are totally contradicted by his other study (2007b) on the U.S immigrant-trade link, in which the link appears to be weaker as the income of the home-countries rise. White (2007b) reports that a 10% increase in the immigrant stock will cause a 4.7% increase in U.S imports from the low-income countries, and also a 1.5% increase in the U.S exports to these countries. He also estimates that the average immigrants from the low-income countries increases U.S imports by approximately US\$2057 due to the preference mechanism effect, and in between US\$910 and US\$2967, due to the immigration-link mechanism effect. The U.S trades more with lower- income countries in which market trading is less developed and contract enforcements are less obligatory. These conditions present huge opportunities for immigrants that come from lower-income countries to exercise their business network in facilitating bilateral trade. These empirical evidences cast further doubt on the empirical importance of the preference mechanism, and therefore strengthen the supports for the prevalence of the information-link mechanism.

Clearly, all the presented empirical evidences show that the disparity in immigration-trade links may potentially vary due to different cultures, customs and socio-economic institutions.

2.4.1.3 Different classes of immigrants

The impact of immigration on trade can also be studied in term of the classes of immigrants. Different personal characteristic of immigrants may lead to different impacts of immigration on trade. High-skilled immigrants are more inclined to create cultured and

intellectual trade diaspora which stimulates and facilitates trade by improving the contract enforcement, playing a better role of trade intermediaries and developing better trade collaboration than low-skilled immigrants (IOM, 2008). Besides that, experience, expertise and skill levels also affect the immigrants' ability to acquire and communicate trading opportunities thus lowering transaction costs (Herander and Saavedra, 2005: 327).

Empirical studies by Blane (2006), as well as Hong and Santhapparaj (2006), report that the higher skilled immigrants have a stronger effect on the trade flows in comparison to the lower skilled immigrants in Spain and Malaysia respectively. Such findings support the notion that high-skilled immigrants may enhance trade due to their more efficient use of knowledge on their home countries' information and their more entrepreneurial activities.

In search of the link between immigration and trade, Head and Ries (1998) divide immigrants into five classes: independent, family and refugee, where in the independent class there are two more groups which include entrepreneurs and investors, which gain merit through creating additional jobs or increasing the level of investment in Canada. Interestingly, they find that the 'other' independent class of immigrants exerts the strongest influence on trade, and not the entrepreneurs and investors as expected. This finding, to some extent, supports the immigration-link mechanism, where the high-skilled immigrants possess knowledge and information that may benefit trade.

Overall, the observations on the different impacts of immigration on trade across the types of products, trading partners' characteristics and classes of immigrants show that there is a causal relationship between immigrants and trade. The next section will discuss the data, theory and econometric specification used by this study in exploring and examining the immigration and trade link in the case of Malaysia.

2.5 MODELLING FRAMEWORK

Factors such as the accuracy of the econometric model, the identification of potentially relevant variables, the control of various factors and the use of the correct functional form are very important in any applied empirical study in order to avoid bias results. This section aims at detailing such issues for the empirical part of this study.

Since the gravity model has long been consistently applied to international trade, it is chosen for this paper. This section briefly reviews the links between the gravity model and international trade theories, and examines the gravity model in detail by providing econometric specifications used in this paper as well as the research methodology.

2.5.1 Links between the gravity theory and international trade

The gravity equations are renowned for their empirical success in explaining the pattern of trade and hypotheses testing. However, the application of gravity models in the exploration of international trade is sceptically questioned due to its shaky theoretical foundations. The absence of strong theoretical foundations has instigated many prominent trade economists to build and develop the foundations of the gravity model, starting with Tinbergen (1962) and followed by Linnemann (1966), Anderson (1979) and Bergstrand (1985, 1989 and 1990).

Tinbergen (1962) includes dummy variables to capture trade agreements and a common border among trading partners. Linnemann (1966) presents the gravity model in the reduced form of a four-equation partial equilibrium model of exports and imports; however, prices are omitted in the theory. He also introduces population as an additional variable measuring the country's size. Anderson (1979) employs a Linear Expenditure System (Stone 1954) in which the assumption includes a constant elasticity of substitution (CES) set of preferences for a country's good which are applied across importing countries. Bergstrand (1985, 1989 and 1990) takes a further stride by proposing a more flexible and practical utility function, where the prices and preference

effects are included in the model. Unlike Linnemann (1966), Bergstrand uses the general equilibrium framework of world trade to derive the gravity model. More recent research was undertaken by Harrigan (2001) where his contribution includes the theoretical foundations for gravity models of trade derived from the monopolistic competition model and the Arlington-Heckscher-Ohlin –Vanek model.

The resurgent interest in the model has generated extensive literature; the most interesting discovery is that the gravity models and its derivation can be from both the neoclassical and the new trade theories, not only from the latter as claimed by Helpman and Krugman (1985) and Helpman (1987). The gravity equations derived from a Ricardian Framework are provided by Eaton and Kortum (1997), while the ones from the Heckscher-Ohlin Framework are contributed by Deardorff (1998). Evenett and Keller (1998) add the element of product specialization in the Heckscher-Ohlin model and the increasing returns to scale model, and conclude that these models support the gravity model. This is hardly surprising as the gravity equation works well in any theoretical trade framework because it is an intentional but simplified depiction of reality, as claimed by Deardorff (1998: 7), ‘any plausible model of trade would yield something very like the gravity equation, whose empirical success is therefore not evidence of anything, but just a fact of life’. Deardorff believes that the conquest to evaluate the validity of trade theories is not practical because in reality, many trade models can be connected to the gravity theory.

All of these contributions have strengthened the theoretical justifications for the gravity model by providing a concrete theoretical foundation, therefore repudiating most of its previous criticisms. Most gravity models employed in international economics have powerful predictive power, with the R-squared values are often being in between 70% to 95% (Paas, 2002: 10).

In spite of the numerous formal theoretical rationales for gravity models, many empirical works are scarcely connected to the theory. In reality, most immigration-link gravity models studies insert variables in their functions in an ad-hoc manner. However, Frankel (1997) deems the practice acceptable as a lot of theoretical justifications exclude

important features of bilateral trade. For instance, geographical elements are frequently missing from gravity models. Helpman (1987) also omits the distance variable therefore his model does not build an accurate foundation for the gravity model. Thus, this paper adopts a similar approach – an ad-hoc fashion – for estimation, and both gravity theory and immigration-link trade literatures are referred to in constructing the equations and determining the relevant variables.

2.5.2 Gravity Theory

Akin to a relational theory, gravity theory describes the degree of spatial interaction among points hypothetically analogous to the physical world (Nijkamp and Reggiani, 1992). According to the Classical Gravity Theory, an attractive force a_{ij} between two substances i and j is relatively dependent upon their respective masses m_i and m_j , and inversely related to the squared distance D_{ij}^2 between these substances. The gravity theory originates from Newton's law of gravity, which can formally be written as:

$$F_{ij} = G \frac{M_i M_j}{D_{ij}^2} \quad (2.1)$$

where:

F_{ij} = Attractive gravitational force between two entities i and j
 G = Gravitational constant, a constant of proportionality
 M_i = i 's mass body
 M_j = j 's mass body
 D_{ij} = Distance between i and j

Following Head (2000: 2), the elementary applied gravity model to social science studies is:

$$F_{ij} = G \frac{M_i^\beta M_j^\theta}{D_{ij}^\alpha} \quad (2.2)$$

where:

F_{ij} = Flow from country i to j

G = Gravitational constant
 M_i = economic mass of country i
 M_j = economic mass of country j
 D_{ij} = Distance between i and j

National incomes of countries i and j are then the equilibriums of the forces of demand and supply, and distance represents the costs incurred in the trading. Thus, the applied gravity model to trade is:

$$F_{ij} = R_j \frac{Y_i Y_j}{D_{ij}^\alpha} \quad (2.3)$$

where:

F_{ij} = Trade Flow between country i and j
 R_j = Gravitational constant
 Y_i = GDP of country i
 Y_j = GDP of country j
 D_{ij} = Distance between country i and j

Equation 2.3 is the basic form of the gravity model used in the analyzing of international trade. The theoretical prediction in the trade volume (exports and imports) between two countries is directly proportional to their sizes and inversely proportional to their distance. By implication, there are closer trade relations between countries whose economies are more similar in size. Also, trade volume tends to be large between larger economies than smaller and differentiated economies. On the other hand, trade volume is negatively affected by the geographical distance; the larger the distance between countries, the lesser the volume of trade will be (Head, 2000: 3).

2.5.3 Econometric specification

Following the literature review in the preceding sections, the augmented gravity model for trade is used to examine the linkage between immigration and bilateral trade for Malaysia and its trading partners. Derived from equation 2.3, the estimate of both export

and import flows, from and to Malaysia is to be performed by using a reduced form in equation 2.4:

$$T_{ijt} = a (M_{ijt}, V_{ijt}) \quad (2.4)$$

where :

T_{ijt} = Trade flows (exports or imports) from country i to Malaysia at time t

M_{ijt} = Number of Immigrants (Immigrant Stock) resides in Malaysia from country i at time t

V_{ijt} = a vector of variables which influences the trade flow between country i and Malaysia at time t

Discussions on each of these variables are presented below.

2.5.4 Variables and data description

To date, the analysis of the impact of immigrants on both Malaysian exports and imports has been hampered by the serious lack of data. With the exception of Hong and Santhapparaj's (2006) paper, no other paper explores the linkage between immigration and Malaysian trade and the mechanisms behind it. While Hong and Santhapparaj (2006) uses high-skilled immigrant labour from 16 countries as their subjects, this paper attempts to examine the immigration and trade nexus by using data from ten Malaysian trading partners, which are Bangladesh, Cambodia, China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka and Thailand. The immigrants are mostly employed in the 3D sectors (dangerous, degrading and dirty), therefore it is logical to assume that they are relatively low-skilled labour.

The primary source of data on immigration is collected from the Immigration Department of Malaysia and as the data on the subgroups of immigrants and their proportion of employment in the primary, secondary and tertiary sectors have only been available since 1997, the period of study in this paper is constrained limited to the time period between 1997 and 2008. The data, spanning 12 years, comprises of 120 observations, which is slightly larger than previously similar study by Hong and Santhapparaj (2006). The variables employed and its descriptions are further discussed below.

2.5.4.1 Dependent variables

The variables used in empirical studies are many and varied, owing to the lack of well-built and indisputable theoretical underpinning. This has resulted in a variety of econometric specifications of the gravity equation as adopted in different studies. For the dependent variable, a total or average trade volume is used in some studies while others employ either total exports or total imports data (Parson, 2005; Bryant *et al.*, 2004). This paper will use both total exports and total imports as the dependent variables, where the data is obtained from the United Nations Commodity Trade Statistics Online Database. The analysis of link between trade and immigration is further examined by disaggregating the types of goods, namely the producer and consumer products.

2.5.4.2 Independent variables

Gross Domestic Product

For the independent variable, typical variables employed in measuring the economic mass of a country are the Gross Domestic Product (GDP) and population. A country's total area of land may also be used as a proxy for economic mass and its natural resources, as it captures the effect of larger economies' self-sufficiency and are thus less dependent on trade. However, Leamer (1974) claims that this variable is inferior to the standard GDP and population variable. Although most studies adopt GDP as a proxy of income, by inserting the GDP of importing and exporting countries into the regression individually, other studies use a single regression, which consists of the products of the GDPs of both countries such as Blanes (2003).

However, immigration literature justifies more variables to be included to fully form an international trade gravity model. Thus, some authors include additional trade explanators in the trade gravity models such as per capita GDP, GNP and per capita GNP as a proxy for the standard of living, the measure of the level of development and a picture of the relative income levels of a country (Frankel, 1997: 27). These variables also correlate

with the level of trade barriers imposed by a country and are particularly vital for the analysis as the data on tariff and other trade protections are unobtainable.

Different theoretical foundations offer different predictions with regard to the expected sign of the coefficient for per capita income. In the Heckscher-Ohlin Model, countries that have a different capital-labour ratio, proxy by per capita income, will trade more with each other. For example, developed countries tend to trade more with developing countries rather than with one-another. In contrast, the prediction of the gravity models suggests that countries with a similar per capita income will trade more amongst themselves. Hence, if the coefficient of this variable is negative, this is consistent with the Heckscher-Ohlin theory, while a positive sign will evidence the gravity model (Parsons, 2005: 12). Furthermore, many studies include population as an additional explanatory variable to control the effects of the size of the economy, thus, the use of the GDP per capita is justified as it is equivalent having both the GDP and population.

Following Blanes- Cristobal (2003) and Bryant et al (2004), but by using the GDP per capita, the economic mass of country i and j is defined by the GDP per capita of country i multiplied by the Malaysian GDP per capita (j) as a fraction of the world GDP per capita, and is represented by the following formula:

$$GDPpc_t = \frac{GDPpc_{it} * GDPpc_{Mt}}{GDP_{pcWt}}$$

where t is time, $GDPpc_{it}$ is the GDP per capita for country i , $GDPpc_{Mt}$ is the GDP per capita for Malaysia and GDP_{pcWt} is the World GDP per capita, for which all data is obtained from the World Bank Online Database. It is expected that the impacts of this variable on imports and export are positive.

Distance

Distance is a proxy for many elements, such as transportation costs, transaction costs, historical relationship as well as the period of time for the delivery of shipment of goods. Greater distances create larger linguistic, cultural and legal barriers to effective communication. Hence, omitting this important variable in any bilateral trade model will produce meaningless results (Leamer and Stern, 1970: 45). The coefficient of this variable is expected to be negative, as greater distances will incur higher transportation costs. The usual measure of this variable is the distance among the capital cities of trading partners. Thus, the following Girma and Yu (2000) and others, measure the distance from between Malaysia and her ten trading partners' capital cities by using the Great Circle distances which are obtained from Jon Haveman's web-page (<http://www.eiit.org/>). Even though this could be quite misleading as sometimes cities other than the capital cities can be greater in term of trade activities and the formula does not take into account the impenetrable geographical barrier, it has been used extensively in trade literature as it is the most reliable measure of geographical distance and is the most consistent (Parsons, 2005: 15).

Immigration

The key variable in any immigrant-link empirical work is the immigrant stock so as to capture any effects of immigrants on trade flows. Following Blane (2006) and Dunvly and Hutchinson (1999), migrant stock refers to the number of immigrants from country i living in Malaysia in year t . This study assumes constant marginal returns from immigration, as the ratio of immigrants to the Malaysian native population is small. The migration data is annual data from 1997 to 2008 obtained from the Immigration Department of Malaysia with their total employment in the domestic service, service, manufacturing, construction and agriculture sectors. It is expected that migration has significant and positive impacts on both the exports and imports variables. The identification of which mechanism is stronger becomes more prevalent in any given country through the coefficients of both imports and exports elasticities on this variable. If it is found that immigrants only positively affect imports, it is clear that the preference

mechanism explains the linkage between immigration and trade. On the other hand, if immigrants affect both imports and exports where the coefficient of imports is bigger, both the preference and the immigrants-link mechanisms accounts for the relevant explanation.

Consumer Price Index

Beside distance, another variable added to capture the trade barrier is relative price (Bergstrand, 1985), proxy by the consumer price index (CPI). Omitting this variable may result in a misspecified gravity model (Bergstrand, 1985: 475). Following Head and Ries (1998) and Bacarreza and Ehrlich (2006), this paper employs the ratio of CPI in the immigrants' home countries (CPI_i) to CPI in Malaysia (CPI_m), in which the specific formula is as stated below:

$$CPI = \frac{CPI_i}{CPI_m}$$

This ratio is also a proxy for the exchange rate (Bergstrand, 1985: 478). The exchange rate is one of the most influential variables in the history of international trade since the breakdown of the Bretton Woods system in 1973, as its volatility exerts a powerful impact on exports, imports and trade balances. A higher volatility poses higher risks, thus affecting the exporters' and importers' expected profits. This in turn influences the trade volumes (Bahmani-Oskooee and Hegerty, 2009). The appreciation of Malaysian ringgit against the currencies of these immigrants' home countries is predicted to raise imports and reduce exports, and vice versa. All data is obtained from the International Financial Statistics (IFS) online database.

Openness

Openness, a proxy for openness to trade, is included to capture a policy-induced barriers and other 'multilateral resistance' (Anderson and van Wincoop, 2003: 21) such as

changes in general transaction costs in terms of geographical barriers or institutional barriers. The institutions in Malaysia and these immigrants' home countries have undergone a rapid, remarkable progress, thus it is necessary to include these changes as it has tremendous impacts on trade policies and trade growths. Furthermore, openness is also a proxy of a country's integration in the world economy. From a purely hypothetical standpoint, Malaysia may trade more with partners that have high level of trade openness. Following Ghatak *et al.* (2009) and Herander and Saavedra (2005), the openness of a country is measured by the value of total exports plus imports as a percentage of gross domestic products $[(X + M) / GDP]$.

Dummy variables

Additional variables are added in the model to determine the mechanisms explaining the link between trade and immigration. As discussed previously, neighbouring countries are posited to trade extensively with each other, *ceteris paribus* (Wong, 2007: 475). A border effect, captured by a dummy variable, measures the economic, social and political integrations, cultural proximity as well as ease of trading among neighbouring trade partners. However, since Malaysia only shares border with Thailand in this case, it seems inappropriate to include this dummy into the model.

Other common dummy variables for common language and common trade agreement are included, which have similar predictions as the common borders (Schaefer *et al.*, 2008: 8). Language commonality and linguistic links, or sometimes referred as psychic links (Linnemman, 1966: 89), are significant elements in the trade gravity model. If the majority of the residents in a country are able to speak the language of its trading partners, *ceteris paribus*, it is hypothesized that the trade volume will be higher among these countries due to lower trading, transaction and information costs, as most previous research has consistently shown. However, the impact of similar, dominant, or official language spoken may be different when it comes to immigration. The hypothesis is that migrants exert stronger impact on trades when they share a dissimilar language with the native due to the stronger ethnic network. The counter argument states that, as discussed

in the literature review, language is a proxy for culture, social, systems and institutions, thus greater dissimilarities stimulate greater bilateral trade between countries.

Likewise, it is expected that countries that belong to the same trade block will enhance the trade volume among the members through the trade agreements (Bendjilali, 2000: 34). Free trade agreements (FTAs) lower the trade barriers thus boost the volume of trades among the collaborating countries. It is, hence, expected that migrants from countries which have negotiated FTAs with Malaysia will have a bigger impact on trades. To date, Malaysia has signed FTAs with Cambodia, China, Indonesia, Pakistan, Philippines and Thailand.

Time dummies are included to capture the Malaysian macroeconomic and trade policy factors that affect Malaysian aggregate trade. As this study only examines the bilateral trade flows of Malaysia, Malaysian GDP per capita does not differ across the trading countries, thus their effects are encompassed into the set of year dummies. Furthermore, the dummy variable is employed to capture the effect of simultaneous growth in a number of immigrants and trade volumes (Wagner *et al.*, 2002: 514) thus allowing the intercept to vary over time.

2.5.5 Formulation of the Functional Form of the Model

The specific functional form and the control variables selected for this paper's econometric specification are as followed:

$$Export_{it} = \rho_1 + \beta_1 Mig_{it} + \beta_2 GDPpc_{ijt} + \beta_3 DIS_{it} + \beta_4 CPI_{it} + \beta_5 OPEN_{it} + \beta_6 LANG_{it} + \beta_7 FTA_{it} + DummyY_t + \epsilon_{it} \quad (2.5)$$

$$Import_{it} = \gamma_1 + \alpha_1 Mig_{it} + \alpha_2 GDPpc_{ijt} + \alpha_3 DIS_{it} + \alpha_4 CPI_{it} + \alpha_5 OPEN_{it} + \alpha_6 LANG_{it} + \alpha_7 FTA_{it} + DummyY_t + \epsilon_{it} \quad (2.6)$$

where: all variables excluding dummy variables are in a log form. The notations ρ , γ , α and β denotes parameters, i and j denote countries and t represents years. $Export_{it}$ is the volume of exports from Malaysia to country i in US\$, $Import_{it}$ is the volume of imports from country i to Malaysia in US\$. Mig_{it} is the immigration stock from country i in Malaysia in year t , where it is expected that there will be a positive correlation between this variable with both Malaysian exports to and imports from the immigrants' origin countries. $GDPpc_{it}$ is the Gross Domestic Product per capita which is calculated as shown in the previous section. DIS_{it} , a proxy of time and cost of trading, is measured by distance from the capital city of country i to the capital city of Malaysia. FTA_{it} is a dummy variable that will take a value of 1 for the countries which have a FTA with Malaysia and 0 for otherwise. $LANG_{it}$ is also a dummy variable that will take a value of 1 for the countries who share a similar primary language with Malaysia and 0 for otherwise. CPI_{it} is the ratio of consumer price index calculated as shown above. $OPEN_{it}$ is the trade openness. $DummyY_t$ is the year dummies variables. ε_{it} is the error term, which is assumed to be normal, independent and identically distributed, with zero mean and constant variance.

Additional tests will be performed to identify the mechanism accounting for linkage between immigration and trade. The total sample will be categorized according to product classification, the trade agreements, the language spoken and occupational segmentation. However, due to the insufficient data, the analysis concerning the contribution of high-skilled and low-skilled immigrants towards facilitating trade between home and host countries could not be produced.

2.5.5.1 Product classification

To further examine the linkage between immigration and trade, the trade flow samples are divided into two classes according to the BEC classification: consumer and producer goods. Following Blanes (2005: 11), for the consumer goods, the BEC codes are 6, 61, 62, 63, 112 and 122 while for the producer goods, the BEC codes are 111, 121, 21, 22,

31, 32, 41, 42, 521 and 53. It is expected that the consumer goods will have stronger immigrant effects than producer goods, as it is imported to fulfill particular tastes. The following specifications are estimated:

$$Export_{igt} = \rho_1 + \beta_1 Mig_{it} + \beta_2 GDPpc_{ijt} + \beta_3 DIS_{it} + \beta_4 CPI_{it} + \beta_5 OPEN_{it} + \beta_6 FTA_{it} + \beta_7 LANG_{it} + DummyY_t + \varepsilon_{it} \quad (2.7)$$

$$Import_{igt} = \gamma_1 + \alpha_1 Mig_{it} + \alpha_2 GDPpc_{ijt} + \alpha_3 DIS_{it} + \alpha_4 CPI_{it} + \alpha_5 OPEN_{it} + \alpha_6 FTA_{it} + \alpha_7 LANG_{it} + DummyY_t + \varepsilon_{it} \quad (2.8)$$

where g represents consumer goods and producer goods.

2.5.5.2 Trade agreements

Free trade agreements (FTAs) are one of the most effective, successful ways for providing access for Malaysian exports and cheaper imports from the FTA partners. It is expected that the immigrants from these countries will take opportunities to enhance the trade volume between Malaysia and their home countries. The multiplicative variables of dummies and Mig_{it} are used instead of Mig_{it} which permit the elasticities of immigration to vary across two different classes of countries. The functional form as expressed in equation 2.9 and 2.10, distinguishes immigrants from FTA and non-FTA (NFTA) countries:

$$Export_{it} = \rho_1 + \beta_1 FTAMig_{it} + \beta_2 NFTAMig_{it} + \beta_2 GDPpc_{ijt} + \beta_3 DIS_{it} + \beta_4 CPI_{it} + \beta_5 OPEN_{it} + \beta_6 FTA_{it} + \beta_7 LANG_{it} + DummyY_t + \varepsilon_{it} \quad (2.9)$$

$$Import_{it} = \gamma_1 + \alpha_1 FTAMig_{it} + \alpha_2 NFTAMig_{it} + \alpha_3 GDPpc_{ijt} + \alpha_4 DIS_{it} + \alpha_5 CPI_{it} + \alpha_6 OPEN_{it} + \alpha_7 FTA_{it} + \alpha_8 LANG_{it} + DummyY_t + \varepsilon_{it} \quad (2.10)$$

2.5.5.3 Language and culture

This paper also investigates the role of language and culture in enhancing trade by splitting the sample into Malay and non-Malay speaking countries. Since the various forms of the Malay language are spoken by a majority in Malaysia, Thailand, Philippines and Indonesia¹⁸, it is interesting to see whether the immigrants from those countries will have more influence on trade by lowering the transactional costs. The multiplicative variables of dummies and Mig_{it} are used instead of Mig_{it} . $MMig_{it}$ are immigrants from Malay speaking countries and $NMMig_{it}$ are otherwise, allowing the elasticities of immigration to differ across the two groups of countries. However, it is difficult to determine the sign of the coefficients *priori*. The functional forms are as follow:

$$Export_{it} = \rho_1 + \beta_1 MMig_{it} + \beta_2 NMMig_{it} + \beta_3 GDPpc_{ijt} + \beta_4 DIS_{it} + \beta_5 CPI_{it} + \beta_6 OPEN_{it} + \beta_7 FTA_{it} + \beta_8 LANG_{it} + DummyY_t + \epsilon_{it} \quad (2.11)$$

$$Import_{it} = \gamma_1 + \alpha_1 MMig_{it} + \alpha_2 NMMig_{it} + \alpha_3 GDPpc_{ijt} + \alpha_4 DIS_{it} + \alpha_5 CPI_{it} + \alpha_6 OPEN_{it} + \alpha_7 FTA_{it} + \alpha_8 LANG_{it} + DummyY_t + \epsilon_{it} \quad (2.12)$$

2.5.5.4 Segregation of Employment

No papers available so far have investigated the impact of immigration on trade in terms of the occupational segmentation. Thus, in this paper, the link between migration and trade is further examined by incorporating occupational breakdown into the analysis. The basic comparative groups in the analysis include the immigrant employment in the domestic service (D_{it}), service (S_{it}), manufacturing (M_{it}), construction (C_{it}) and agriculture (A_{it}) sectors, allowing the elasticities of immigration to differ across the five occupational groups. The objective is to investigate whether the labour market segregation has an effect on the trade. The following equations are estimated:

¹⁸ See: http://en.allexperts.com/e/m/ma/malay_people.htm

$$Export_{it} = \rho_1 + \beta_1 DMig_{it} + \beta_2 SMig_{it} + \beta_3 MMig_{it} + \beta_4 CMig_{it} + \beta_5 AMig_{it} + \beta_6 GDPpc_{ijt} + \beta_7 DIS_{it} + \beta_8 CPI_{it} + \beta_9 OPEN_{it} + \beta_{10} FTA_{it} + \beta_{11} LANG_{it} + DummyY_t + \varepsilon_{it} \quad (2.13)$$

$$Import_{it} = \gamma_1 + \alpha_1 DMig_{it} + \alpha_2 SMig_{it} + \alpha_3 MMig_{it} + \alpha_4 CMig_{it} + \alpha_5 AMig_{it} + \alpha_6 GDPpc_{ijt} + \alpha_7 DIS_{it} + \alpha_8 CPI_{it} + \alpha_9 OPEN_{it} + \alpha_{10} FTA_{it} + \alpha_{11} LANG_{it} + DummyY_t + \varepsilon_{it} \quad (2.14)$$

Table 2.6. summarises the variables and its expected results in relation to the theoretical literature.

Table 2.6: Description of variables, sources and expected signs

Variables	Description	Source	Expected Sign
$Export_{it}$	The volume of exports from Malaysia to country i in US\$	United Nations Commodity Trade Statistics Online Database	
$Import_{it}$	The volume of imports to Malaysia from country i in US\$	United Nations Commodity Trade Statistics Online Database	
Mig	The immigration stock from country i in Malaysia in year t	The Immigration Department of Malaysia	+
$GDPpc_{ijt}$	$\frac{GDPpc_{it} * GDPpc_{Mt}}{GDP_{pcWt}}$	The World Bank Online Database	+
DIS_{it}	Distance from capital city of country i to capital city of Malaysia.	http://www.eiit.org/	-
FTA_{it}	Free trade agreements (FTAs) with Cambodia, China, Indonesia, Pakistan, Philippines and Thailand.	http://www.miti.gov.my/	+
$LANG_{it}$	Malay language is spoken by majority in Malaysia, Thailand, Philippines and Indonesia.	http://en.allexperts.com/e/m/malay_people.htm	+/-
CPI_{it}	CPI_i/CPI_m	The International Financial Statistics (IFS) online database.	+/-
$OPEN_{it}$	$(X + M) / GDP$	United Nations Commodity Trade Statistics Online Database and the World Bank Online Database	+

2.5.6 Econometric Modelling

As depicted in Table 2.5, many empirical papers in the literature on the subject have employed either pooled ordinary least square (OLS) or fixed effects or both in examining the linkage between immigration and trade. Following Girma and Yu (2002), Blanes (2003), Bacarreza and Ehrlich (2006), Rauch and Trindade (2002) and Fautino and Leitão (2008), this paper adopts pooled OLS. Pooled OLS is a simple econometric approach, an extension of OLS, used in investigating an independent impact of an explanatory variable on a dependent variable, holding the other explanatory variables' influence constant. The validity of the results will still hold even if some of the explanatory variables are correlated with a dependent variable (Parsons, 2005; Hong and Santhapparaj, 2006). Since the main objective of this paper is to examine the effect of immigrants in Malaysia on Malaysian exports and Malaysian imports, this approach is therefore deemed appropriate, as it allows the effect to be quantified independently.

Pooled OLS is chosen over panel estimation as running unbalanced panel regression estimators are unsuitable due to problems of missing and unknown trade data. In addition, the data is comparatively small as only 11 countries are subject to the estimation in this study, thus pooled OLS is selected.

Pooled OLS, however, tends to suffer from an omitted variable bias due to the problem of unobserved heterogeneity (Grab, 2006). Therefore, many papers employ fixed effect estimators to minimize and eliminate the influence of unobserved individual effects. However, this approach will not be employed in this paper due to several factors. First, fixed effect does not recognize the impact of time-invariant regressors that are very relevant to the analysis such as distance that represents trade costs, language that depicts cultural differences, and FTA that symbolizes the institutional similarity. These time-invariant regressors are also very important to the robustness of the econometric results. Second, the country-specific effects approach does not allow the exploitation of between-countries variation data, thus identification of the mechanisms behind the linkage between immigration and trade is impossible to carry out. Third, as dummy variables will

be assigned to each cross-sectional unit, this will result in a loss in the degree of freedom. However, with the inclusion of Free Trade Agreement specific fixed effect dummy to capture its possible distinctive effects on the trade volumes, the simultaneous effects of immigration and trade membership will be mitigated, thus will result in more robust findings.

2.5.7 Diagnostic tests

Several diagnostic tests will be run to assess the feasibility of the model. The F -test, a test of the null hypothesis that all coefficients are simultaneously equal to zero, is calculated for each regression. The null hypothesis is rejected if the obtained p -value is less than the levels of significance, for examples 0.01, 0.05, 0.1. On the other hand, the null hypothesis cannot be rejected at the selected significance level if the p -value is higher, indicating that the coefficients are not statistically significantly different from zero.

Many researchers are concerned with the issue of heteroscedasticity in the pooled data. If this problem is found to be present, the parameter estimates and the prediction of the models are as biased and as inconsistent as the variances, hence the standard error, obtained can be over or underestimated (Heckman, 1979; Greene, 1981). Thus, the graphs of the fitted values from the regression against the residuals for each regression are to be plotted first to observe any definitive patterns of indication of heteroscedasticity. Also, it is a common practice to combine the diagnostic plots with the test to detect this problem. The Breusch-Pagan/ Cook-Weisbergh test will be conducted, and its hypothesis is:

H_0 = the variance of the residuals is constant (homogenous)

H_1 = the variance of the residuals is not constant (heteroscedastic)

If the p -value is too small, the null will be rejected, thus confirming the presence of the heteroscedasticity. To overcome this problem, the models will be re-estimated using

robust standard errors or in the formal term - White's heteroscedasticity-consistent covariance matrix estimator.

Multicollinearity, where two or more independent variables are highly correlated, is another problem that always plagues the analysis of any regression (Greene, 1981). To detect this problem, the Variance Inflation Factor or VIF values and its tolerance level ($1/VIF$) are estimated. The rules of thumb are the VIF value should not exceed 20 and its tolerance level must be over 0.05 (Menard, 1995). The bigger values of VIF and the smaller values for its tolerance indicate the problem of multicollinearity.

Ramsey's RESET test for the misspecification of the functional form will also be conducted to test the specification errors or omitted variable bias. None of the empirical studies except Parsons (2005) report the result from this diagnostic test, understandably, as data on trade barriers *i.e.* tariffs and quotas are unavailable due to its extreme difficulty in collection. The result of excluding this variable may lead to bias estimated coefficients as it is one of the key variables Linneman (1966) proposes to be included in any gravity model of trade. Thus, the result of Ramsey's RESET test is expected to fail owing to the missing data on trade barriers. The hypothesis is presented below:

H_0 = No omitted relevant explanatory variable

H_1 = Omitted relevant explanatory variable

To reject the null hypothesis, the p -value is again used, and similar interpretations are employed as described above. The next section will report and discuss the findings of the pooled OLS regressions and the diagnostic tests.

2.6 EMPIRICAL RESULTS AND DISCUSSION

Table 2.7 presents the results of the pooled OLS estimation for coefficients of both models. The results are obtained by using the pooled data for Malaysia's bilateral trade with ten trade partners during the 1997-2008 period. The general findings in existing literature that the existence of pro-trade impact of immigration on both exports and imports due to the strong preference mechanism as well as the immigration-link mechanism is further supported in this study. The empirical results are in line with a priori expectations, and the coefficients, except for a few variables, have the predicted signs, of high magnitudes and are statistically significant; therefore contribute to the major understanding of the immigration-link to the home country which enhances bilateral trade flows between Malaysia and these immigrant home countries. The results are consistent with the previous empirical studies such as Gould (1994), Girma and Yu (2002), Head and Ries (1998), Dunlevy and Hutchinson (1999, 2001) and Hong and Santhapparaj (2006), to name a few.

Both total exports and total imports are estimated separately as dependent variables in the log-log specification of equation 2.5 and 2.6. The use of a log-log specification makes the analysis of the empirical results easier, as the direct interpretation of coefficients is as elasticities. Since the initial models (Model 1 and Model 3) suffer the problem of heteroscedasticity as it has been shown by the significant p -value of Breusch-Pagan test, the models are re-estimated with White's heteroscedasticity-consistent covariance matrix estimator to correct the standard errors (Model 2 and Model 4). The following results are obtained for both exports and imports equation models, where the robust standard errors are given in parentheses:

$$\begin{aligned}
 \text{EXPORTS} = & 1.2626 + 0.4921 \text{ MIG} + 3.1468 \text{ GDPpc} + 1.3778 \text{ DIS} + 1.3048 \text{ FTA} - 1.9693 \text{ LANG} \\
 & (0.0686) \quad (0.2573) \quad (0.1586) \quad (0.2483) \quad (0.561) \\
 & + 3.0639 \text{ CPI} + 25.0719 \text{ OPEN} \\
 & (0.666) \quad (8.5867)
 \end{aligned} \tag{2.15}$$

$$\begin{aligned}
\text{IMPORTS} = & -11.1753 + 0.7175 \text{ MIG} + 4.1615 \text{ GDPpc} + 1.2972 \text{ DIS} + 2.7298 \text{ FTA} - 1.3598 \text{ LANG} \\
& (0.1439) \quad (0.4365) \quad (0.3569) \quad (0.5312) \quad (1.1116) \\
& + 5.9218 \text{ CPI} + 23.8169 \text{ OPEN} \\
& (1.3488) \quad (17.4297) \qquad \qquad \qquad (2.16)
\end{aligned}$$

The empirical analysis starts with the main variables of interest in Model 2 and Model 4, namely the immigrant stock. In the exports equation, the sign of the immigration stock coefficient suggests that the immigration stock is positively and significantly related to the exports activity. This is in accordance with the theory discussed previously, as the presence of immigrants increases the bilateral trade flow by lowering the transactions costs through their network, cultural ties and their superior knowledge of and greater access to their home-countries trading opportunities. The actual coefficient value suggests that, *ceteris paribus*, a 10% increase in the immigration stock in Malaysia leads to an increase in exports flow to these immigrants' home countries by 4.9%, confirming that the Malaysian international trade with these immigrants' home country is on the rise as examined before.

The obtained coefficient for immigration stock is quite similar to the findings of Hong and Santhapparaj's (2006) study, where a 10% increase in the skilled immigrants from non-ASEAN and ASEAN countries raises Malaysian exports by 1.8% and 5.3% respectively. Unlike previous empirical studies which find a smaller coefficient, for example Gould's (1994) U.S exports elasticity is only 0.2 while Head and Ries (1998)'s Canadian export elasticity is 0.8, the present study found that the elasticity of exports is bigger in magnitude, clearly implying that the immigration stock has a vital impact on the levels of Malaysian exports.

Table 2.7: Estimation of equation 2.5 and 2.6 using pooled OLS

	Model 1	Model 2	Model 3	Model 4
	Export	Export	Import	Import
I. Model Estimation				
Variables	Coefficient	Coefficient	Coefficient	Coefficient
MIG	0.4921315*** (0.0762823) 6.45	0.4921315*** (0.0686407) 7.17	0.7174815*** (0.1316903) 5.45	0.7174815*** (0.14394) 4.98
GDPpc	3.146809*** (0.2588654) 12.16	3.146809*** (0.2573481) 12.23	4.161526*** (0.4468934) 9.31	4.161526*** (0.436519) 9.53
DIS	1.037784*** (0.2303886) 4.50	1.037784*** (0.1585665) 6.54	1.297239*** (0.3977324) 3.26	1.297239*** (0.3569024) 3.63
FTA	1.304821*** (.2638399) 4.95	1.304821*** (.2482685) 5.26	2.729782*** (0.4554812) 5.99	2.729782*** (0.5319818) 5.13
LANG	-1.969334*** (0.6038662) -3.26	-1.969334*** (0.5609798) -3.51	-1.359848 (1.042487) -1.30	-1.359848 (1.111637) -1.22
CPI	3.063919*** (1.083335) 2.83	3.063919*** (0.6659821) 4.60	5.921793*** (1.870221) 3.17	5.921793*** (1.348821) 4.39
OPEN	25.07187** (11.70008) 2.14	25.07187*** (8.586656) 2.92	23.81693 (20.19848) 1.18	23.81693 (17.42974) 1.37
II. Statistic Estimation				
R-Squared	0.7867	0.7867	0.7673	0.7673
R-Bar Squared	0.7487		0.7259	
F-Stat	F(18, 101) = 20.69 Prob > F = 0.0000	F(18, 101) = 46.69 Prob > F = 0.0000	F(18, 101) = 18.51 Prob> F = 0.0000	F(18, 101) = 28.88 Prob > F = 0.0000
No. of observations	120	120	120	120
III. Diagnostic Tests				
Breusch-Pagan / Cook-Weisberg	chi2(1) = 16.14 Prob > chi2 = 0.0001		chi2(1)= 3.28 Prob > chi2 =0.0069	
Ramsey RESET test	F(3,98)=0.69 Prob>F= 0.5630	F(3,98)= 0.69 Prob > F= 0.5630	F(3,98)= 3.13 Prob > F = 0.0290	F(3,98)= 3.13 Prob > F = 0.0290
Multicollinearity				
MIG	3.65 (0.274146)	3.65 (0.274146)	3.65(0.274146)	3.65(0.274146)
GDPpc	3.07 (0.326006)	3.07 (0.326006)	3.07(0.326006)	3.07(0.326006)
DIS	1.78 (0.563147)	1.78 (0.563147)	1.78(0.563147)	1.78(0.563147)

FTA	1.98 (0.506215)	1.98 (0.506215)	1.98(0.506215)	1.98(0.506215)
LANG	9.05 (0.110440)	9.05 (0.110440)	9.05(0.110440)	9.05(0.110440)
CPI	2.53 (0.394897)	2.53 (0.394897)	2.53(0.394897)	2.53(0.394897)
OPEN	5.79 (0.172717)	5.79 (0.172717)	5.79(0.172717)	5.79(0.172717)

Notes:

(i). Estimates include times dummies, and its outcome together with the constant term are not shown.

(ii). The standard errors are in parentheses, Model 2 and 4 are re-estimated with White's heteroscedasticity-consistent covariance matrix estimator.

(iii). t- value is reported below the robust standard error value.

(iv). (***) , (**) and (*) significant at 1% , 5% and 10% respectively.

This finding is not surprising, given that these immigrants are predominantly from Indonesia, Thailand, China and India, where they share the same common roots, ancestors and bloodlines with many Malays, Chinese and Indians in Malaysia. The closer relationships with the natives enable these immigrants to fully exploit the created ethnic transnational network that stimulates trade by an increased shared information as well as the generation of trust and reciprocity, which results in better contract enforcements.

In addition, their preexisting ties to the potential customers in their home country further enhance their exports promoting activities. The finding adds further evidence on the important role of ethnic networks in facilitating trade, consistent with the results from the previous empirical studies such as Rauch and Trindade's (2002) study of existing ethnic Chinese network and Min's (1990) contribution of the Korean network of ties, bonds and connections in the increasing the U.S. trade with Korea.

Another possible explanation is the strong ethnic transactional networks also allow immigrants to transmit information on trading opportunities efficiently, further resulting in higher exports volumes. Moreover, another possible implication from the empirical result is the immigrants' superior knowledge of their home-countries heterogeneous goods, business practices and laws creates opportunity spaces for higher bilateral trade. Conducting trade in foreign countries requires familiarity with certain information such as patent and contracting enforceability, judicial functions and property rights (Herander and Saavedra, 2005: 327). Besides having first-hand information about the product

variety and trading markets of their home countries, immigrants are also familiar with the consumer demand patterns and consumer expenditures in their countries. Utilizing their knowledge of and information on the quality, attributes, availability, prices and costs of the products, immigrants in Malaysia facilitate a higher degree of trade with their home countries. This result thus provides strong evidence on the proposition of trade-creation effect of immigrants.

For Malaysian imports, on the other hand, the elasticity of immigration indicates that a 10% increase in the immigrant stock leads to imports from the immigrants' home countries to Malaysia by 7.2%, which is found to be highly statistically significant at the 99% confidence level. Again, this finding is consistent with the main hypothesis that immigration increases trade. Even though this coefficient is lower than the findings of Hong and Santhapparaj's (2006) study where they found that the 8.8% increase in Malaysian imports was due to the increase in the immigration stock, the obtained result is nevertheless much higher than the previous empirical studies conducted for developed countries, such as the United Kingdom, the United States, France, the EU and New Zealand. Hong and Santhapparaj's (2006) study, however, is concerned with skilled immigrants, while the present study assumes that most of the immigrants are unskilled workers. It is therefore reasonable for Hong and Santhapparaj (2006) to obtain a higher elasticity, yet it is astonishing that these low-skilled immigrants also manage to generate a remarkable increase in trade flows.

The high sensitivity of Malaysian imports to immigration reflects the fact that immigrants affect imports directly through the preference mechanism. In spite of the majority of them sharing the same roots and ancestry with Malaysian natives thus are presumed to have similar cultures, cuisine and lifestyles, the empirical result shows that they still retain a stronger preference for their home-country products. Indisputably, the existing cultural ties with the origin countries enable them to maintain their previous patterns of consumer behavior in culturally dissimilar markets, thus is the dominant factor in driving up the Malaysia's imports from the home countries.

Other implications of the results also include the fact that the locals may acquire a taste for these new unfamiliar products, thus resulting in a higher volume of imports. Evidently, the growing local consumers' preference towards foreign products from the home countries of immigrants attests to the fact that migration is an influential instrument in transmitting preferences through consumer socialization (Penaloza, 1989: 113) and exposure to diverse cultures (Tai, 2009: 5). Certainly the results lend further support to the idea that social dimensions have a powerful impact upon the consumption of common goods, a notion introduced by the Becker and Murphy (2000).

Furthermore, the existing population of immigrants in Malaysia is fairly sizeable; therefore their impact on the import flows is predictably large. Currently, the immigrant population is estimated to be around 7% of the Malaysia's total population. This growing population has greatly benefited the economy. For example, among others things, is the fact that its heterogeneity opens up the opportunity to increase Malaysian trade with the immigrants' countries of origin, as it has been proven in this study.

The key finding here is that the elasticity for imports is higher than exports, which is consistent with the findings by Head and Ries (1998), Wagner *et al.* (2002), Bryant *et al.* (2004), Parsons (2005) and Hong and Santhapparaj (2006), while in contrast with the studies by Gould (1994), Girma and Yu (2000), Combes *et al.* (2005) and Blanes (2003). If it is believed that immigrant-preference mechanism has the greatest influence on import elasticity, while the immigrant-link mechanism influences export elasticity most considerably, then these findings suggest the dominance of preference effect in stimulating trade. The findings on how immigration affects trade according to product classification lends further support to the notion of dominance of the preference mechanism, will be discussed later. Since taste and preference do not affect the export flow, these results are doubtlessly the indicatory of the combination of both the immigrant-preference and the immigrant-link hypotheses, where the preference effect will account for the difference.

One possible explanation could be that, in addition to their superior knowledge on market information, the immigrants also have a greater demand bias due to their emotional attachment, thus causing a greater impact on imports than exports. In addition, the exported goods from Malaysia must be introduced first in the immigrants' home countries and be advertised heavily to improve sales, therefore resulting in the smaller impact of immigration on the export flows. Alternatively, immigrants may find it relatively easier and more profitable to set up importing business rather than exporting business due to the favourable Malaysian economic and legal conditions and incredibly stable social and political environments.

From the empirical results, it could be concluded that immigrants might have facilitated trade by providing business contacts, utilizing their specialized knowledge, market information and social networks as well as offering cultural competence to Malaysian businesses.

On to the result of next variable, the GDP per capita is a common variable employed in the gravity model studies (Bergstrand, 1989: 143), but not in immigrant-link studies. The obtained coefficient on the GDP per capita is positive, large in magnitude and significant at a 99% confidence level, which is also in accordance with the expectation. This is in contrast with some previous literature where this variable has been found insignificant such as in both Dunlevy and Hutchinson's (1999, 2001) studies. The significance of this variable is important as it is fundamentally attesting of the validity of the gravity model. Thus, one would expect this variable to be very highly significant. The mass of the two countries, GDP_{pc} , positively affects their bilateral trade relation. Looking at Table 2.7, a 10% increase in the GDP per capita, *ceteris paribus*, results in a 31.5% increase in Malaysian exports and 41.6% increase in Malaysian imports. An increase in income will act as a strong incentive to expand production, thus allowing for higher export levels. Also, a rise in GDP per capita is an indication of higher purchasing power, thus stimulating the demand for imports.

It should be noted that the positive coefficient signifies the triumph of the gravity model over the Heckscher-Ohlin theory, as it is evidenced by this study that the countries with a similar per capita income will trade more among themselves. Given that the countries involved in the present study are mostly developing countries, and are thus clustered with similar levels of GDP per capita, it is therefore not surprising that they trade with each other more. These findings are in line with Parsons (2005) and Hong and Santhapparaj (2006), where they claim countries generally prefer to trade more with those who share similar tastes, as proxy by GDP per capita, thus gaining from consuming a wide variety of goods and services.

Distance represents the transportation and other transaction costs, thus it is expected to have a negative sign. However, the obtained coefficients, even though highly significant and large in magnitude, are contradicted with the postulated theory. Both exports and imports equations show a positive sign for distance variable, bearing the implication that the greater the distance between Malaysia and its trading partner, the higher the bilateral trade there is. A 10% increase in the distance between the trading pairs is estimated to increase Malaysian exports and Malaysian imports by approximately 14% and 13% respectively. These findings are similar to Hong and Santhapparaj (2006), even though it is much higher in magnitude, and in contrast with Gould (1994), Head and Ries (1998), Bacarreza and Ehrlich (2006), Bryant *et al.* (2004) and Girma and Yu (2002). One of the possible explanations is that distance inhibits trading but infrastructure accelerates trade by reducing transport costs (Bougheas *et al.*, 1999). Therefore, the better and higher quality of the development of the transport and telecommunications infrastructure outweigh distance, thus reduce trading costs and stimulating further bilateral trading between countries. Moreover, in this sample, Malaysia's greatest distances are with China and India, yet these countries are Malaysia's top trading partners in Asia. Thus, the positive estimated coefficient of distance seems to fit with the above explanations well. This also shows the possible theoretical weakness of the augmented gravity model.

FTA is another important variable that influences trade significantly. As expected, the results are positively and statistically significant for both exports and imports models. As stated before, Malaysia has signed bilateral Free Trade Agreement with Cambodia,

China, Indonesia, Pakistan, Philippines and Thailand. These trade agreements enhance the trade volume among members significantly where Malaysian exports are greater by 13% and Malaysian import by 27%.

A similar spoken-language will bridge the differences among trading partners and is expected to increase trade by lowering the transaction costs. However, the coefficients of language variable are significant but negative for Malaysian exports and imports, -1.97 and -1.36 respectively. Sharing a similar language, namely Malaysian, and cultures does not enhance trade, in fact, reduces it, as indicated by the findings of this study. An explanation that can be made is that the greater the dissimilarity of spoken-language is, the higher the volume of bilateral trade will be as this indicates for dissimilarity in consumption habits else.

In other words, language similarity indicates cultural similarities, hence, reduces choices for exports and imports. Similar consumer patterns and preferences thus do not provide the opportunity to trade extensively among countries. However, language similarity should play a role in enhancing trade by reducing transaction costs. Therefore, to explore the impact of language, another model is attempted, which can be found in section 2.6.1.3

The results on CPI variable, a proxy of the depreciation of ringgit Malaysia, are statistically significant in all models; however, have an unexpected sign for import. This positive coefficient implies that the amount of Malaysian import increases when Malaysian ringgit depreciates. On the other hand, the positive coefficient for the export equation is in accordance with the theory: depreciation in the currency of Malaysia against the currencies of its trading partners stimulates Malaysian exports as the reduction in the price of Malaysian exported goods will attract a higher expenditure by foreign customers. If the Malaysian ringgit is devalued by 10%, it is estimated to raise Malaysian exports by 30.6%. Both findings are similar to Bacarreza and Ehrlich's (2006) results and opposite to the findings by Head and Ries (1998) and Insel *et al.* (2010).

As regards to the last variable, OPEN, a proxy for the measure of integration in the world economy and policy-induced barriers, the results produce positive and statistically significant impacts on both Malaysian exports and imports. These results suggest that

Malaysia trades more with the countries that have high trade to GDP ratios, as they are more open and more integrated with the world economy, have less trade-restrictive means and also lower trade barriers. This may also reflect that these countries possess superior trading infrastructures, which lends more support to the finding in the case of distance variable previously. The findings reported here are similar to many existing studies such as Head and Ries (1998) and Co *et al.* (2004).

2.6.1 Classification of main variables: Extending the model

The augmented gravity models (equation 2.5 and 2.6) as discussed in the preceding sections are further extended in several dimensions to determine the mechanisms explaining the link between trade and immigration. More comprehensive tests on the influence of immigrants on the Malaysian economy are conducted by investigating variations in the Malaysian immigrant-trade link across product classification, the trade agreements, language and culture as well as the occupational categories of immigrant workers. The estimated results will be presented and discussed below.

2.6.1.1 The impact of immigrants on Malaysian disaggregated trade

By disaggregating the levels of trade into two classes, namely consumer and producer goods, it is found that immigration stimulates trade more strongly on imports than on exports, which is in the stark contrast with the findings by Blanes- Cristobal (2003) where he finds that immigrants in Spain have greater influences on both producer and consumer exports. However, this study finds that a 10% increase in immigration will lead to 9% increase in consumer imports and 5.8% increase in producer imports as shown in Model 7 and Model 8 respectively, while only yielding a 2.8% increase for consumer exports and a 5% increase for producer exports as produced by Model 5 and Model 6

respectively. All of these are significance at 99%. The results for the estimated coefficients for equation 2.7 and 2.8 are reported in Table 2.8.

These results lend additional support to the domination of the immigrant-preference mechanism as a principle mechanism through which immigration stimulates and facilitates trade. Evidently, the large magnitude of immigrant coefficient in the consumer imports equation reflects that the preferences are captured in both directions, from the immigrant home countries to the host country and vice versa. As discussed above, immigrants in Malaysia have a high desire to consume unavailable home country consumer products, and it is more likely that Malaysians have developed a strong taste for foreign consumer goods.

Table 2.8: Estimation of equation 2.7 and 2.8 using pooled OLS

	Model 5	Model 6	Model 7	Model 8
	Consumer Export	Producer Export	Consumer Import	Producer Import
I. Model Estimation				
Variables	Coefficient	Coefficient	Coefficient	Coefficient
MIG	0.2806678*** (0.0578472) 4.85	0.4979048*** (0.0673137) 7.40	0.9002456*** (0.1189036) 7.51	0.579414*** (0.158091) 3.67
GDPpc	2.236978*** (0.1944223) 11.51	3.266128*** (0.2556788) 12.77	5.003607*** (0.3796445) 13.18	4.376698*** (0.4845292) 9.03
DIS	0.3431118** (.1513194) 2.27	1.197206*** (0.1618047) 7.40	1.252356*** (0.2815607) 4.45	1.272307*** (0.4165399) 3.05
FTA	0.7957619*** (.2322587) 3.43	1.298554*** (0.2578785) 5.04	2.199562*** (0.4650689) 4.73	2.816237*** (0.597371) 4.71
LANG	-0.1059 (0.4554432) -0.23	-1.784293*** (0.5319154) -3.35	-2.977994*** (0.9239859) -3.22	-0.3209627 (1.208781) -0.27
CPI	2.185728*** (0.6631316) 3.30	3.358303*** (0.6933136) 4.84	6.053315*** (1.212699) 4.99	5.910119*** (1.561905) 3.78
OPEN	10.16697 (7.075109) 1.44	25.68926*** (8.036503) 3.20	16.94474 (15.09189) 1.12	14.04499 (19.48265) 0.72

II. Statistic Estimation				
R-Squared	0.8199	0.7994	0.7738	0.7611
F-Stat	F(18, 101) = 68.61 Prob > F = 0.0000	F(18, 101) = 63.72 Prob > F = 0.0000	F(18, 101) = 60.93 Prob> F = 0.0000	F(18, 101) = 30.00 Prob > F = 0.0000
No. of observations	120	120	120	120

Notes:

(i) Estimates include times dummies, and its outcome together with the constant term are not shown.

(ii) The standard errors are in parentheses, all models are re-estimated with White's heteroscedasticity-consistent covariance matrix estimator.

(iii) t-value is reported below the robust standard error value.

(iv) (***) , (**) and (*) significant at 1%, 5% and 10% respectively.

The strong presence of home bias is confirmed with a number of studies, including White (2007), Wei (1998), Helliwell (1997) and Engel and Rogers (1996). Such biases would be more pronounced for consumer goods rather than producer goods, as most consumer goods are classified as differentiated and imported to satisfy the immigrants' specific tastes and preferences.

Nevertheless, since the coefficients of consumer and producer exports are also positive and very significant, the results provide another strong evidence for the presence of trade-promoting effects of immigrant-based networks in Malaysia. Even though the theoretical literature postulates that network has the most significant influence on differentiated products as differentiated products require more market information (Rauch and Trindade, 2002; and Rauch, 2001, 1999), the present findings suggest the opposite; immigrant network also has an influential impact on the producer, or the less differentiated goods. This implies the outstanding ability of immigrants in Malaysia in exploiting the network connection in order to enforce the contracts and to reduce information, communication and set-up business costs, as well as using their superior knowledge on the home market trading, consumer patterns and demands, and product characteristic, consequently leading to higher trade activities between host and home countries.

The findings that immigration increases both exports and imports across all types of goods is in line with the earlier empirical works such as Gould (1994), Rauch and Trindade (2002), and White (2007a, 2007b) and is in contrast with Mundra (2005). Without any doubt, the findings further support the hypothesis of immigration effects on trade via both the preference and the immigrant-link mechanisms.

2.6.1.2 Free trade agreement and immigration

The previous results in section 2.6 provide strong evidence that being a member in a trading block or signing up for an FTA will enhance bilateral trade tremendously. It is expected that immigrants from countries that have FTAs with Malaysia will have a bigger impact on trade as they will take advantage of the absence of the protectionism to increase trade volumes between Malaysia and their home countries. Results shown in Table 2.9, however, present mixed findings. A 10% increase in the immigration stock from the FTA countries is estimated to increase Malaysian exports by 2.9% and Malaysian imports by 6% as can be seen in Model 9 and Model 10 respectively, while a 10% increase in the immigration stock from the non-FTA countries will raise Malaysian exports by 3.1% and Malaysian imports by 5.7% as presented in Model 9 and 10 respectively. In these regressions, the common language variable (LANG) is dropped, as there is a high correlation between this variable with immigrants from FTA and non-FTA countries.

Table 2.9: Estimation of equation 2.9 and 2.10 using pooled OLS

	Model 9	Model 10
	Export	Import
I. Model Estimation		
Variables	Coefficient	Coefficient
FTA_MIG	0.2944807*** (0.0347291) 8.48	0.595739*** (0.0661319) 9.01
NFTA_MIG	0.3080337*** (0.0575355) 5.35	0.5677983*** (0.0928196) 6.12

GDPpc	2.77357*** (0.2576655) 10.76	3.918916*** (0.392754) 9.98
DIS	1.06914*** (0.1462649) 7.31	1.323799*** (0.342364) 3.87
FTA	1.077223** (0.436078) 2.47	2.172256*** (0.8217421) 2.64
CPI	2.98656*** (0.7564809) 3.95	6.27273*** (1.412043) 4.44
OPEN	-3.575304 (5.220091) -0.68	7.870485 (10.91074) 0.72
II. Statistic Estimation		
R-Squared	0.7644	0.7637
F-Stat	F(18, 101) = 44.14 Prob > F = 0.0000	F(18, 101) = 27.53 Prob > F = 0.0000
No. of observations	120	120

Notes:

(i) Estimates include times dummies, and its outcome together with the constant term are not shown.

(ii) The standard errors are in parentheses, all models are estimated with White's heteroscedasticity-consistent covariance matrix estimator.

(iii) t- value is reported below the robust standard error value.

(iv) (***), (**) and (*) significant at 1%, 5% and 10% respectively

The findings clearly show that there is no sharp distinction between these two groups on both exports and imports elasticities. The findings are similar to Hong and Santhapparaj's (2006) study, where immigrants from both ASEAN and non-ASEAN countries affect Malaysian trade positively. Clearly, in this context, the existence of trade agreements does not play an important role in facilitating immigrants to increase trade between host and home countries.

2.6.1.3 Culture, immigration and trade

It has been shown empirically in the literature that sharing a common language will better facilitate trade flows (Girma and Yu, 2002; Hutchison, 2002; Engel and Rogers, 1996; Helliwell, 1997; Wagner *et al.*, 2002). However, the previous results presented in the section 2.6 show that Malaysian exports and imports are less to those countries with a larger proportions of those who speak Malay as their first language. In investigating the impact of language spoken by immigrants on the volume of trades, the results show that immigrants, regardless of their native languages, enhance the bilateral host-home country trade. This result is in accordance with the existing empirical studies such as Hutchinson (2002), while it is in contrast with Gould (1994), Dunlevy (2004) and Hutchinson (2005).

Table 2.10 presents the pooled OLS coefficient estimates for the empirical specification of equation 12 and 13. A 10% increase in the immigration stock from Malay-speaking countries increases Malaysian exports by 3.4% and Malaysian imports by 6.1% as presented by Model 11 and Model 12 respectively. The results lend support to the fact that a shared language between immigrants and natives will stimulate higher trade by reducing the costs associated with the matching of potential trading partners.

As the findings indicate, on the other hand, a 10% increase in the immigration stock from non-Malay-speaking countries increases Malaysian exports by 4.7% and Malaysian imports by 7%, shown in Model 11 and Model 12 respectively. Clearly, immigrants coming from non-Malay speaking countries have stronger effects on the trade as they increase exports and imports more than immigrants from Malay-speaking countries. The language barrier evidently does not prevent these immigrants from conducting and facilitating trade between Malaysia and their home countries.

Furthermore, language commonality is often used as a proxy for cultural similarity (Tadesse and White, 2010: 240). In other words, cultural dissimilarity is associated with social and institutional dissimilarity as well as information asymmetries, a condition conducive for immigrants to enhance trade through manipulating their superior knowledge on their home social, law and political institutional, market trading

opportunities and cultural norms, thus lowering the transaction costs of informational barriers (Gould, 1994; Girma and Yu, 2002).

A greater cultural dissimilarity signifies greater dissimilar consumption patterns, therefore creating an economic opportunity for immigrants to foster higher levels of bilateral trades between host and home countries, as discussed previously. The heterogeneity of consumer patterns no doubt induces larger trade flows in differentiated goods, both for exports and imports. The finding lends additional weight on the above finding where immigrants affect the Malaysian consumer imports the most. Consumer products are mostly differentiated and product differentiation is greatly influenced by cultural elements. Generally, the findings provide further support to the relevancy of the immigrant-link mechanism in explaining the linkage between trade and immigration.

Table 2.10: Estimation of equation 2.11 and 2.12 using pooled OLS

	Model 11	Model 12
	Export	Import
I. Model Estimation		
Variables	Coefficient	Coefficient
MALAY-LANG MIG	0.337129*** (0.0413752) 8.15	0.6081416*** (0.0814276) 7.47
NON-MALAY-LANG MIG	0.4705945*** (0.0674944) 6.97	0.6920383*** (0.1478849) 4.68
GDPpc	3.118569*** (0.2606597) 11.96	4.121007*** (0.4566225) 9.02
DIS	0.9356126*** (0.1552361) 6.03	1.235065*** (0.3412854) 3.62
FTA	1.306159*** (0.234414) 5.57	2.707526*** (0.5373515) 5.04
CPI	2.823013*** (0.7086107) 3.98	5.774666*** (1.366715) 4.23
OPEN	9.697857* (5.262896) 1.84	12.4655 (10.91074) 1.15

II. Statistic Estimation		
R-Squared	0.7794	0.7656
F-Stat	F(18, 101) = 46.36 Prob > F = 0.0000	F(18, 101) = 29.64 Prob > F = 0.0000
No. of observations	120	120

Notes:

- (i) Estimates include times dummies, and its outcome together with the constant term are not shown.
- (ii) The standard errors are in parentheses, all models are estimated with White's heteroscedasticity-consistent covariance matrix estimator.
- (iii) t- value is reported below the robust standard error value.
- (iv) (***) (** and *) significant at 1%, 5% and 10% respectively

2.6.1.4 Occupational categories of immigrant workers and trade

The link between immigration and trade is further investigated by incorporating the occupational categories of immigrant workers into the empirical specifications. Equation 2.13 and 2.14 are estimated using pooled OLS and the results are presented in Table 2.11. Disaggregating the immigration stock into five occupational categories where migrants are predominantly employed- that are: domestic services, services, manufacturing, construction and agriculture - it is found that all immigrant occupational categories affect Malaysian exports and Malaysian imports positively and statistically significantly, however, with two exceptions. First, only immigrant workers in the manufacturing sector have a negative impact on Malaysian trades, and second, the coefficient of immigrant workers in construction sector variable gives positive, but not statistically significant result.

In general, the effects of occupational categories on imports appear to be greater than the effects of occupational categories on export, especially for workers in the service sector, where a 10% increase in immigrant workers in this sector is estimated to increase Malaysian imports approximately by 8.5% as can be seen in Model 12 in Table 2.11. These findings add further support for the posited pro-trade effect of immigration to Malaysia.

The result of the negative imports coefficient for immigrant workers in manufacturing is interesting, as it provides empirical evidence on the existence of import-substitution activities where the acquired knowledge by the immigrants concerning manufacturing methods and technology enables them to produce the home-products efficiently, or rather, local Malaysian producers produce the home-products to accommodate the immigrants' tastes and preferences. Furthermore, given the fact that the immigrant population has become larger, they may establish their own entrepreneurial activities and start producing home-products in Malaysia. This finding is consistent with finding from prior empirical works such as Diaz-Alejandro (1970), Girma and Yu (2002), Bryant *et al.* (2004) and Dunlevy and Hutchinson (1999).

Table 2.11: Estimation of equation 2.13 and 2.14 using pooled OLS

	Model 11	Model 12
	Export	Import
I. Model Estimation		
Variables	Coefficient	Coefficient
DOM_MIG	0.2157207*** (0.0530716) 4.06	0.405178*** (0.0982763) 4.12
CONSTR_MIG	0.1951416** (0.0943875) 2.07	.0350605 (0.1510043) 0.23
MANUF_MIF	-0.150779* (0.0870667) -1.73	-0.2606734* (0.1465834) -1.78
SERV_MIG	0.3830825*** (0.0836507) 4.58	0.8494827*** (0.1492853) 5.69
AGRI_MIG	0.1539847** (0.0693952) 2.22	0.27661** (0.1322312) 2.09
GDPpc	2.794274*** (0.2209748) 12.65	3.59829*** (0.3660077) 9.83
DIS	1.241677*** (0.23512) 5.28	1.68998*** (0.4792584) 3.53
FTA	1.304474*** (0.2291157)	3.027889*** (0.4496508)

	5.69	6.73
CPI	2.98043*** (0.5376674) 5.54	5.93968*** (1.134583) 5.24
OPEN	49.45845*** (12.9979) 3.81	62.85662*** (21.07634) 2.98
LANG	-3.838187*** (0.8155412) -4.71	-4.899593*** (1.185333) -4.13
II. Statistic Estimation		
R-Squared	0.8473	0.8403
F-Stat	F(18, 101) = 49.25 Prob > F = 0.0000	F(18, 101) = 34.86 Prob > F = 0.0000
No. of observations	120	120

Notes:

- (i). Estimates include times dummies, and its outcome together with the constant term are not shown.
- (ii). The standard errors are in parentheses, all models are re-estimated with White's heteroscedasticity-consistent covariance matrix estimator.
- (iii). t- value is reported below the robust standard error value.
- (iv). (***) , (**) and (*) significant at 1% , 5% and 10% respectively.

The decrease in export, on the other hand, could be due to the fact that return migrants, equipped with the information on the Malaysian products and their acquired new technology, namely the know-how, may set up productions in their home-countries to produce Malaysian products, therefore the Malaysian exports to these immigrant home-countries fall. The same result is found by Mundra (2005) in the U.S study.

2.6.2 The statistic estimation and diagnostic tests

With regards to the statistical estimation, the *R*-square, which is the coefficient of determination, measures the ‘goodness of fit’ of a model. The explanatory powers of the gravity equations are high, ranging from 0.761 to 0.847, indicating that the explanatory variables account for between 76% and 85% approximately of the variation in Malaysian bilateral exports and imports. Though the obtained *R*-square for this study is significantly

lower than Gould's (1994) study where 99% of the variations in US imports and exports are explained, it is nevertheless similar to the results of many immigrant-trade link related empirical studies.

The F -test is computed to test the overall regression. In other words, F -test tests the significance of the overall relationship between the dependent variables and the set of explanatory variables. The p -value of the F -statistics obtained is really small, 0.0000, for every model, indicating that the null hypothesis where all coefficients equal zero is rejected at a 1% level of significance. Therefore, all model regressions have the overall significance.

The results for the diagnostic testing are summarized in Table 2.12 where three tests are conducted. The presence of heteroscedasticity is tested using the Breusch-Pagan/Cook-Weisberg test, the misspecification of the functional form is tested using the Ramsey's RESET test, and the multicollinearity problem in the model is tested using VIF and its tolerance value. As stated before, the diagnostic results reveal that for the heteroscedasticity test, both exports and imports models fail thus the models are re-estimated with the robust standard error. The predicted values from the regression models are plotted against the residuals in Figure 2.1 and Figure 2.2 for exports and imports respectively. There are inconclusive patterns indicative of heteroscedasticity's presence.

Table 2.12: The Diagnostic Tests' Results

Diagnostic Tests	Export	Import
Breusch-Pagan / Cook-Weisberg	chi2(1) = 16.14 Prob > chi2 = 0.0001	chi2(1) = 3.28 Prob > chi2 = 0.0069
Ramsey RESET test	F(3, 98) = 0.69 Prob > F = 0.5630	F(3, 98) = 3.13 Prob > F = 0.0290
Multicollinearity		
MIG	3.65 (0.274146)	3.65 (0.274146)
GDPpc	3.07 (0.326006)	3.07 (0.326006)
DIS	1.78 (0.563147)	1.78 (0.563147)
FTA	1.98 (0.506215)	1.98 (0.506215)
LANG	9.05 (0.110440)	9.05 (0.110440)
CPI	2.53 (0.394897)	2.53 (0.394897)
OPEN	5.79 (0.172717)	5.79 (0.172717)

For multicollinearity, the figure in bracket is the value of tolerance level (1/VIF)

For Ramsey's test, the exports model have a correct functional form, but not for imports models. It is not surprising as the trade barriers data are missing, and in this case, it affects the Malaysian imports more than the Malaysian exports. For the multicollinearity test, there is no VIF value that exceeds 20 or has a tolerance (1/VIF) below than 0.05; therefore it is reasonable to conclude that the multicollinearity problem is not present.

Figure 2.1: The Predicted Values From The Regression Models Plotted Against The Residuals For Export Model.

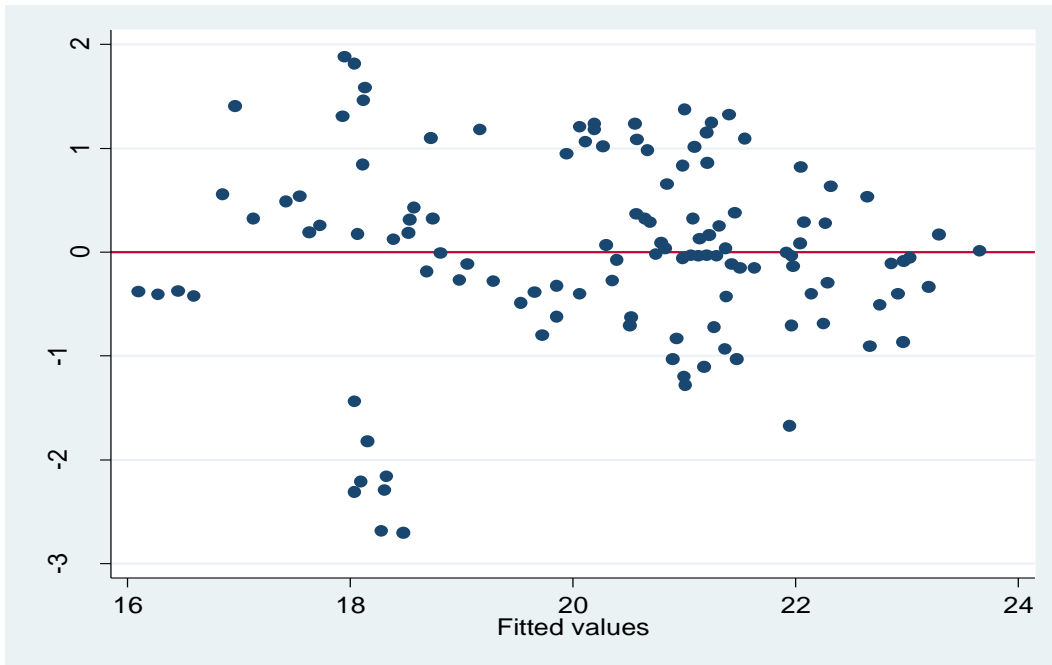
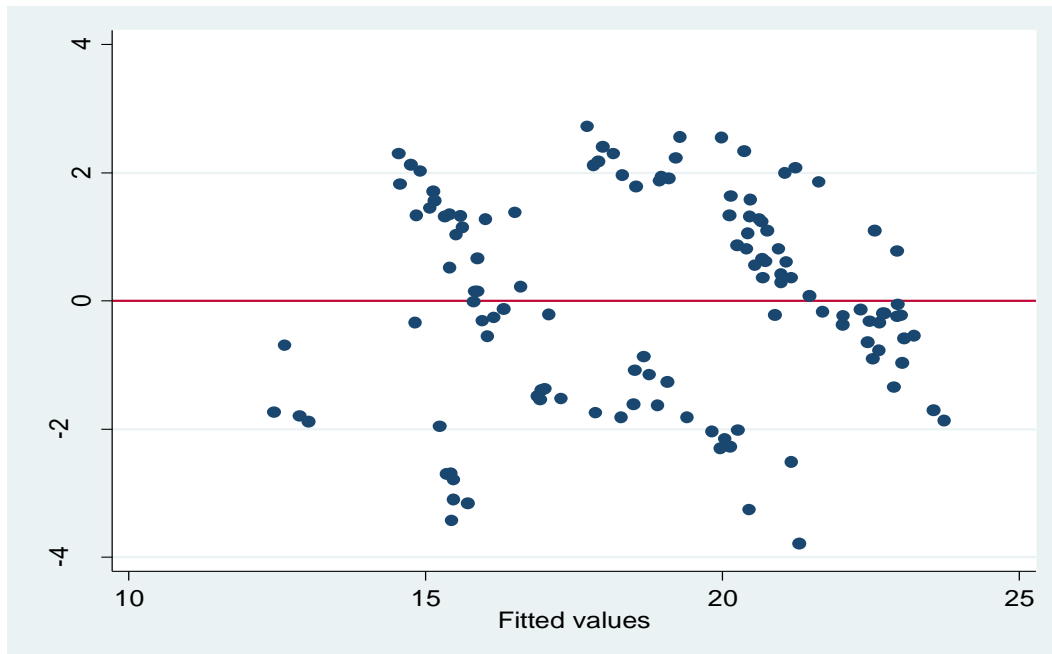


Figure 2.2: The Predicted Values From The Regression Models Plotted Against The Residuals For Import Model



2.7 CONCLUSION

This paper explores the linkage between trade and immigration, as it is one of the most pressing issues in the globalized world in which many advocate the capital movement freely but not the free labour movement. Two mechanisms on how immigration affects both imports and exports, namely the preference mechanism and immigrant-link mechanism, are outlined and discussed, and empirical implications are elicited and analyzed in the context of trades between Malaysia and ten immigrant home countries: Bangladesh, Cambodia, China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka and Thailand. One aim of this study is to identify whether immigrants stimulate trade, and another is to investigate which mechanism is more dominant in explaining the immigrant-trade link.

Following the literature, the gravity model of trade is employed to analyze the impact of immigration on trade. Adopting an ad-hoc notion for estimation, many variables are added to the core gravity variables, including the immigration stock variable. Pooled OLS is chosen for several reasons, mainly due to its simplicity and ability in exploiting the cross-country variation data. Using the annual data set of trade flows between Malaysia and its trading partners over the 1997 to 2008 period, the empirical estimation in this study shows that more than a 75% of variation in trade can be explained with a set of explanatory variables. The main finding, thus, states that a 10% increase in immigration from these countries is estimated to increase Malaysian exports by 4.9% and Malaysian imports by 7.2%, providing support for the main hypothesis that immigration increases trade. The elasticity is higher for imports than exports, indicating the dominance of the preference mechanism over the immigrant-link mechanism in stimulating trade. Nevertheless, since immigrants influence both exports and imports significantly, these will evidence the prevalence of both mechanisms.

The analysis is further extended in several dimensions; the Malaysian immigrant-trade link is investigated across product classification, the trade agreements, language and culture as well as occupational categories of immigrant workers. It is found that

immigration stimulates trade most strongly on consumer and producer imports rather than on consumer and producer exports; lending additional support to the domination of immigrant-preference mechanism as a principle mechanism behind the linkage between immigration and trade. Nevertheless, the finding of the positive and significant export elasticity also indicates that immigrants exploit their strong network connection and utilize their superior knowledge about the home market trading, consumer patterns and demands, and product characteristics, consequently leading to higher trade between host and home countries.

With regards to FTAs, however, there is no sharp distinction between immigrants from FTA and non-FTA (NFTA) countries on both exports and imports elasticities. In investigating the impact of languages spoken by immigrants on the volume of trades, the results show that immigrants, regardless of their native language, boost the bilateral host-home country trade, though immigrants that come from non-Malay speaking countries have stronger effects on the trade. As language commonality is a proxy for cultural similarity, these findings show that trade is more affected by immigrants who have different cultures. In terms of occupational categories of immigrant workers, all immigrant occupational categories effect Malaysian exports and Malaysian imports positively and statistically in a significant manner, except in the case of immigrant workers in the manufacturing sector, for whom the study provides empirical evidence on the existence of import-substitution activities in Malaysia.

In conclusion, based on the findings, it is clear that immigrants in Malaysia stimulate higher trade, in which both mechanisms play major roles in determining the Malaysian bilateral trade flows. In conjunction with Hong and Santhapparaj's (2006) study, this study also finds that not only skilled immigrants stimulate higher trade between host and home countries, low-skilled immigrants also influence trade heavily.

CHAPTER 3

THE MACROECONOMIC DETERMINANTS OF REMITTANCES OF IMMIGRANTS IN MALAYSIA

3.1 INTRODUCTION

The issue on the link between migration and development is high on many global policies, as it is perceived that migration plays a large role in the process of economic development in both host and home countries (IOM, 2003). One of the most fundamental issues within this context is the significant functions of remittances in the capital flows to the developing countries.

In general, remittance is defined as the portion of the migrants' incomes sent from the host country to the home country (Addison, 2004). Due to the difficulties in recording the flow of remittance, the International Monetary Fund (IMF) has addressed this issue by imposing the law that remittances need to be recorded in three different sections of the balance of payments. These are the employee compensations, the workers' remittances and the migrants' transfers; in which all of these refer to the monetary and 'other' cash transfers transmitted (Reinke, 2007: 12). It is widely acknowledged that remittance flows are underestimated due to the use of informal channels such as the *hundi* or the *hawala* system of money transfer or otherwise remittance in the form of currency that is hand-carried by family members and friends, as well as in-kinds remittance such as jewelry, apparel and other consumer goods. For many countries, especially in Asia, this unrecorded remittance is estimated to be ranged in between 10% and 50% of the official total remittance (Puri and Ritzema, 1999; El-Qorchi *et al.*, 2002), making the systematic evidence on its scale, structure and distribution is impossible to construct.

The immense flows of remittance in recent decades have invoked major interest from the academic, research, public and political circles. The estimated amount of remittances to developing countries in 1990 was USD\$31.1 billion, which increased more than twofold

in 2000 at USD\$76.8 billion, increased up to USD\$167 billion in 2005 (De Haas, 2007), and reached USD\$325 billion in 2010 (Issue Brief, The World Bank, 2010).¹⁹

The magnitude of remittance' flows have rekindled great debates on the external finance in the economic growth literature (see, for examples, Bhagwati, 1976; and Pereira, 1983). Besides being increasingly recognized as an engine of growth and development, remittance also has the potential to be the most effective tool in alleviating poverty and the provision of social protection (Department for International Development [DfID], 2007). With its less volatile behaviour in response to the economic cycles, the stability of remittances provides a cushion to the economic shocks such as term-of-trade shock, capital flow fluctuations and natural calamities. Also, remittance is a powerful mechanism in achieving consumption smoothing and lessening the liquidity constraint (Rapoport and Docquier, 2005: 40).

Given its important implications for the economic, social and cultural development for both host and home countries, it is imperative that remittance behaviours are studied vigorously, for its knowledge can be used to aid financial and economic policies. Wise policies will ensure a quality investment environment that induces a larger portion of remittances to be invested in physical and human capital (Kapur and McHale, 2003: 50). Furthermore, many governments of home countries have developed a dependency on this large flow of remittances for enhancing their countries' welfare (Kapur, 2003). Thus, the issue of what motivates migrants to remit arises owing to its role as a significant source of foreign exchange and as an efficient tool for enhancing local economic growth (Ratha, 2003: 161).

Without any doubt, the economic and political conditions in the host and home countries are the critical factors in affecting remittance decisions. However, the literature on the determinants of remittance, its variables and its expected signs remain controversial, partly due to the lack of a consensus on the framework for identifying and interpreting

¹⁹ See: http://siteresources.worldbank.org/TOPICS/Resources/214970-1288877981391/Annual_Meetings_Report_DEC_IB_MigrationAndRemittances_Update24Sep10.pdf

the empirical works on the driving forces of remittance. Severe data limitations also further add to the confusion on the theories of remittance determination as these are accuracy, credibility and reliability issues in relation to the statistical conclusions (Chami *et al.*, 2003: 3).

The aim of this essay, therefore, is to examine and analyse the relationship between remittances of Indonesian workers in Malaysia and the macroeconomic variables both in Malaysia and Indonesia, investigating whether the immigrants weigh primarily on the host country's macroeconomic situations, or consider instead the home country macroeconomic circumstances, or take both the host and home country's macroeconomic conditions into account in their remittance decisions. Also, this essay attempts to determine which motive dominates the migrant's remittance decision.

The remainder of this paper is as followed: section 3.2 examines briefly Malaysia's economic background and also the Indonesian workers' movement. Section 3.3 discusses the literature review concerning remittance determinations. Section 3.4 describes the empirical literature regarding remittance determination. Section 3.5 presents the econometric framework including the theoretical background, econometric specifications and data descriptions. Section 3.6 presents the empirical results and section 3.7 which is the conclusion.

3.2 A BRIEF MALAYSIAN ECONOMIC BACKGROUND AND INDONESIAN WORKERS MOVEMENT

Malaysia has achieved remarkable growth in just a few decades after it gained independence from the British rule in 1957. Despite the many troubles and challenges that have been plaguing the country since independence – the confrontation with Indonesia, the struggle against communism and the separation of Singapore – as well as its long-standing problems of racial and ethnic problems, Malaysia has utilized its rich and varied natural resources efficiently as well as its inherited British colonial

management effectively to become one of the most developed countries in South-East Asia. Malaysia emerged to become the world's tenth-fastest rising economy in 1970-90 (Snodgrass, 1995: 3) and is currently placed at 24th out of 133 countries in the Global Competitiveness Report 2009-2010 released by the World Economic Forum.

In responding to the race riots of May 1967, the New Economic Policy (NEP) was launched as the key economic policy in 1970 to build national unity by lessening interethnic antagonism resulting from discrepancies in the socioeconomic status. Consequently, the 1970s witnessed the transformation from reliance on the agricultural and mining sectors to the export-oriented manufacturing industries such as textiles, electrical products and appliances, electronic components, rubber goods *etc* (Drabble, 2000). By mid-1980s, these sectors have been the country's primary engine of growth, generating massive employment and income, as well as attracting larger Foreign Direct Investment (FDI), from a modest 151.6 million US Dollar in 1971 to a staggering 12.9 billion US dollar in 2008 (MIDA, 2008). Clearly, FDI plays an important role in developing the manufacturing industries in Malaysia, shaping its base through technology transfer, technical expertise and in-depth specialisation in the production process. This is more evident during the adoption of import-substitution policies in the 1980s which focused on the development of heavy industries (Lee, 2004).

One of the principles underlying the NEP is to promote Bumiputera (indigenous people) interest, and the end of the NEP in 1990 did not stop the Malaysian Government in continuing this objective. The New Development Policy (NDP) was launched in 1991, which is actually a part of a longer-term policy known as the Vision 2020, a grand program designed by the ex-Prime Minister Mahathir Mohamad. The ultimate aim is to transform Malaysia into a fully developed and industrialised country by the year 2020 in terms of national unity and social cohesion, economy, social justice, political stability, system of government, quality of life, social and spiritual values, national pride and confidence (Mahathir, 1991). Therefore, the shift to a knowledge-driven economy or K-Economy is seen as a must if the objective is to be achieved. To be globally competitive; elements such as knowledge, creativity and innovation are fundamental, where

Information and Communication Technology (ICT) is employed to enhance the value added products produced by the key economic activities of the agricultural, manufacturing and services sectors.

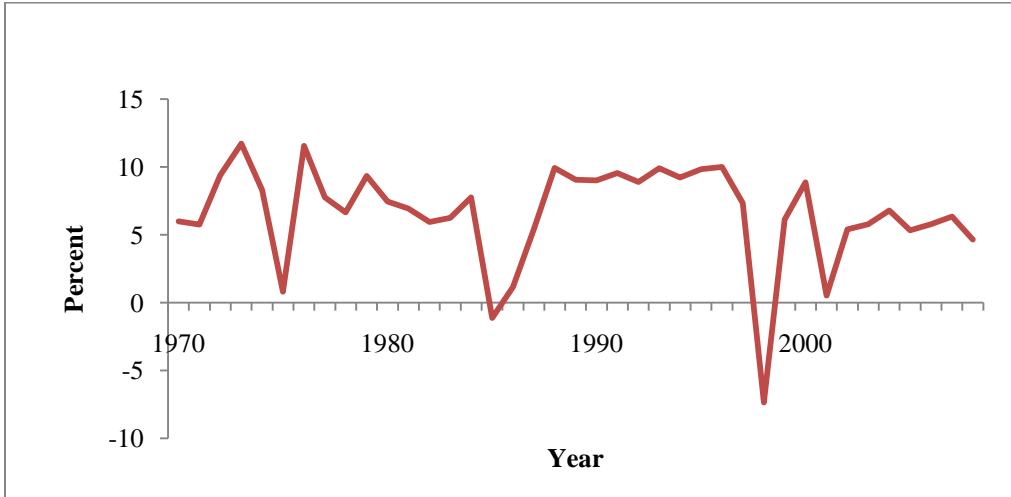
The Malaysian government's commitment at implementing, monitoring, evaluating and modifying these policies has resulted in remarkable economic development and growth. Malaysia consistently achieved the rates of 8-9% of GDP growth in the 1980s and 1990s, and even with its robust economic growth, its inflation rate is still relatively low by international standards, which is 3.0% (Economic Report, 1995/1995: 19).²⁰

Figure 3.1 depicts the Malaysian GDP growth rate from 1970 to 2008. This trend shows that the GDP growth is remarkably stable except for several periods; in the years of 1975-76, 1985-86, and 1997-98. During these sporadic periods, the country experienced economic depression stemming mainly from external factors.

Furthermore, the persistent pursuance of the growth policy has produced an increasing output from Malaysian export-based manufacturing industries at an incredible pace as shown in Figure 3.2, regardless of the economic downturns. The 1990s, therefore, witnessed the highest peak of its success, where Malaysia became the world's third largest manufacturer, and one of the world's largest exporters of semiconductors.

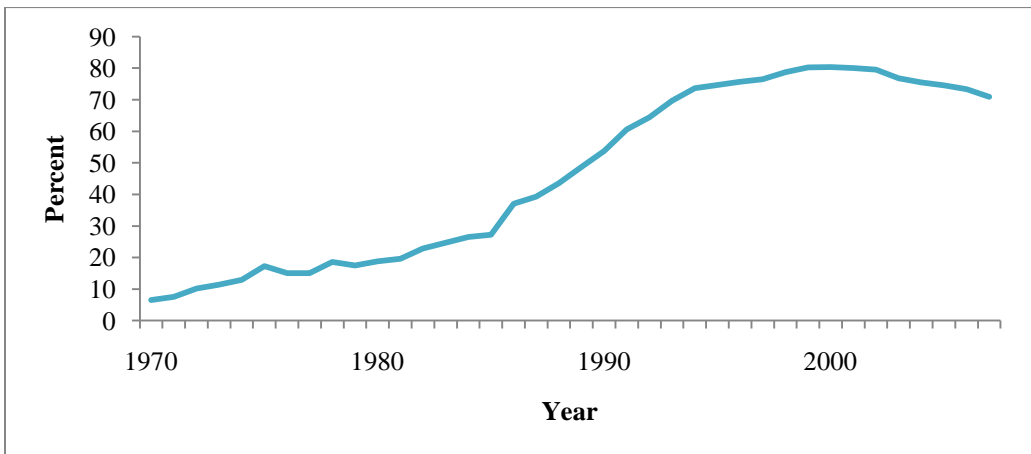
²⁰ See: http://www.treasury.gov.my/index.php?option=com_content&view=article&id=690:laporan-ekonomi-19941995&catid=73:senarai-laporan-ekonomi&Itemid=174&lang=my

Figure 3.1: Malaysian GDP growth rate



Source: The World Bank Online Database

Figure 3.2: Malaysian Manufacturing Export (%)



Source: The World Bank Online Database

However, manufacturing exports fell during the 2000s, accountably to many factors such as China's trading grows with its WTO membership, less Japanese Foreign Direct Investment as Japan struggles with its internal economic restructuring, and competition

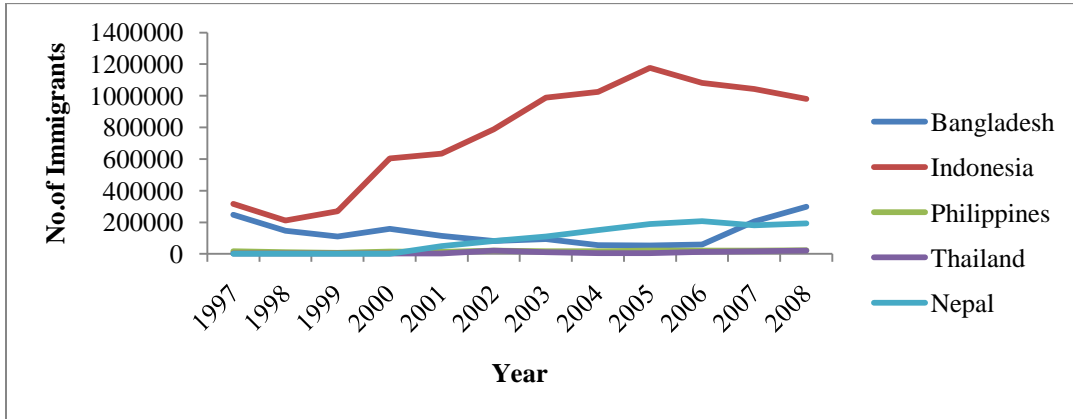
from other ASEAN countries such as Thailand and Indonesia as they pursue similar strategies to achieve higher economic growth (Siew-Yean, 2001: 14).

The rising growth of the manufacturing industries has stimulated a greater demand for labour, yet, the domestic labour market has not responded well to the structural changes in economy. Therefore, the insufficient supply of labour is met by importing foreign labour to realize the objectives of growth policies.

Moreover, the expansion of higher education in Malaysia has further resulted in a labour shortage for low-skilled jobs. In order to redistribute the wealth, many rigorous policies have been implemented especially under the NEP, which have resulted in more education opportunities and improved education facilities for the Bumiputera. Many Bumiputeras including women are educated locally or overseas, which enables them to take higher-skilled and higher-paying employments (Kassim, 2000: 100). While their contributions certainly accelerate the pace towards higher economic growth and development, nevertheless, it has also created a tight labour market where there is a huge demand created for low-end jobs that are shunned by the increasingly well-educated and comfortable locals. Consequently, immigrants are employed to fulfil these “3D” jobs – dirty, dangerous and difficult works (IFBWW, 2004: 3). Furthermore, the expansion of the Malaysian economy has generated higher wages and better working conditions, in which these are other factors that attract a large number of immigrants from neighbouring countries such as Indonesia, Nepal, Bangladesh, Thailand and Philippines (Kassim, 2000: 101).

As depicted in Figure 3.3, it is clear that the numbers of Indonesian migrants are the highest in Malaysia, in comparison to other migrants from other countries, as they account for more than 60% of the total migrant labour force. In 1999, the total of Indonesian workers was about 270,000 people and the number has risen by four times since 2005. There were more than one million officially registered Indonesian workers in Malaysia in 2005, mostly women and the unskilled, who worked in plantations, manufacturing, construction and domestic service

Figure 3.3: Number of immigrants in Malaysia from selected countries

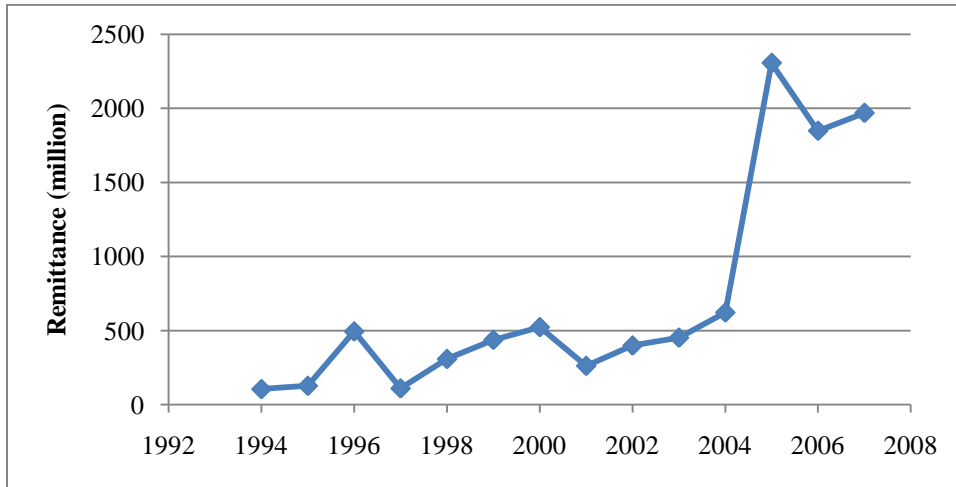


Source: The Immigration Department of Malaysia

The undocumented Indonesian workers however, are estimated to be over two million people working particularly in Sabah and Sarawak (East Malaysia) (Osman and Antara, 2009). Many factors are believed to contribute to this high flow of immigration. Besides economic motivation, other key drivers, such as close geographical proximity, culture and language similarity, also play important roles in the Indonesian migrants' decision to migrate to Malaysia (World Bank, 2008: 18).

After meeting their basic consumption needs, the remaining wages and salaries received by the Indonesian workers are normally remitted back home for their families. As most migrant labour are low-skilled workers and are hired temporarily, they tend to remit more. Looking at Figure 3.4, the remittance flow from Malaysia to Indonesia was the highest in 2005: USD 2 billion, and falls afterward. This is in conjunction with the number of Indonesian workers as their number was the highest in 2005 in comparison with the trend over the years. It should also be noted that despite the decline in 2006, the increasing trend set returned in 2007. It is important also to note that remittances did not fall but kept increasing even during the 1997 Asian Financial Crisis. Clearly, the impact from the crisis is minimal on remittance, which indicates the dominance of altruistic motive as the probable deriving force of migrant remittance decisions.

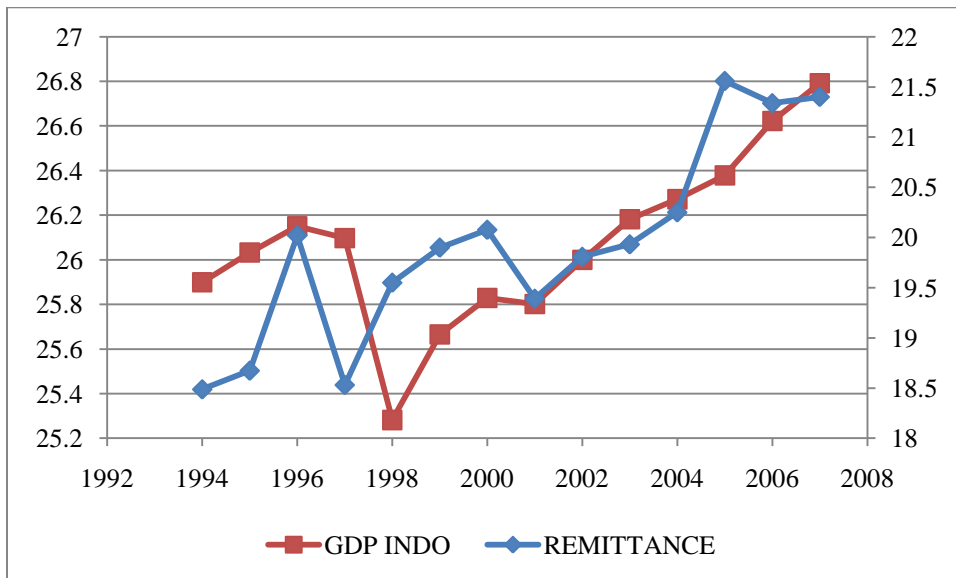
Figure 3.4: Remittance to Indonesia



Source: Own calculation, please refer to the next section

Figure 3.5 plots the trends and the relationship between remittances sent to Indonesia by Indonesian labour and Indonesian GDP in log for the period 1994 to 2007.

Figure 3.5: Remittance and Indonesian GDP (in log)



Although nominal data as depicted in Figure 3.5 shows a positive correlation between Indonesian GDP and remittance, after the time series treatment of data, negative correlation is established. The countercyclicality but also the established trend after 2000 of remittance is an indication of the altruistic transfer by Indonesian labour in Malaysia, especially for the 1997-2000 period when Indonesia suffered tremendously from economic collapse due to the Asian Financial Crisis which took some time to recover. This calamitous economic downturn has prompted a higher remittance sent as Indonesian migrants seems to be concerned with their families' income and expenditure back home. Similarly, remittance relatively falls when the Indonesian economy grew as a result of economic reforms, particularly for the 1994-1996 period and 2003-2004 period.²¹

Figure 3.6: Remittance and Malaysian GDP (in log)

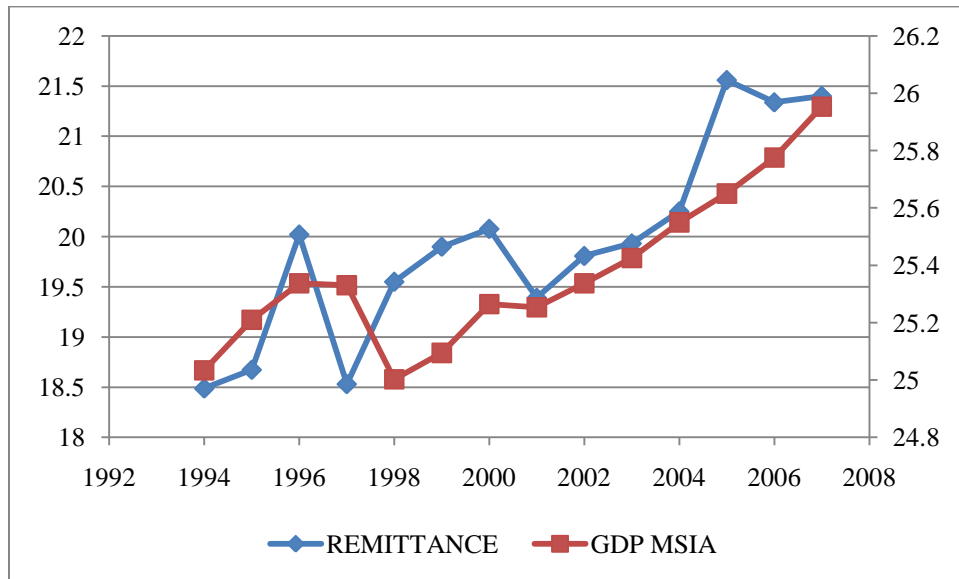


Figure 3.6, on the other hand, depicts the relation between remittance and the Malaysian GDP, where remittance is consistently increasing according to its own linear trend when the Malaysian economy accelerates, except in the years 1994, 1995 and 1997. This reinforces the above stated argument that remittance sent by the Indonesian migrants is

²¹ See: http://www.kbri-islamabad.go.id/index.php?option=com_content&view=article&id=18&Itemid=47

largely motivated by altruism, as a greater economic activity in Malaysia provides more chances for Indonesian workers to be hired, allowing them to remit more. Between 2004 and 2007, however, there was a shift in the remittance pattern, where there was a marked increase in remittance transfer to Indonesia. During this period, the implementation of the Ninth Malaysia Plan (9MP 2006-2010) has resulted in strong Malaysian economic expansion, driven by the rapid growth of service sector (7% annually on average), followed by manufacturing sector (6% annually on average) and agriculture sector (3% annually on average).²² As most of Indonesian labour are employed in these sectors, this implies a higher rate of their labour absorption and a higher income earning, leading to a higher level of remittance sent home.

Recently, there have been international concerns about remittances used to fund terrorism and criminal activities (UICIFD, 2007); therefore efforts have been made to encourage Indonesian workers to use formal channels when remitting money to their families in Indonesia, including proposing the construction of the Malaysia-Indonesia remittance corridor. This is because it is estimated that only a 10% of the remittance flows into Indonesia is transferred using formal channels, while the remaining amounts are transferred through alternative means such as money changers, courier services, hand delivery and employment agencies (World Bank, 2008). It is hoped that this corridor will facilitate the remittance transactions, provide higher security, quality and reliability, reduce costs and offer better investment options, particularly for women and undocumented Indonesian migrant workers.

3.3 DETERMINANTS OF REMITTANCE: THEORETICAL LITERATURE

The early neo-classical literature on migration does not place a substantial role for remittance (see, for examples, Sjaastad, 1962; Todaro, 1969; Harris and Todaro, 1970), as it focuses simply on the migration decision based on the individual strategy for income maximization. Starting in the early 1980s, a new strand in migration literature surged,

²² See: http://www.asiaconst.com/past_conference/conference/14th/08Malaysia.pdf

known as the New Economics of Labour Migration (NELM), which embodies the idea that the individual migration decision is also influenced by the household characteristics (Stark and Bloom, 1985). Consequently, the issues of remittance and its determinants have become a key feature in many in-depth theoretical and empirical studies.

There are two dominant approaches in the current literature on the determinants of worker remittance: the altruism approach and the portfolio approach (Barua *et al.*, 2007: 11). These are discussed in detail in the following section:

The altruism approach is also known as the behavioural/microeconomic approach, which is pioneered by Lucas and Stark (1985: 902). This approach centralizes on the economics of the family where remittance is a benevolent transfer to the family members and is motivated by the compassionate consideration. A set of variables that captures the economic circumstances of the immigrants and their family, the strength of family ties and the presence of any other contractual family arrangements is studied to establish the determinants of remittance. These variables include the length of stay, household income, the number of dependents at the home country, the marital status, education level, age, gender, wage and job situation of immigrants, and the migration status as temporary or permanent (Barua *et al.*, 2007: 13). Lucas and Stark (1985: 902) theorise that the determinants of remittance can be categorized as following: “pure altruism”, “pure self-interest” and “tempered altruism or enlightened self-interest”. The first category postulates that remittance is sent out of pure altruistic motive to improve the well-being of the family left behind. The second category, however, hypothesizes that pure-self-interested migrants send remittance for investing in financial and physical assets, for assuring receiving inheritance and for maintaining the status quo by bringing social capital when returning to their home countries. The last category implies that remittance is sent home for repaying the initial loans for migration or education abroad taken from relatives and extended families, or as an effective mechanism of risk-diversification and mutual support within a family (Blue, 2004: 64). Even though the last two categories identify that remittance is driven by self-interest related motives, family is nevertheless still the key concept in the framework of remittance decision-making. Most of these

theories are reviewed by Hagen-Zanker and Siegel (2007) and Rapoport and Docquier (2005).

On the other hand, the portfolio investment approach or as is also known as macroeconomic/structural approach resembles the behaviour of remittance to the behaviour of private capital flows (Akkoyunlu and Kholodilin, 2006: 5). Under this approach, remittance is profit-driven and responsive to the profitable environments in either the host or home country. Aggregate data is used in analysing the macroeconomic factors that are hypothesized to have substantial effects on the decision to remit. The variables employed in such studies are the level of economic activity both in the host and home country normally represented by Gross Domestic Product (GDP), inflation rate, relative interest rate on the deposits and exchange rate between the home and host country, among others (see, for examples, El-Sakka and McNabb, 1999; Karafolas, 1998; Russell, 1992). In addition, the domestic government policy and political stability are also considered to play important roles in influencing the volume of remittance flows. This approach is further discussed in the next section.

Building on the Lucas and Stark (1985) and Blue (2004) model, Figure 3.7 presents a model incorporating both altruistic and portfolio investment motives of remittance. The model recognizes that the individual migrant's remittance decision is determined by many social obligations and structural constraints prevalent in both the host and home countries. This essay, however, does not address the socio-demographic characteristics of migrants in investigating the remittance decision by Indonesian migrant workers in Malaysia, but instead focuses on the macroeconomic conditions that serve as determinants of remittances. Conclusively, altruistic and self-interest motives to remit differ by social-cultural norms and are hampered or unhindered by structural aspects which are beyond the migrants' control. In this case, there are no legal limits on the amount of remittances sent in either Malaysia or Indonesia, therefore, the state has less of a role in influencing the remittance decision by migrants. The combination of changes in the host and home countries' economic and political conditions, global economic crises and the closeness of family ties are thus expected to determine the remittance flow.

Table 3.1 lists the most frequently cited empirical papers in terms of determinants of remittance in the literature. Even so, the general theory of remittance is conspicuously absent as pointed out by Stark (1991). The previous empirical studies offer beneficial descriptive evidence, but are bound by some geographical, socio-cultural and temporal limitations (SOPEMI, 2006). In spite of these, the cited factors are primarily regarded as being the main determinants for workers' remittance.

Figure 3.7: Behavioural and structural determinants of remittance

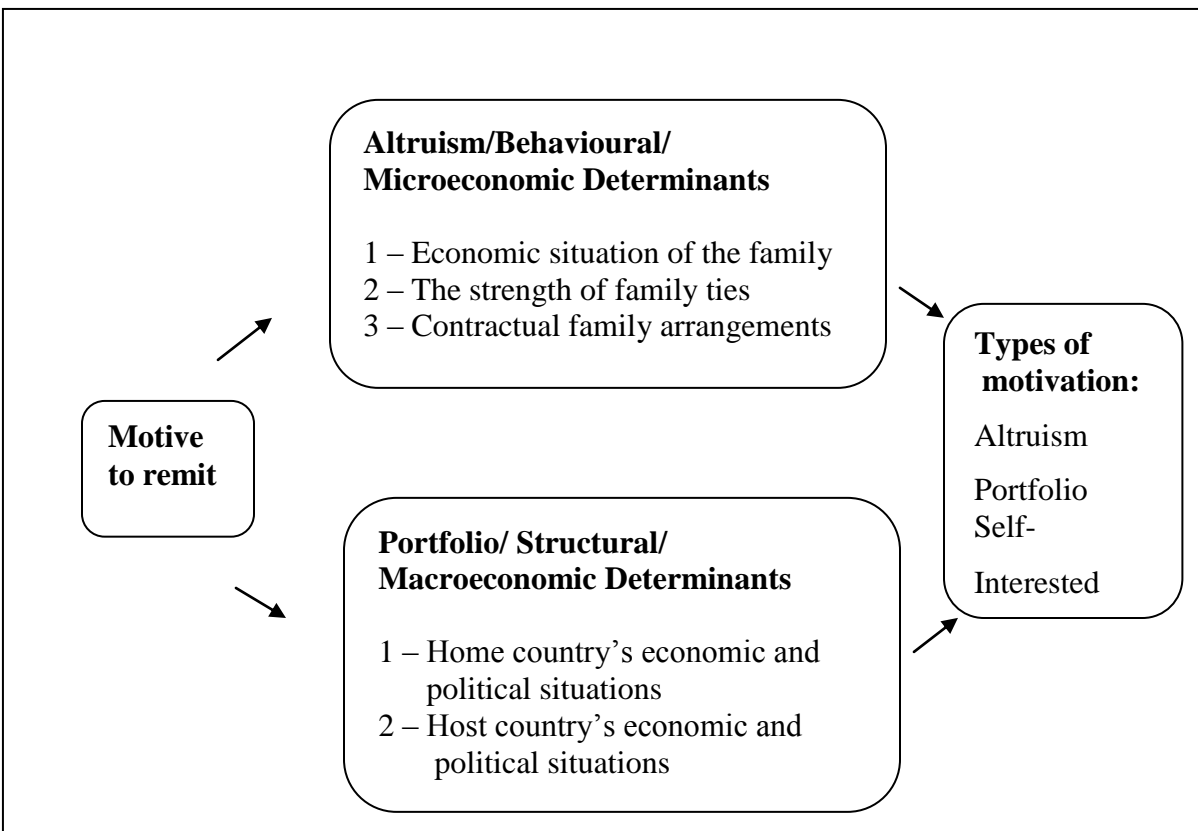


Table 3.1 replicates Garip (2006) list table, with additions from several studies.

Determinants	Reference Authors	Method
Altruism	Agarwal and Horowitz; 2002 Benarjee; 1984 Johnson and Whitelaw; 1974	2-stage – Probit, Heckman Procedure and maximum likelihood Tobit and 2-stage Tobit
Self-Interest		
Exchange /Intention to return	Mouhoud et al.; 2008 Cox <i>et al.</i> ; 1998 Cox; 1987 Rapaport and Docquier; 2005	Error Correction Models (ECM) Probit and Generalized Tobit Probit and Generalized Tobit Theoretical approach
Inheritance	De la Briere <i>et al.</i> ; 2002 Regmi and Tisdell; 2002 Stark and Bloom; 1985	OLS, Tobit and CLAD Regressions Tobit and Maximum Likelihood Method Theoretical Approach
Investment	Blue; 2004 Durand <i>et al.</i> ; 1996	Household surveys A Bivariate Probit, OLS and Multinomial Logit Model
Loan Repayment	Rapoport and Docquier; 2005 Piorine; 1997 Brown; 1997	Theoretical approach Theoretical approach Tobit
Insurance	Lucas and Stark; 1985 Stark; 1991 Rapaport and Docquier; 2005	OLS Theoretical approach Theoretical approach

After discussing the theoretical framework of remittance in general, the next section will discuss the determinants of remittance based on the framework presented above.

3.3.1 Altruism

The main query on remittance is why immigrants transfer a portion of their income to their household and relatives. The most obvious motive to remit is considered as altruism, where the money is sent for the care of household and extended family left behind (Johnson and Whitelaw, 1974; Lucas and Stark, 1985). In this understanding, remittance is seen as an altruistic gesture born of affection, obligation and responsibility towards the

family. In modeling this behaviour, a Becker type setting is utilized, where an immigrant's utility function including the utility of the household is derived. It also symbolizes the concerns of immigrants towards the other members of household consumption patterns.

The altruistic transfer rises with the increase in the immigrants' income and falls with the increase in household's income at the home countries (Funkhouser, 1995: 138). Therefore, an adverse situation of befalling the receiving household will prompt more remittance to be sent. Another prediction of this model is remittance tends to decay over time on the grounds that the family ties grow weaker as time passes by. Furthermore, migrants may intend to be the permanent residents of the host countries, thus bringing along the entire family leading to a fall in remittance. However, in contrast with this theoretical prediction, most papers, with the exception of Banerjee (1984) and Funkhouser (1995), find no evidence on 'remittance decay', which reveals that in general migrants preserve the family-ties and maintain their connection with the home countries.

Bhattacharyya (1985), on the other hand, has proposed an extreme altruistic model where it is assumed that immigrants send a maximum amount of remittance to their family. In this model, the home country's income plays no role in the altruistic transfer.

Since the altruism theory possesses an appealing element, the prediction of the theory is unambiguous. However, this theory's testable hypothesis, in which the amount of remittances should increase with the decrease of the recipient's income in the home country is difficult to prove as an altruistic gesture, as this prediction is compatible with other alternative motives of remittance such as insurance motive. This will be further discussed in the relevant section, which is section 3.3.4.

3.3.2 Exchange Motive

The essential difference between altruistic and exchange motives is that under the latter motive, the remitters remit money with the intention of receiving something in exchange

when the needs arise (Kang, 2004: 512). Remittance sent due to the exchange motive could be disguised under many Pareto-improvement situations. First, one often-observed situation is where remittance is transmitted to ‘buy’ a range of services including those concerning the care of the migrants’ assets or family affairs such as child, parental and elderly care (Cox, 1987; Lucas and Stark, 1985). The study by Cox *et al.*, (1998) in Peru establishes that most remittances are sent for care services for households where the family members are either very old or very young. Such motives reflect the migrants’ intention to return home and regard a migration as a temporary phenomenon. These, in turn, will affect the likelihood and the size of remittance.

The model predicts that remittance increases with the migrants’ income (Rapaport and Docquier, 2005: 13). Remitters will send more remittance if their incomes increase. However, unlike the altruistic motive, even if the household’s income increases, remittance will continue to be sent as the family is now able to afford higher quality of services such as a better consumption, education and health (Mouhoud *et al.*, 2008: 9).

Similarly, if the household’s marginal utility of income decreases, higher amounts of remittance will be sent to assure the services are performed amply at home. Apparently, the pre-transfer household’s income is not significant under this motive (Cox *et al.*, 1998). Clearly, the predicted signs for the variables of income in the host country and home country could be positive in the context of exchange motive.

Second, another intuitive situation involves the repayment of loans taken to finance the migrants’ investment in human capital or expenditure incurred during the phase of migration. This is also known as the loan repayment motive and will be further discussed below.

3.3.3 Loan repayment

The loan repayment theory emphasizes the idea of remittance as the repayments of loans provided by the family for the investments in the migrant’s education or for financing the

migratory process (Piorine, 1997; Brown, 1997; Glytsos, 1988). The implicit family contract in this case is to increase family income instead of reducing uncertainty. The family finances the tuition fees, travelling costs and other expenses incurred during the migrants' study. During the next time period, the already established migrants who manage to get the high-paid employments are expected to repay the loans in the form of remittance (Stark, 1991; Agarwal and Horowitz, 2002 and Gubert, 2002). Migrants may also lend money to other family members who wish to migrate, thus leading to higher amounts of remittance sent home.

If sending more immigrants increase the family income, the family members will continue to support migration. However, due to the increasing cost of migration and liquidity constraint, only a few members of the family are allowed to emigrate. Many poor families are unable to support the migrants' education investment, while rich families are less motivated to send family members overseas to enhance family wealth. Therefore, the relationship between remittances and family income is predicted to be an inverse U-shaped relation (Ilahi and Jafarey, 1999; Rapoport and Docquier, 2005). Poor families send immigrants for the purpose of increasing their family income, while wealthy families invest more in the immigrants' education, therefore, remittance flows to the home country should increase in the initial periods and then decrease with the immigrants' skills. Poirine (1997: 590), however, claims that if the loan repayment motive prevails over the altruistic and insurance motives, then the remittance inflow is smooth, regular and shows no inclination to drop over time.

3.3.4 Insurance

The NELM postulates that due to income volatility and possible market failures in the home countries, migration becomes a household strategy for risk diversification (Wouterse, 2006: 3). Emigration is viewed to not only maximize income and minimize economic risk, but households diversify sources of income by sending family members to work in various labour markets. Provided the income and economic risks in the home and host countries are not positively correlated, migration will ensure the remaining members of households are insured against the adverse conditions at home. Thus, there exists a co-

insurance agreement or implicit family contract between the remitters and receivers. Remittance is sent during the looming hardship faced by the households. In reciprocation, they provide support to migrants if the economic condition worsens in the host countries, for example, during the durations of unemployment spells (Solimano, 2003: 8). The contract enforcement is motivated by the self-enforced altruistic element. If the remitters fail to oblige to the implicit contract, households may use several retaliation strategies such as disavowing them for future family solidarity, denying them the rights to inherit the family heritage or disallowing them to return to home for retirement.

The insurance motive shares similar predictions as the altruism motive; remittance increases when the households' income falls, or from a macro perspective, when the output is more volatile in the home country. However, their predictions are different with respect to the timing of references. The altruism model predicts that remittance will gradually decline over time as the altruistic motive weakens over distance and time, while the insurance model hypothesizes that remittance will not decrease during a contract period, however, there is a sharp decline in the amount of remittance after the termination of contract (Rapoport and Docquier, 2005: 23).

3.3.5 Inheritance

Another self-interest related motivation to remit relates to the aspiration to inherit the family estates and heritage, based upon migrants' belief that family members who expand the family wealth may be more entitled to be the heirs. In other words, families use inheritance as an incentive for their children to remit more (De la Brière *et al.*, 2002; Hoddinott, 1994; Regmi and Tisdell, 2002). The central prediction of this theory is that remittance increases with the migrant's income and the households' income and decreases with risk aversion. Thus, it can be translated that a higher level of income in both the host and home countries are associated with a higher remittance, simply because migrants who have the desire to claim the family wealth in the event that they return will remit more to secure the inheritance (Regmi and Tisdell, 2002: 77). Among many self-interest motivations, only the inheritance theory is easily distinguished from altruistic

theory as a higher household income or wealth leads to higher remittances (Hagen-Zanker and Siegel, 2007).

However, Akkoyunlu and Kholodilin (2006) claim that in the context of inheritance motive, the amount of remittance is independent of the home countries' income, as remittance is viewed as, on one hand, a pure strategy of investment from the migrant's viewpoint, and on the other hand, as an enforcement device by the household to ensure the remittance inflow.

3.3.6 Investment

The last self-interest motivation to remit is investment motive which concerns with investment in the home country; be it in property, cattle, land and financial assets (Foster, 1995; Durand, *et al.*, 1996; Blue, 2004). Some authors classify this motive under the exchange motive or inheritance motive. Even though these assets may yield higher rates of return, it also presents higher risks. Thus, the migrant's family may act as trustworthy agents in choosing the desirable investment goods and administrating as well as maintaining these assets during the absence of the migrant. Altruism between family members and migrants may underlie or strengthen such a trust (Vadean, 2007).

Theoretically, the flow of remittance for investment purposes is more sensitive to the host and home country's economic and political climates (Dakila and Claveria, 2007:3). If the host countries' incomes are higher, more remittance will be sent, reflecting the higher income earned by migrants. Correspondingly, higher income level in the home country will induce more remittance, as it indicates favourable economic environments for investment.

Remittance, on the other hand, has a tendency to falter when the output growth in the host country falls. In addition, remittance also responds negatively when the home investment and political conditions worsen, and does not react positively to the adverse shocks at

home, suggesting the investment motive dominates the altruism motive (Lueth and Ruiz-Arranz, 2007: 3).

3.3.7 Macroeconomic determinants of remittance

The macroeconomic literature has apparently exercised many of the motives to remit discussed above in hypothesizing the relationships in explaining remittance reasons. However, the literature in macroeconomic approach is much less rich compared to the microeconomic approach. Theoretically, the volumes of remittance flows are affected by key macroeconomic variables, labour market conditions, political situations, as well as economic policies and institutions. Below are the descriptions of each potential determinants of remittance, which are the home and host income levels, political stability, inflation, interest rate and exchange rate.

3.3.7.1 Host and Home income level

The levels and fluctuations of economic activities in the host and home countries are the main variables that explain remittance behaviour and determination (Akkoyunlu and Kholodilin, 2006). The general level of the country's development is captured by the Gross Domestic Product (GDP) per capita. The model posits that there exist positive relations between remittance and the GDP per capita in the host country, with negative relations between remittance and GDP per capita in the home country.

Improved economic conditions in the host country will raise migrants' earnings and thus enable them to remit more to their family members (Elbadawi and Rocha, 1992: 8). This situation also attracts more migration flows as high economic growth indicates better employment prospects. On the contrary, the recession in the host country will result in less amounts of remittance sent home, either because of lower earnings due to a reduction in wages and salaries, job losses or lesser migration (IMF, 2005: 81).

Better economic situations in the home country, which result in a rise in family income at home, may lead to a fall in the inflow of remittances, as migrants are less willing to send

more remittances. On the other hand, the economic downturn, financial crises or natural disasters experienced by the home country may prompt higher remittance flows due to altruistic motive (El-Sakka and McNabb, 1999: 1496). Worsened family conditions demand more immigrants' assistance and supports, as most families generally depend on remittance for their survivals. Economic hardship also acts as an incentive for more migration activity, thus channelling more remittance back home in the time of need (Ratha, 2003).

Nevertheless, the short run effect of the income level of home countries is uncertain, as this variable also represents the attractiveness of home investment. Higher output growth in the home country may deter further migration as most potential economic migrants choose to work at home, hence this will reduce remittance inflows. On the other hand, countries with a higher economic growth are brimming with investment opportunities, thus migrants may send a larger portion of remittance back home for investment purposes (Akkoyunlu and Kholodilin, 2006: 3).

Table 3.2 provides a prediction with regard to the effects of the host and home countries' income upon the remittance, based upon the argument discussed before.

Table 3.2: Host and Home income levels' impact on remittance.

Motive	Income level of host country	Income level of home country
Altruism	+	-
Maximisation	+	0
Exchange	+	+/-
Inheritance	+	0/+
Investment	+	+/-
Loan Repayment	+	+/-
Insurance	0	-

+: positive effect; -: negative effect; 0 does not have any influence

3.3.7.2 Political stability

Contrary to the popular belief, economic incentives to attract more remittance play a lesser role than the political situation in a certain countries. Political stability is a general term that reflects the governmental and socioeconomic situations, investment environment, embroilment in internal and external conflicts, the existence of corruption, military involvement in political affairs, religious tensions, ethnic and racial hatred, rule of law and order, democratic accountability and bureaucratic quality (Nsouli *et al*, 2004). Evidences in which political stability heavily influences the determination of the size and probability of remittance are many (for examples, see Aydas *et al.*, 2006; and Straubhaar, 1986), and act as proof that remittance behaviour is highly sensitive to the political situation in a country.

There are dual effects of political instability. First, the continuing political turmoil in the home country will cause, among others, a deepening economic slowdown; therefore it may motivate a larger inflow of remittance for family support due to the altruism motive. This is due to the fact that remittance assists the family consumption in the migrants' original countries in this distressed time. In contrast, political instability may discourage remittance flows due to unfavourable impressions of weak governance institutions, higher levels of corruption and the lack of confidence in the credibility of the home political system (Aydas *et al.*, 2005: 58). Political instability leads to macroeconomic instability, and such a situation will create an inconducive and unsupportive environment for investment purposes (IMF, 2005: 82). Political turbulence also breeds economic mismanagement and institutional inability to protect property rights, thus lowering the prevailing sense of security to life and asset properties (Hermes and Lensink, 2000; Lensink *et al.*, 2000). Considering that confidence and liquidity are the paramount backbones of the financial system, the absence of these elements will unquestionably cause economic collapse. Many empirical researches have demonstrated that the economic conditions that provide confidence in the safety and liquidity of savings are much more important than incentives that offer higher returns (see, for example, Straubhaar, 1986).

On the other hand, a stable macro and political atmosphere create attractive and secured investment climates, thus acting as an incentive for larger remittance flows. Also, migrants are more inclined to remain effectively involved, to invest in economic and social activities, to travel and to return to the home countries if the political climate promotes growth and stability and presents less risk in the future (Straubhaar, 1986). Therefore, the prediction sign of the political instability variable is priori unclear.

3.3.7.3 Inflation

Longstanding literature has suggested that another macroeconomic factor which affects remittance flows is the inflation rate of the home country. Nevertheless, some researchers such as Kateeli and Glytsos (1986) believe that the inflation variable has only an indirect impact on the remittance flows. Similar to the political condition variable, the higher rate of inflation variable has two contrasting impacts on remittance behaviour: on one hand, higher prices adversely affect the income of the immigrants' families left behind where it reduces their purchasing powers. This detrimental situation may lead to higher amounts of remittance sent due to the altruism motive clarified above. Furthermore, a higher rate of inflation indicates that the macroeconomic instability which induces higher levels of international migration, thus higher remittances are sent (Schahbaz and Aamir, 2009: 134).

On the other hand, high inflation reflects the price instability as well as captures monetary instability. Monetary instability is often associated with false informational content, which results in inaccurate price signals, causing inefficiency and the misallocation of resources and investment, thereby reducing the return on money that is remitted (Beaudry *et al.*, 2001). High inflation also represents a greater uncertainty and higher risks, thus dampening the volumes of remittance inflows into the home country as remitters mistrust the monetary institutions and are less willing to take unnecessary risks (Buch and Kuckulenz, 2004: 9). Since these two means operate in opposite directions, the expected sign of the inflation rate variable is unclear; it could be positive or negative depending on how the remittance behaves.

3.3.7.4 Interest rate

The decision to either remit to the home country or to save in the host country relies on many factors, including interest rate that serves as the return on the financial assets (El-Sakka and McNabb, 1999; Buch and Kuckulenz, 2004). Along with the income of both the home and host country, interest rate is another potential major determinant of remittance pertaining to the investment motive. However, as income can have a positive or a negative influence on remittances depending on the different motives to remit, interest rate, contrastingly, could have a positive or a negative impact on remittance behaviour subject to the gains differential between the host and home country. A higher host country interest rate will reduce the amount of money remitted as immigrants grab this opportunity to reap a higher return by investing in the host country (El-Sakka and McNabb, 1999: 1496). On the other hand, a higher home country interest rate will undoubtedly be associated with a higher remittance inflow as immigrants view their home market as less risky than the host market (IMF, 2005: 82). Furthermore, the high returns on financial investments encourage immigrants to invest more in their countries of origin.

Obviously, the flow of remittance is associated with one of the self-interest motivations: for the portfolio investment purpose. For the fraction of income available for investment, it is assumed that the matters with regards to the expected returns, security and liquidity place important considerations for immigrants (Straubhaar, 1986: 731). The comparisons of the expected rate of returns and their risks are made prudently by immigrants in choosing investments with higher returns and less risky. One way to do this is to take a closer look at the interest rates in both the host and home countries. Therefore, remittance for investment purpose is negatively correlated with the host country interest rate, and is positively correlated with the home country interest rate.

3.3.7.5 Exchange Rates

The inclusion of exchange rates as one of the major macroeconomic variables in explaining remittance flows is important as it is widely believed that remittance is particularly susceptible towards any changes in exchange rates, especially on currency

devaluation (Chandavarkar, 1980; Loser *et al.*, 2006). Faini (1994: 238) claims that exchange rates, like many other macro variables, possesses two contradictory effects on remittance behaviour, depending on the relative power of wealth or substitution effects, thus its overall impact is not always clear a priori.

The devaluation or depreciation of the home country's currency will allow immigrants to substitute some inferior goods in the home country for the more luxurious goods in the host country, resulting in the decrease of remittance. Furthermore, the goods and services in the home country become cheaper, thus the anticipated remittance falls as it does not require the same amount of money remitted to purchase a given amount of goods and services. This implies the substitution effect (Bouhga-Hagbe, 2004: 11). Similarly, if the host country's currency becomes weaker, the difference between the currencies deteriorates and the amount of money remitted is much greater as to be able to allow the family back home to maintain the same consumptions as previously. This situation also might have an unintended impact of the migration flow. The wage differential becomes lesser and improved opportunity in the home country becomes more attractive. Migration is not as inviting escapism from the economic deprivation as before, it is no longer an inevitability, but as an option (Loser *et al.*, 2006). In light of this shift, the pattern of remittance flows may also be altered differently.

The wealth effect, on the other hand, has the reverse effect on remittance behaviour. As the home country's currency depreciates, immigrants are better off as their income is higher in terms of domestic currency, enabling them to live wealthier and motivating them to remit more money to acquire real assets such as houses, lands, automobiles *etc* for investment and retirement purposes (Ruiz and Vargas-Silva, 2009: 75). However, Bouhga-Hagbe (2004: 11) argues that even though the devaluation of the currency is an important factor leading to a higher remittance surge, it may also weaken the immigrants' confidence in the economy in the long run.

The preceding discussion presents the most commonly used explanatory macroeconomic variables to account for the determinants of remittance which evidently wield substantial

influence on the magnitude of remittance flows. The following section will review the main findings in the empirical studies on remittance.

3.4 DETERMINANTS OF REMITTANCE: AN EMPIRICAL SURVEY

At an empirical level, most empirical studies on the determinants of remittance are microeconomic studies, which are based on survey data, group interviews, schedule interviews, and ethnographic surveys, with various sample sizes (Rapoport and Docquier, 2006); therefore it would be impossible to make generalizations about the research findings. The aggregate remittance flows, on the other hand, echo the individual level microeconomic determinants of remittance. Nevertheless, studies addressing the issue on how responsive remittance is to the changes in the home and host country's economic dynamics are scarce.

The major findings in the empirical literature regarding to the remittance determination include the following: firstly, altruism is found to be the central underlying motivation to remit rather than any other motives. Secondly, remittance is counter-cyclical: its inflow is greater in times of economic depression in the home countries. Thirdly, remittance is spent primarily on consumption rather than on investments. Lastly improved home economic conditions do not stimulate the inflow of remittance for investment purposes (Gupta, 2005: 9).

Elbadawi and Rocha's (1992: 3) review of the motives for remittances divides the empirical approach into two broad categories: the endogenous migration approach and the portfolio approach. The first approach takes migration as a household decision, thus treats remittances as endogenous variable. In this model, many motives are assessed and tested, including the altruistic theory. The portfolio approach, on the other hand, focuses solely on the decision to remit, thus excludes the decision to migrate in the model. The model includes the saving and investment decisions of migrants; whether to save in the

host countries or to remit for investment purposes. This approach, as such, provides a supporting view that remittances behave like other private capital flows.

Not many papers utilize either approach in their empirical estimation of remittances determinations. In general, most papers include some demographic variables, economic variables and financial variables (see, for examples, Swamy, 1981; Glytsos, 1988; El-Sakka and McNabb, 1999). The empirical literature on the determinants of remittances often demonstrates that the demographic and income variables are significant; however, it varies with the significance of financial variables.

The host and home incomes are becoming increasingly significant factors in explaining the remittance determinants and are featured in many papers that use macroeconomic data. Most studies, such as Akkoyunlu and Kholodilin (2006) and Lianos (1997), find that the host income has a significant positive effect on remittance, thus providing a strong evidence to corroborate the theory. Interestingly, the results of the regression of remittance on the home country's income reveal a mixture of conclusions, which will be discussed in the following section. Some papers find the support for exchange and investment motives, while others provide empirical evidence for altruism. Besides, the income in both host and home countries turns out to be statistically insignificant in some papers, such as by Buch and Kuckulenz (2004). These inconsistencies in the results show that perhaps the endogeneity problem is present (Alleyne, 2006: 70).

The studies that include the politic variable render results that lend support to the hypothesis that political instability is negatively related to remittance as predicted by the theory. However, some studies find this variable is statistical insignificant. In addition, the evidences on the variables such as inflation, interest rate differential and exchange rate are also mixed and inconclusive. Table 3.3 provides a summary of the major empirical papers on this issue.

Table 3.3: A comparison of economic and political variables used in some of the econometric works on the determinant of remittances

Empirical Work/ Variables	Income level in the host country	Income level in the home country	Politic al Risk	Inflation	Interest rate	Exchange rate	Econometric Methodology
Akkoyunlu and Kholodilin (2006)	+	NS					Cross- correlations and bivariate VARs
Aydas et al. (2006)	+	-	-	+	+	+	Time series analysis
Buch et al. (2002,2004)	NS	NS but +					Panel regression
Elbadawi & Rocha (1992)	+	NS		-	NS		OLS estimation and fixed effects
El-Sakka and Mcnabb(1999)	+	+		+	-		OLS and autoregressive procedure
Gupta (2005)	+	-	NS	NS	+		Cross-correlation and regression
Huang and Vargas- Silva (2005)	+	NS		-			Vector error correction model (VECM)
IMF (2005)	+	-	NS		+	+	Panel methods
Lianos (1997)	+	NS				-	Regression
Sayan (2006)	NS	+					Detrending and cross- correlations
Straubhaar (1986)	+ but NS	NS	-				OLS estimation
Lueth and Ruiz- Arranz (2006)	+	+		+	NS	-	Panel data
Barua <i>et al.</i> (2007)				-	NS	+	Generalised Least Square
Alleyne et al. (2008)	+	+			+	NS	Panel unit root and cointegration
Glytsos (1997)	+	-		-	NS	NS	OLS

* + stands for positive, - stands for negative, NS stands for not significant

3.4.1 Studies finding only host country income significant

One of the earliest studies in remittance determination using macro data was done by Swamy (1981) who studied the impact of the home and host countries' macro variables on remittances flows to Turkey, Greece and Yugoslavia. She found that 70 -95% of the variation in remittances sent is explained by the level and cyclical fluctuations in aggregate economic activities in the host countries. Indeed, both of the stock of migrants and their wages account for 90% of the variation in inflows of remittance into the home countries. Straubhaar (1986) also obtains similar results when he analyses the

determinants of remittance from Germany to Turkey within the period of 1963-1982. Wages and employment, instead of income, are used as indicators of economic activity in the host country. Like Swamy, Straubhaar's results show that only this variable is positive and significant, showing implicitly the importance of the host country income in the remittance determinants. His findings include a 1% increase in German real wages will induce 2.5-3% increase in remittance to Turkey. He also finds that the Turkish migrants' remittances decision is not driven by an investment motive, even after the time of financial liberalization in Turkey.

Akkoyunlu and Kholodilin (2006) also study the Turkish migrants' remittance from Germany in the period between 1962 and 2004. The results are starkly in contrast to Sayan's (2004) findings. Akkoyunlu and Kholodilin (2006) find that remittance flows are positively responsive to the German output (host country output), and do not respond at all to the changes in the Turkish output (home country output). Germany's economic condition is the main factor considered in the remittance decision, since accelerated economic growth and employment in the host countries are considered to provide greater opportunities and a higher income earned by migrants, thus inspiring more people to migrate. As the Turkish GDP is statistically insignificant, the migrants' behaviour is consistent with the prediction of maximization and inheritance theories. In addition, using a number of different cointegration tests, the authors conclude that there is no long run relationship between the real remittance and the real GDP in Turkey and German.

In his influential empirical work of the Greek migrants' remittance from Germany, Sweden and Belgium from 1961 to 1991, Lianos (1997) finds that the host countries income, either measured by the per capita income or by the wage rate, has a positive and statistically significant effect on the flows of remittance, with the elasticity of 1.4 and 1.61 respectively, which are much higher than the others' findings. The level of income in the home country, on the other hand, is not significant at all. The author also is the first researcher that includes the unemployment rate of the host country as another explanatory variable. He argues that if the unemployment rate is higher, the income of migrants suffers as they lose their jobs. In addition, an increased rate of unemployment brings

uncertainty to their future income, therefore resulting in a reduction of remittances. However, Lianos's (1997) findings show that the unemployment rate of host countries has a negative but statistically insignificant impact on remittance.

Huang and Vargas-Silva's (2005) conclusions are also consistent with the conclusions of the studies mentioned above; they find that the economic condition in the host country is the most important determinants of remittance inflow. Since there is a potential for an endogeneity problem in the remittance and economic conditions variables, the authors use a vector error correction model (VECM) to solve the problem and to test if remittance is affected by the economic condition of the host country or home country. Data used is from Brazil, Colombia, the Dominican Republic, El Salvador, Mexico and the U.S. Following Hingpins *et al.* (2004), the authors use the unemployment rate as a proxy of the host country's income considering the possibility of social marginalization of the immigrants. They believe that the unemployment rate, compare to the GDP, is a better representation of the income generating opportunities of immigrants. Their results show that the home country's economic situation is not significant and the unemployment in the host country is a significant determinant of remittance. A decrease in the unemployment rate will result in better economic condition for the immigrants, thus inducing higher remittance to be sent back home.

Another empirical work that examines the macroeconomic determinant of remittance is by Elbadawi and Rocha (1992) who study remittance using data from Algeria, Portugal, Turkey, Morocco, Tunisia and Yugoslavia within the period of 1977-1989. They find that the level of income in the host country has a positive and statistically significant effect on remittance flows, with the elasticity being in the range of 0.62 to 0.48. This study establishes the importance of economic activity in the host country as the main determinant of migrants' remittances. However, inexplicably, the authors do not test the effect of the home country's economic activity on remittance.

3.4.2 Studies finding only home country income significant

Sayan (2004) uses quarterly data for the period of 1987 – 2001, as opposed to Akkoyunlu and Kholodilin (2006) who use annual data. Sayan finds that remittance responds more to the changes in the home output than to the changes in the host output. Turkish migrants' remittances are significantly positively correlated with the Turkish GDP, and do not correlate with the German GDP at all. The author attributes these results to the possibilities of inaccurate data used or the presence of other motives influencing Turkish remittance behaviour more strongly than the German output.

3.4.3 Studies finding both host and home country income insignificant

Similar to the results of Sayan's (2004) study, Buch and Kuckulenz (2004) also find the GDP in the host countries is insignificant in explaining the remittance determination. Surprisingly, they also discover that the home income is also an insignificant determinant of remittances inflows too. The authors use a panel data set consisting of 87 developing countries and their data spanning the period of 1970 to 2000. In addition, the GDP growth is used to assess the attractiveness of countries for investment and the regression results also show that this variable is statistically insignificant for the entire sample period. However, the panel regression for each decade reveals compelling results; there exists a negative relationship between remittances and GDP growth in the home countries for the 1970s, while positive sign is obtained during 1990s. The findings lend support towards the prevalence of altruism in the first decade, while the decision to remit in the next decade is driven more by investment motive rather than altruistic reasons.

3.4.4 Studies finding both host and home countries income significant

The evidence of the significant impact of the level of economic activity in the host and home country remittance flows is provided by El-Sakka and McNabb (1999). The authors study the determinants of remittance to Egypt from several Arab countries which are the

primary destination for Egyptian emigrants²³. The sample data consists of annual observations from 1967 to 1991. Wages in the host countries are used as an indicator of the level of economic activity, and this variable is found to be positive and significant with the elasticity of 0.034, as predicted by the theory. The Egyptian income is also found to be positive and statistically significant with elasticity of 0.0001; which suggests that much of remittance is not used for consumption smoothing, but for investing in local real and financial assets. The good performance of the domestic economy attracts a higher level of remittance; reflecting that remittance is motivated by investment purposes rather than altruistic motive.

Gupta (2006) examines the incentives behind remittance in the case of India. His empirical analysis shows that most macroeconomic variables employed are insignificant in explaining remittance behaviour. However, among the significant variables there includes the economic situations in both the host and home countries which have positive and negative impacts on remittance flows respectively, which are in contrast with the El-Sakka and McNabb's (1999) findings. Remittance is found to be higher when the host country's economic conditions are better, signifying a larger relative increase in the earnings of migrants. Gupta (2006) also finds some weak evidence supporting the notion that remittance is countercyclical, that is, remittance is higher during the years of negative growth in the agricultural output due to draught; indicating the existence of altruistic motive. The elasticity of remittance with respect to the host country income is 0.13 while for home country is 0.082.

Another study on Turkey by Aydas *et al.* (2005) reveals that remittance flows are significantly influenced by the level of GPD in both the host and home countries, similar to Gupta's findings. Their empirical study is based on the time series analysis for two sample periods; 1965-1993 and 1979-1993. This is due to the unavailability of interest rate differential data until 1978. The authors find a positive and significant effect of the

²³ These countries include Bahrain, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia and the United Arab Emirates.

home country's GDP on remittance after the year 1979, indicating that both consumption smoothing and investment are the dominant remittance motives in the period of 1979-1993, while consumption smoothing is the only effective motive for the period of 1965-1993. The elasticity of Turkey GDP per capita for the period of 1965-1993 is -6.80, while for the period of 1979-1993 it is at -14.32. On the other hand, the elasticity of host country's income for the period of 1979-1993 is 3.05.

Many papers study remittance determinations by focusing on a country-to-country remittance flow, or from a number of countries to a particular country, as far as the available data permits. The results are heterogeneous across studies; therefore prohibit the generalization of study conclusions. An IMF study (Chami *et al*, 2005), on a large scale, is an attempt to better understand the causes of remittance and to channel them into a fruitful investments by creating sound policies. Using annual panel data, Chami *et al*. (2005) examine the determinants of the remittance of 113 countries during the period of 1970–1998. The obtained results are similar to the previous studies mentioned above: the host countries' GDP have a positive and statistically significant impact on remittance while the home countries' GDP have a negative and statistically significant impact. The results are in line with theories suggesting that altruism is the dominant motive in remittance decision. The authors also test whether remittance behaves similar to capital flows. Since migrants' remittance behaviour is predictably countercyclical where the inflows of remittance to the home countries increase during an economic recession, this suggests that remittance appears to be a more effective instrument for cushioning economic shocks, rather than acting as an economic development vehicle. In contrast to El-Sakka and McNabb's (1999)'s and Aydas *et al.*'s (2005) conclusions, this study concludes that remittances do not behave like any other private capital flows.

Similar findings are also reported in IMF separate studies, in the case of Samoa by Chamon *et al*. (2005). However, instead of altruism, the empirical work supports insurance as a motive to remit to home countries. In investigating the impact of growth in the Samoan economy on the decision to remit, Chamon *et al*. (2005) discover that the variable has a negative and statistically significant effect on the inflow of remittance, as a

1% increase in Samoan economic growth will reduce the growth in remittances by 1.17%.

In surveying the relevant literature, Glytsos (1988 and 1997) studies should be mentioned. Both studies examine the determinants of remittances to Greece using the same equation but for different sample periods. Glytsos' (1988) work covers the period of 1960 – 1982, and the results include positive and statistically significant coefficients for the domestic current and lagged per capita income in Greece, indicate that the dominant motive to remit is self- interest. Glytsos' (1997) findings, on the other hand, provides a clear evidence on the altruistic motive behind remittance over the period of 1960-1993 where the sign of Greek per capita income has changed from positive to negative. Glytsos attributes such different results to the different status achieved by Greek migrants over the years. In the early 1960s, Greek migrants were temporary migrants with an intention to return home. Remittance therefore, is more likely to be sent for investment and future consumption smoothing purposes. However, since 1980s, many Greek migrants have become permanent residents in the host countries, and consequently they are more likely to remit due to altruism. The remittance behaviours for Greek migrants in the U.S.A and Australia are also found to be similar to their counterpart in Germany.

3.4.5 Studies exploring the impact of political risk

While these economic activities in the host and home countries are significant variables in determining the remittance behaviour, remittance is also sensitive to the abrupt and forcible political changes in the home countries or abroad. Ghosh (2006: 44) observes that a sharp decline in the remittance experienced by Pakistan in 1992 and 1998 are due to the loss of confidence in the Pakistani government, where remittance falls from USD\$ 150 million per month to USD\$ 50 million. Lucas (2005) also finds that the political upheaval in Albania gravely affected the flows of remittance in 1999 at the height of the Kosovo conflict.

Likewise, Straubahaar's (1986) analysis on Turkish remittances from Germany during 1963-1982 also demonstrates the importance of political stability, who finds that Turkish migrants response more to the changes of in the Turkish government rather than to other economic and financial incentives. He identifies that initially the wage and employment rates determine the potential remittance flows, and then the political stability dummy determines the portion of actual remittance sent. The political confidence levels and its effects on the safety and liquidity of investment have a major impact on the Turkish emigrants' decision to remit. Aydas *et al.* (2005) also report a similar finding; the political risk is found to be significant with the elasticity of -0.91. In effect, this shows that remittance declines when the political environment worsens. On the contrary, the political risk is found to be not significant in affecting the inflows of remittance as highlighted in the IMF (2005) study and the case of India investigated by Gupta (2005).

It should be noted that the previous literature does not demonstrate a clear link between remittance and macroeconomic activities as well as the political condition in the host and home countries. The diverse results show that further research are needed to be conducted in these area to lead to a better understanding in remittance' behaviour.

3.4.6 Studies exploring the impact of inflation

Another important variable employed in determining remittance flows is inflation, which is a depiction of economic uncertainty. Many studies find the evidence of a significant negative relationship between inflation and remittance, such as Katselli and Glytsos' (1986) study on Greek data, Barua *et al.*'s (2007) analysis on Bangladeshi data and Shahbaz and Aamir's (2009) study on Pakistani data. The influential study by Elbadawi and Rocha (1992) also arrives at the same conclusion, although with a much lower elasticity result that is -0.03 which indicates that inflation does not directly influence remittance flows.

El-Sakka and McNabb's (1999) study on Egyptian data, on the other hand, reveals an opposite conclusion. They find that the domestic inflation has a positive and significant

impact on remittance implying that a 1% increase in the inflation rate will induce an increase in remittance by 1.6-1.9%. Obviously Egyptians remit more money during a high-inflation period to support their families whose welfare level has relatively worsened off. This finding is supported by two separate papers by Lueth and Ruiz-Arranz (2006, 2007) on the eleven Asian, European and Middle-East countries, and Sri Lanka respectively. This evidence of altruistic behaviour is prevalent among most of the samples observed.

3.4.7 Studies exploring the impact of interest rate

Similar to the inflation rate variable, the influence of interest rate on remittance behaviour is inconclusive. Parallel to economic and political stability, suitable macroeconomic environments such as interest rate stability is needed for investment to thrive. Various studies use interest rate as an indication of the investment motive of remitters. In El-Sakka and McNabb's (1999) study, the differential between the host and home country's interest rate has a negative and significant impact on the remittance flow, signifying that migrants put their saving in the host country. They found that the elasticity of remittance with regards to the interest rate differential is ranged between -1.07 and -1.26. Katselli and Glytsos (1986) who study the remittance flow to Greece also find similar conclusion. Another Greek study by Lianos (1997) includes both foreign and domestic interest rates as macroeconomic variables, and the obtained results reveal that the coefficient of the domestic interest rate is positive and significant, while the results for coefficients of the foreign interest rate are diverse under different formulations.

In contrast, Alleyne *et al.* (2008) study the migrant's remittance to Caribbean countries using panel data and cointegration techniques and find that the sign for the interest rate differential is positive, which implies that the attractive local financial returns encourage migrants to invest in the home country and that there is a room for the government to play an active role in formulating policies which promote and attract the migrant savings. It should be noted that independent studies conducted by the World Economic Outlook (2005) and IMF (2005) also arrive at the same conclusion and recommendation.

Many studies, on the other hand, have reported that this variable is not significant, meaning that it has no impact on remittance flows. Such studies include by Swamy (1981), Straubhaar (1986), Glytsos (1988) and Elbadawi and Rocha (1992). Furthermore, in the long run, Bouhga-Hagbe (2004) finds no evidence on the portfolio motive behind the remittance sent by Moroccans who live abroad.

3.4.8 Studies exploring the impact of exchange rates

As discussed above, theoretically, exchange rate is a potentially major factor in influencing the amounts of money remitted by migrant workers. Various studies have included exchange rates as one of their macroeconomic variables, and most of them have successfully established the positive impact of exchange rates on the remittance flows. Barua *et al.* (2007), for example, find that Bangladeshi migrants send more money when the domestic currency is depreciated. Their findings also imply that remittance may be adversely affected during the appreciation of local currency or become stagnant if the currency is stable. The same conclusions are obtained by Bouhga-Hagbel's (2004) study on Morocco, Lueth and Ruiz-Arranz's (2007) analysis on Sri Lanka, Chamon *et al.*'s (2005) study on Samoa, and Shahbaz and Amir's (2009) examination of Pakistan. Chamon *et al.* (2005), for example, have found that a 1% real depreciation of the tala in Samoa will result in an increase of in remittance of 1.2%. Clearly in this case, the wealth effect takes places where the higher remittance flows from the host country to home country are due to investment motive, as the financial and physical assets are comparatively cheaper than before.

Fascinatingly, the outpouring inflow of remittance may lead to an appreciation of the real exchange rate (Amuedo-Dorantes and Pozo, 2004). Additionally, the exchange rate volatility where it measures the risk is found to be a considerable factor in remittance decision-making (Higgins *et al.*, 2004).

An IMF study by Chami *et al.* (2005) shows that the complete removal of any distortions to the exchange rate system will induce an increase in remittance by 1 to 2% of the GDP.

In other aspect, the counter-terrorism policies adopted by the international community will contribute to a greater magnitude of remittance flows through formal channels, as shown by Bruyn and Kuddus (2005: 27)'s study. These findings imply that, like an interest rate variable, supportive government policies and regulation are imperative in bolstering a higher level of remittance.

3.4.9 Studies exploring the impact of migrant stock

The stock of immigrants is hypothesized to have a positive impact on the remittance flows to their countries of origin. A study on Turkey by Aydas *et al.* (2005) shows that the stock of migrants affects remittances flow during the period of 1964-1993, but not for the period of 1979-1993. The authors believe that this phenomenon is attributed to the gradual deterioration of family ties over the years, which shows the possible presence of altruistic motive. Another possible reason is the family reunification effect where there are increased family unifications thus resulted in less remittances sent as there are less people left behind to be taken care of. On the other hand, Elbadawi and Rocha (1992) and Swamy (1981) find that the elasticity for stock of immigrant labour is unitary, indicating the proportional effect of an increase in the migrant stock has on remittance flows. Swamy (1981: 13) even argues that any empirical research that fails to uphold this proportionality relationship signifies the underspecified model equation.

It is crystal clear from the above discussion on the previous empirical literature that those macroeconomic variables' impacts on the migrants' decision to remit are undetermined and uncertain. The next section presents the econometric framework where an empirical model of the macroeconomic determinants of remittance by Indonesian labour in Malaysia is developed and tested.

3.5 ECONOMETRIC FRAMEWORK

The motives to remit, as previously discussed, are divided into two major reasons: altruism and self-interest. These motives have been the center of attention of many economic and social researchers for at least three decades, and the latest work of Rapoport and Docquier (2005) offers an admirable overview of theoretical models for the workers' remittance flows. This section focuses on the brief review of the theoretical model, and provides the econometric specifications used in this paper as well as the related research methodology.

3.5.1 Theoretical Background

Impressively, previous studies have documented the reliability and dependability of remittance as a substantial source of foreign exchange to many countries; therefore, its determinants need to be understood before the economic policy is formulated to encourage such resource flows. Since the objective of this essay is to investigate whether remittances sent by the Indonesian immigrants in Malaysia are more responsive to the macroeconomic and political conditions in the host country or their home country, the testable theoretical model is presented below. Originating from Huang and Vargas-Silva (2005: 85), the theory has clearly showed the relationship of remittances with the macroeconomics conditions of host and home countries. The model implies that remittance sent to the home country by emigrants will increase when the economic conditions of the host country improve while an improvement in the economic conditions of the home country will result in a decrease in the remittance flow.

It is generally believed that remittance is to a great extent, if not exclusively, driven by altruistic motive. Under this assumption, remittance flows will be greater if the output in the home country is more volatile, and as such represent as insurance when household is hit by the exogenous shocks. Similarly, the amounts of remittance will also be higher if the economic condition in the host country is favourable. On the other hand, if the nature

of remittances behavior is procyclical with respect to the output of home country, it indicates the presence of the self-interest motives.

After discussing the theoretical underpinnings of the study, the next section will discuss the econometric specification as well as the variables adopted in accordance with the objective of the paper and in line with the previous literature in this area.

3.5.2 Econometric specification

In this study, the twofold objectives are included to not only examine which motives are adopted by immigrants to remit, but also to explore the impact of other factors which might affect the decision to remit to home country. It is assumed that remittance is correlated not only to the home country variables, but to the host country variables as well. This paper adopts the variables that show a measure of the economic well-being and political situation in both the host and home country. Hence, based on the combining of the literature (Huang and Vargas-Silva, 2005; Akkoyunlu and Kholodilin, 2006; Aydas *et al.*, 2006; Sayan, 2006; IMF, 2005), the general model is as follows:

$$R = f(B, X, Y, Pol) \quad (3.10)$$

where R represent remittance, B is the stock of Indonesian workers in Malaysia, X and Y are indicators of economic conditions in the host (Malaysia) and home (Indonesia) countries respectively, and Pol is political risk. Discussions on each of these variables are presented below.

3.5.3 Variables employed and Data Descriptions

To date, the analysis of the macroeconomic determinants of remittance has been hampered by the serious lack of data. The primary source of data on remittance is collected by the IMF and falls under the current account in the balance of payment. However, the data is in the form of aggregate outward and inward flows for an individual country, no information on the source of the country of origin or destination is provided. The numbers of Indonesian migrants in Malaysia also are not fully recorded, and owing

to the utmost importance of this topic and the data only being available since 1994, the period of study for this paper is between 1994 and 2007. The variables employed and its descriptions are discussed below.

3.5.3.1 Remittances

Workers' remittance is broadly defined as the amount of money sent home by citizens working in foreign (host) countries. Many studies, in analyzing the determinants of migrant remittances, employ either the level of remittance (El-Sakka and McNaab, 1999; Lianos, 1997), or remittances per migrant worker (Swamy, 1981; Elbadawi and Rocha, 1992) and remittance per capita (Shahbaz and Aamir, 2009) as the dependent variable. Due to data deficiency, following Sayan (2004), for remittance, a proxy is used by the series of remittance weighted by the share of Indonesian workers in Malaysia in corresponding to the stock of migrant workers from Indonesia as reported in Table 3.4. While this assumption is debatable, it is necessitated by the scarcity of data. Besides, most Indonesian workers abroad have similar family backgrounds on economic status and social standing, possess similar skill distributions and a great many of them can be found employed in other countries which share similar characteristics with Malaysia. Thus, it can be established that remittance sent to Indonesia by Indonesian workers in Malaysia does not differ substantially across other host countries, so the resulting series may be regarded as an accurate proxy for remittances sent by Indonesian workers in Malaysia. The remittance data used in this study is obtained from one of the Indonesian Labour Ministry agencies website (<http://www.bnp2tki.go.id/content/view/180/87/>).

3.5.3.2 Migration stock

It is widely believed that higher amounts of remittance sent are directly correlated with larger numbers of immigrants. Nevertheless, the socio-economic characteristics of immigrants also play an important parts in determining the volumes of remittance, as this determines their earnings (Global Economic Prospects, 2006). Examples include the status of immigrants; whether they are temporary or permanent residents. Temporary immigrants are presumed to send a higher fraction of their income. Levels of skill are

another important socio-economic characteristic where low skilled immigrants are argued to send more remittances than high skilled immigrants do (Schiopu and Siegfried, 2006). Since there is no available data on these characteristic, such factors cannot be incorporated in the model to determine its impact on remittance flows. The Indonesian migration stock in Malaysia is also derived from the same site (the Indonesian Labour Ministry agencies - <http://www.bnp2tki.go.id/content/view/180/87/>) where the remittance data is obtained for consistency; therefore the data used does not match with the data used in the previous essay.

Table 3.4: Share of Indonesian Workers in Malaysia in Total Stock of Indonesian Workers Abroad (%)

	Number of Indonesian workers in Malaysia	Total of Indonesian Workers abroad	Percentage share
1994	41,712	175187	23.81
1995	23,909	120886	19.78
1996	321756	517169	62.21
1997	36248	235253	15.41
1998	132950	411609	32.3
1999	169177	427619	39.56
2000	191700	435222	44.05
2001	74390	295148	25.204
2002	152680	480393	31.782
2003	89439	293865	30.435
2004	127175	380690	33.406
2005	201887	474310	42.564
2006	219664	680000	32.304
2007	222198	696746	31.891

3.5.3.3 Proxies for host country economic conditions

Fluctuations in the economic activities of host country affect demand for imported migrant workers and lead to changes in the wages received by them. In turn, this will

have a greater affect on remittance sent to the home country. Previous studies have employed many variables as proxies for the level of economic activity in the host country, such as GDP or GDP per capita, since these variables have a large impact on the immigrants' savings and consumptions (El-Sakka and McNaab, 1999; Lianos, 1997; Elbadawi and Rocha, 1992; Sayan, 2004). Furthermore, a higher GDP generates higher employment opportunities, thus increases the likelihood of a higher absorption of immigrants in the host country. Other explanatory variables include the hourly industrial wage of the host country (Swamy, 1981) and the unemployment rate (Lianos, 1997; Gupta, 2005; Huang and Vargas-Silva, 2005). Higgins *et al.* (2004: 405) claim that the unemployment rate is a better indication of the income generating opportunities of immigrants than the GDP due to the potential social marginalization of immigrants. However, this paper adopts the Malaysian GDP at a level in the functional specification as the proxies of economic condition in the host country, where the data is obtained from the World Bank online database.

An interest rate variable is employed to represent the portfolio investment motive due to the fluctuating financial returns between the home and host countries. Many studies have included interest rate differentials in their econometric modeling. However, this paper, following Lianos (1997), adopts the Malaysian 3-Month Fixed Deposit rate as a proxy for returns on financial assets where the data is obtained from the International Financial Statistics (IFS) online database. The 3-Month Fixed Deposit rate is chosen as the return offered is higher and the risk is lower in terms of interest rate fluctuations²⁴. Thus it is an ideal instrument in examining whether the investment motive is prevailing among Indonesian labour in Malaysia, as a higher interest rate in Malaysia will shift their savings to Malaysia and reduce the amount of remittance sent to Indonesia. Variations in remittance flows in response to fluctuations in interest rate suggest the modification of the immigrants' behaviour in taking advantage of favourable economic circumstance, a clear indication of remittance is driven by investment motive. However, if it is found that

²⁴ See:

http://www.maybank2u.com.my/mbb_info/m2u/public/personalDetail04.do?cntTypeId=0&channelId=BTR E-Treasury&cntKey=BTRE02&programId=BTRE02-MoneyMarket&chCatId=/mbb/Business/BTRE-Treasury

the fluctuations in interest rate do not affect the remittance flows, this implies that remittance is sent for financing the household consumption, an evidence of remittance is motivated by altruistic motive.

As stated in the theoretical literature, it would be difficult to assign a priori to determine the impact of both the Malaysian GDP at level and the Malaysian 3-month Fixed Deposit rate variables on remittance. However, the expected sign for the coefficient of GDP is positive while for the interest rate it is negative.

3.5.3.4 Proxies for home country economic conditions

As discussed previously, the economic condition of the home country is also a significant variable as it can affect immigrants' remittance behaviour. It also determines whether remittance behaves as capital flow or as an altruistic transmittal. To capture the economic conditions in the home country, researchers employ variables such as GDP (Huang and Vargas-Silva, 2005), GDP per capita (El-Sakka and McNaab, 1999; Lianos, 1997), hourly industrial wage (Lianos, 1997), GDP growth (Gupta, 2005), and the manufacturing production index (Shahbaz and Aamir, 2009) to present the hardship situation in the home country.

As discussed above, the assumption is that the more deprived the economic situation is in the home country, the more remittances will be sent by immigrants. However, if remittance is regarded as financial or capital investment, favourable economic environments can act as stimulation for more remittance flows, as they are associated with future potential economic growth. This paper employs the Indonesian GDP at level as a measure of economic well-being in the home country, obtained from the World Bank online database.

Other explanatory variables that represent both the host and home country economic conditions are the Indonesian 3-Month Fixed Deposit Rate for the depiction of the investment motive, the Indonesian inflation rate for capturing the monetary instability and the nominal Indonesian exchange rate (rupiah/ringgit) as the valuation of home

currency, in which all data is obtained from the International Financial Statistics (IFS) online database. The bilateral exchange rate is calculated using the ratio of the RUPIAH/USD exchange rate and the RINGGIT/USD.

The expected signs of the coefficients of these proxies are uncertain according to the remittance literature, which bears resemblances to the cases of proxies for the host country's economic conditions. Nevertheless, the predicted outcomes include negative signs for both the Indonesian GDP and the Indonesian inflation rate, and positive signs for both the Indonesian 3-Month Fixed Deposit Rate and the nominal exchange rate.

3.5.3.5 Political situation

Political instability is another important factor in affecting the remittance flows, which is undoubtedly, always upsets the volume and flow of remittance. It is natural for immigrants to be concerned with the remittance system in repatriating assets and savings from the host to home country, or vice versa. If the political risk rises, more control will be reigned, therefore there is a danger of expropriation- direct or indirect- which will induce less remittance flows as immigrants become reluctant to remit more. Since the data is available from 1994 to 2007, the dummy variable will take the value of 1 for 1997 and 1998, which represent the peaks of political instability in Indonesia, where there are many riots protesting the President Suharto (Daihani and Purnomo, 1998). In addition, for 2001 a dummy variable is also considered, as major political events took place with relation to militant Islamism as well as the domestic political developments such as the power battle between President Abdurrahman Wahid and his deputy Megawati Sukarnoputri (Mietzner, 2002). Further dummy variables for 2003 and 2004 were also used to take into account the guerrilla warfare between the Free Aceh Movement (GAM) and the Indonesian military (Aspinall, 2005: 2).

3.5.3.6 Asian Financial Crisis

The Asian Financial Crisis 1997 disrupted several decades of the magnificent economic performance of Asian countries, leading to the bankruptcy of several countries through

collapsed currencies, horrendous stock market performance and other devalued commodities prices (Kaufman *et al.*, 1999). The crisis also weakens their national securities, destabilizes their financial systems and contracts their output growths greatly, which generates and aggravates the human crisis too (Self and Grabowski, 2006: 247). The severity of the economic downturn definitely affected the magnitudes of remittance sent by the migrants from the host economies, which was the case for Malaysia as well. This study, hence, aims to investigate the impact of the 1997 Asian financial crisis on the flow of remittance. The dummy variable will take the value of 1 for 1997 and 1998 representing the period of the Asian Financial Crisis.

3.5.4 The Model Formulation

Based on the above discussion, the remittance determination model employed in this study can be written by the following functional form:

$$\begin{aligned} \text{Log } R = c + \alpha_1 \text{STOCK} + \alpha_2 \text{GDPM} + \alpha_3 \text{GDPIND} + \alpha_4 \text{INF} + \\ \alpha_5 \text{INTM} + \alpha_6 \text{INTIND} + \text{EXRATE} + \alpha_8 \text{POL} + \\ \alpha_8 \text{DUMMY} + \varepsilon_t \end{aligned} \quad (3.11)$$

where R is the level of remittances sent by Indonesian immigrants, STOCK represents the number of Indonesian immigrants in Malaysia, GDPM is the Malaysian GDP at level, GDPIND is the Indonesian GDP at level, INF is the Indonesian inflation rate (%), INTM is the Malaysian 3-month Fixed Deposit rate, INTIND is the Indonesian 3-month Fixed Deposit rate, EXRATE is the nominal exchange rate (rupiah/ringgit), DUMMY is the dummy variable for the Asian Financial Crisis, POL is the political situation in Indonesia and ε_t is the error term, which is assumed to be normal, independent and identically distributed, with zero mean and constant variance. Table 3.5 shows the summary of the descriptions of the variables, its source and its expected results in relation to the remittance theory.

Table 3.5: The Variable Descriptions, Source and Expected Sign

Variable	Description	Source	Expected Sign
<i>R</i>	See the explanation above on how it is derived	http://www.bnp2tki.go.id/content/view/180/87/	
<i>STOCK</i>	The number of Indonesian immigrants in Malaysia	http://www.bnp2tki.go.id/content/view/180/87/	+
<i>GDPM</i>	The Malaysian GDP at level (millions of USD\$)	The World Bank Database	+
<i>GDPIND</i>	The Indonesian GDP at level (millions of USD\$)	The World Bank Database	-
<i>INF</i>	The Indonesian inflation rate (%)	International Financial Statistics (IFS) database	+
<i>INTM</i>	The Malaysian 3-month Fixed Deposit rate (%)	International Financial Statistics (IFS) database	-
<i>INTIND</i>	The Indonesian 3-month Fixed Deposit rate (%)	International Financial Statistics (IFS) database	+
<i>EXRATE</i>	The nominal exchange rate (rupiah/ringgit)	International Financial Statistics (IFS) database	-
<i>DUMMY</i>	The dummy for the Asian Financial Crisis		+
<i>POL</i>	The political situation in Indonesia		+

3.5.5 Econometric Modelling

Most macroeconomic time series exhibit a trend characteristic, where the observed data is continuous and is recorded gradually over evenly matched time increments, for example daily, weekly, monthly, quarterly and annually²⁵. This trended data therefore is not stationary, which mean that the data's means, variances and covariances change over time, making the process of modelling or prediction nearly impossible. Using non-stationary data may results in spurious and invalid statistical inferences as the data has unit root and these violate the assumptions of classical linear regression (Granger and Newbold, 1974; Lin and Brannigan, 2003).

Following previous empirical literature, in order to determine whether each variable to be employed in this study has stationarity, first the natural logarithm of all variables, except inflation rate, interest rate and dummy variables in their levels is computed. Then, the Augmented Dickey-Fuller (ADF) unit root test, as suggested by Dickey and Fuller (1979; 1981) is performed on the natural logarithms of the levels to confirm the stationarity of

²⁵ <http://www.statsoft.com/textbook/time-series-analysis/>

the series. Unit root tests performed on the individual variable is more of a process rather than a step. If the presence of the unit root is detected, the level data is differenced and the ADF test is repeated. Differencing techniques are generally used in transforming a non-stationary time series to stationary by deducting the first observation from the second, as represent by the equation 3.12:

$$\Delta y_t = y_t - y_{t-1} + \varepsilon_t \quad (3.12)$$

Through differencing, the mean and variance of non-stationary time series can be stabilized. If the data is stationary without any differencing, it is said to be integrated of order zero, or a stationary series at level, designated as I (0). If it is stationary in the first difference, this implies the series is integrated of order 1, denoted by I (1). Some series need to be differencing more than once before its means and variances are constant. The outstanding survey done by Dickey *et al.* (1986) presents the literature review on testing for the unit roots theory.

The unit root hypotheses is:

H_0 : The time series data has a unit root (*i.e* non-stationary data)

H_1 : The time series data has no unit root (*i.e* stationary data)

The unit root tests are carried out by using Microfit software, this econometric software automatically generates the ADF statistics and critical values for each variable. If the ADF statistics are bigger than its critical value, the null hypothesis is rejected.

Once each economic time series has completed the unit root testing, they are regressed together by the OLS to estimate the parameters. The standard OLS estimation includes a *t*-ratio for testing the null hypothesis that the coefficient (or parameter β) of the explanatory variable is zero. The null and alternative hypotheses are:

H_0 : $\beta = 0$

H_1 : $\beta \neq 0$

The null hypothesis is rejected if the obtained p -value is less than the levels of significance, for examples 0.01, 0.05, 0.1. On the other hand, the null hypothesis cannot be rejected at the selected significance level if the p -value is higher, indicating that the coefficient is not statistically significantly different from zero. Besides, the hypothesis testing of the statistical significance of the estimated parameters, the goodness of fit of the model – the R-squared, the overall fit – F -test, as well as the analysis of the residuals patterns are important in order to determine the model's adequacy. In particular, the residual diagnostic tests are important to assess the model's properties of estimators; its unbiasedness, consistency and efficiency.

Automatically generated by Microfit, these residual diagnostic tests are the Breusch-Godfrey LM test for serial correlation; the Ramsey's RESET test for misspecification of the functional form; the Bera-Jarque test for normality of the error terms; and the White's test for detecting heteroscedasticity. The hypothesis of each test is presented below:

Breusch-Godfrey LM:

H_0 : No autocorrelation detected in the time series data

H_1 : Autocorrelation is detected in the data

Ramsey's RESET test:

H_0 = Functional form is linear

H_1 = Functional form is non-linear

Bera-Jarque test:

H_0 : The error terms follow a normal distribution

H_1 :The error terms do not follow a normal distribution

White's test:

H_0 : No heteroscedasticity is present

H_1 :Heteroscedasticity is present

To reject the null hypothesis, the p -value is again used, and a similar interpretation employed as described above. The next section will present and discuss the empirical results of the determination of remittance in Malaysia.

3.6 EMPIRICAL RESULTS

This section will report and discuss the empirical results from the unit root tests and the OLS estimation. The results are obtained by using the time series annual data for Malaysia and Indonesia during the 1994-2007 period.

3.6.1 Unit Root Test Results

In order to determine whether the series is stationary or non-stationary as well as their order of integration, the Augmented Dickey Fuller (ADF) test is carried out on the time series annual data for remittance, the Indonesian stock in Malaysia, both the GDP for Malaysia and Indonesia, both the 3-month Fixed Deposit rates for Malaysia and Indonesia, the inflation rate for Indonesia and the exchange rate. The optimal lag structure is determined using the Akaike Information Criterion (AIC) introduced by Akaike (1977), and the number of optimum lags are in the parentheses.

Table 3.6 summarizes the results of the unit root tests for all variables. As shown in panel A Table 3.6, the null hypothesis of non-stationarity is rejected for the immigrant stock (*STOCK*), the Indonesian inflation rate (*INF*) and the Indonesian 3-month Fixed Deposit rate (*INTIND*) at 5% significance level, indicating that these variables are stationary at level I (0). However, the null hypothesis of non-stationarity cannot not be rejected for remittance (*R*), both GDP (*GDPM* and *GDPIND*), the Malaysian 3-month Fixed Deposit rate (*INTM*) and the nominal exchange rate (*EXRATE*) at a 5% level, indicating these variable are stationary in the first difference, denoted by I (1). Hence, the first differences for the I (1) variables will be employed in the OLS estimations, along with the I (0) variables.

Table 3.6: Unit root tests for all variables

	Intercept		Intercept and Trend	
A. At Level I (0)	ADF Test	95% critical value	ADF Test	95% critical value
R			-3.4581 (0)	-3.8288
STOCK			-5.2376 (0)	-3.8288
GDPM			-2.3650 (1)	-3.6746
GDPIND			-1.5682 (1)	-3.6746
INF	-3.8864 (0)	-3.0199		
INTM			-2.6155 (0)	-3.6592
INTIND			-4.4137 (1)	-3.6746
EXRATE			-2.1630 (0)	-3.6592
B. At Level I (1)				
R	-5.6253 (0)	-3.1485		
GDPM	-3.4573 (0)	-3.0294		
GDPIND	-3.4091 (1)	-3.0401		
INTM	-4.2866 (0)	-3.0294		
EXRATE	-5.2247 (0)	-3.0294		

The number of optimum lags is in the parentheses according to AIC.

3.6.2 OLS estimations

Table 3.7 presents the results of the OLS estimation for coefficients of the model as depicted by equation 3.11. The general findings in existing literature that remittance is partly driven by both the altruism and investment motives, the notion that the level of economic activity in both the host and home countries has a direct impact on the remittance flow and the Asian Financial Crisis contributing to the sizeable reduction in the remittance sent are further supported in this study. The empirical results are in line with priori expectations and the coefficients have the predicted signs and are statistically significant, therefore contribute to the major understanding of the macroeconomic determinants of remittance flow from Malaysia to Indonesia. The results are consistent with the empirical studies such as Aydas *et al.* (2006), Elbadawi & Rocha (1992) and El-Sakka and McNabb (1999), to name a few.

A number of models are estimated, however, only two models produced the best efficient results, therefore it is presented and discussed in this chapter, the summary of the other models can be found in the appendix A. The difference between Model 1 and Model 2 is that in Model 1, the dummy for the Asian Financial Crisis is omitted, and is introduced in Model 2. The results for these models are discussed separately below.

In both models, however, both the Indonesian inflation rate and the Indonesian 3-month Fixed Deposit rate variables as well as the dummy for political situations are omitted from the regression analysis as any inclusion of these variables will yield in the non-significant coefficients of all variables regressed. It can be concluded that these variables are not important in determining remittance flows, and the regressed equations without these explanatory variables perform better and can be regarded as the best OLS estimations. The following results are obtained for both models:

Model 1:

$$R = -0.4559 + 0.5611STOCK + 7.1429GDPM - 3.1975GDPIND - 0.4711INTM - 0.8162EXRATE$$

(3.8385)
(0.2535)
(3.6148)
(1.5113)

(0.1917)
(0.4812)

Model 2:

$$R = 2.7164 + 0.5242STOCK + 3.3320GDPM - 3.1674GDPIND - 0.3792INTM - 1.1129EXRATE - 1.4521DUMMY$$

(3.6112)
(0.2142)
(3.6069)
(1.2725)

(0.1680)
(0.4323)
(0.7376)

where the standard errors are given in parentheses.

The empirical analysis starts with the main variables of interest in Model 1 and Model 2, namely the levels and fluctuations of economic activity in both the host and home

countries. In Model 1, the sign on the Malaysian GDP coefficient suggests that host country's economic activity is positively and significantly related to remittance flow. This is in accordance with the theory discussed before, as the improved economic conditions in the Malaysia will raise the Indonesian migrants' employment prospects and earnings levels and thus enable them to remit more to their family members. Furthermore, this situation also attracts higher migration flows from Indonesia to Malaysia as high economic prosperity indicates better employment prospects, and thus, in turn will result in higher amount of remittance sent home.

The actual coefficient value suggests that, *ceteris paribus*, a 1% increase in Malaysian GDP leads to an increase in remittance flow to Indonesia by 7.1%. This is a huge magnitude, clearly implicating that the economic activity in the host country has a vital impact on the level of remittance sent to Indonesia. Furthermore, the result is in line with the hypothesis of altruistic model where remittance increases with the migrants' income, thus affirming the prevalence of the altruistic motive in the Indonesian labour's remittance decision. This finding is similar with other previous researches, such as Swamy (1981), Straubhaar (1986), Akkoyunlu and Kholodilin (2006) and Huang and Vargas-Silva (2005).

Table 3.7: Estimation of equation 11 using OLS

	Model 1	Model 2
I. Model Estimation		
Variable/ Models	Coefficient	Coefficient
CONSTANT	-0.4558 (3.8385) -0.1187	2.7164 (3.6112) (0.7522)
STOCK	0.56113* (0.25346) 2.2139	0.52422** (0.2142) 0.9238
GDPM	7.1429* (3.6148) 1.9760	3.3320 (3.6069) 0.9238
GDPIND	-3.1975* (1.5113) -2.1157	-3.1674** (1.2725) -2.4891
INTM	-0.47114**	-0.3792*

	(0.19170) -2.4577	(0.16802) -2.5745
EXRATE	-0.81616 (0.48122) -1.6960	-1.1129** (0.4323) -2.5745
DUMMY		-1.4521* (0.7376) -1.9686
II. Statistic Estimation		
R-Squared	0.71265	0.82541
R-Bar Squared	0.50740	0.65083
F-Stat	P=0.068	P=0.040
DW Stat	2.4265	2.6855
III. Diagnostic Tests		
Serial Correlation (LM)	p=0.280	p=0.151
Functional Form	p=0.752	p=0.822
Normality	p=0.859	p=0.856
White test	p=0.884	p=0.184

Note:

- (i) (***), (**) and (*) Significant at 1%, 5% and 10%.
- (ii) The standard errors are in parentheses, t- value is reported below
- (iii) the robust standard error value.

On the other hand, as shown in the Model 2, the coefficient of Malaysian GDP loses its significance with the inclusion of the dummy variable for the Asian Financial Crisis, even though it is still positive. The dummy variable represents a break in the trend occurring at the period of this study, and given its coefficient is statistically negatively significant, it could be argued that this structural break is gravely influential. Indeed, the 1997 financial and economic crisis is one of the most traumatic experiences to affect the Malaysian economy and the obtained result confirms the severity of the economic downturn triggered by this turmoil. The explanatory power of the model has shifted from the Malaysian GDP to the dummy variable, indicating that the contracting Malaysian economy has induced the reduction in the remittance flow by almost 1.5% as the crisis's impacts include the loss of jobs due to factory closures and the worst affected are the migrant workers.

Furthermore, this plunge in Indonesian remittance due to the inclusion of the Asian Financial Crisis variable is partly owing to the control on the international financial outflow implemented by the Malaysian government during the dark days of financial crisis in 1997 and the following years. Unrelated trade and foreign direct investment (FDI) transactions are prohibited and the de-internationalized the use of Ringgit (*i.e.* the reduction and elimination of international trade in Ringgit) is adopted by the Malaysian authorities to avoid any speculation against the Ringgit, to stabilize the flows of short-term capital as well as to regain some degree of autonomy in monetary policy (Tamirisa, 2006). Moreover, given the fact that Indonesia nearly went bankrupt during this crisis and its domestic currency depreciated rapidly by more than 35% (Hill and Shiraishi, 2007), it is hardly a surprise that the amount of remittance to Indonesia falls, as Indonesian workers in Malaysia may have taken precautionary attitude to avoid the risk.

Another interesting finding is the exchange rate variable (*EXRATE*), which is significant at 5% level in Model 2, where previously in Model 1 it is not significant at all. The gain of significance implies its importance as one of the macroeconomic determinants of remittance flow after taking the financial crisis into account. The statistically negatively significant coefficient implies that the amount of remittance falls when the Indonesian rupiah appreciates. This finding is in similar to many previous studies, such as Bouhga-Hagbel (2004), and Chamon *et al.* (2005) that find home country exchange rate depreciation leads to higher remittance sent; though it is in stark contrast to studies such as Lueth and Ruiz-Arranz (2007) and Lianos (1997) in which exchange rate depreciation reduces the amount of remittance sent home.

This finding supports the wealth effect as outlined earlier in the theoretical literature, where the exchange rate appreciation discourages immigrants' remitting behaviour. Similarly, it could be interpreted that Indonesia's exchange rate depreciation will increase the purchasing power of the Indonesian immigrant population in Malaysia. This, in turn, will provide them incentives to increase the amount of money remitted to Indonesia to be invested in financial and physical assets which have become cheaper. This result also suggests that Indonesia labour are sensitive to potential economic returns as they are

aware that the devaluation of Rupiah would render remittance more profitable. Thus, the result shows the evidence of the wealth effect as opposed to the substitution effect, which is also consistent with the portfolio investment motive for remittance transfer. The fact that Indonesian labour seem to take economic conditions into consideration in their remittance decision indicates that the portfolio investment motive is present. This is because if the remittance is sent as altruistic transfer, changes in exchange rate should not have an impact on remittance flow, while for investment purpose, it is expected that remittance vary with changes in the exchange rate movement. Thus, given the evidence presented above, it could be postulated that remittance responds to portfolio investment motives too.

Looking at the home country's economic activity, in contrast to the host country, its coefficients are negatively associated with the flow of remittance in both model 1 and 2; providing additional evidence for the presence of altruistic behaviour among Indonesian migrants irrespective of Indonesian economic conditions. The estimates for the Indonesian income coefficients are estimated at - 3.2 for both models, clearly showing that it has a strong negative effect on the remittance sent. The results indicate that the occurrence of an economic turndown in Indonesia will prompt high remittance to be sent from Indonesian migrant workers in Malaysia. This is in line with the theoretical framework that the negative correlation between remittance and Indonesian income, *ceteris paribus*, is the manifestation of concern and benevolence the Indonesian migrants feel towards their families, therefore taking their well-beings into consideration in the remittance decision-making process. The findings reported here are similar with many existing studies such as El-Sakka and McNabb (1999), Gupta (2006) and Aydas *et al* (2005), that the remittance flow is significantly influenced by the level of GDP in both host and home countries, and are opposite to Buch and Kuckulenz (2004)'s results.

Also, despite the negative coefficient of the dummy variable for the Asian Financial Crisis, the remittance flow to Indonesia in the event of recession remains resilient as Indonesian labour continue to send money, implying their capability of coping with adversity. Many immigrants tend to spend less on themselves, might work more hours

and multiple jobs, could take more debts, possibly move to different districts searching for new jobs, shift sectors and are even more likely to dip into their savings in order to maintain the same level of remittance. Moreover, Figure 3.4 has also illustrated that remittance is not lessening but keeps rising even during the 1997 Asian Financial Crisis and this signifies that remittance is, first and foremost, a family obligation. Worsened family conditions require more of immigrants' help and support, since most families rely on remittance for their survivals.

Recalling that an attempt has been made to include the Indonesian 3-month Fixed Deposit rate variable in the model regression, as the results indicate, however, does not produce any effective results. This could be explained by the fact that the less important role it plays in the remitters' decision making where a favourable financial rate of return does not appear to be significant in attracting more remittance to be sent either in the form of savings or investment in Indonesia. This provides evidence for supporting the fact that remittance is not dominated by the portfolio diversification motive. Instead, the finding lends more support to the altruism hypothesis, implying that a large part of remittance is used primarily for family consumption. This is consistent with the results from previous empirical studies, amongst others, Swamy (1981), Straubhaar (1986), Glytsos (1988) and Elbadawi and Rocha (1992), which all fail to establish a direct statistical link between the interest rate in the home country and remittance. In addition, most Indonesian workers are women and are unskilled, therefore, it is reasonable to postulate that they and their families have limited investment and financial knowledge as well as narrow access to additional financing for investment.

Nevertheless, the insignificance of the interest rate as proxy for the Indonesian 3-month Fixed Deposit rate variable could be related to the fact that it is possible that discretionary remittance is sent through the unofficial market or remains in Malaysia as saved remittances, reflecting the higher costs involved in transferring through the official channels. Also, many Indonesian migrant workers are originally from remote areas where the banking and financial services offered are fewer, thus limiting the official remittance transactions.

This is further supported, as the Malaysian 3-month Fixed Deposit rate variable is found to have a negative and significant impact on the remittance flows in both models, reinforcing the above analysis that a major constraint to the remittance sent is the higher costs and risks involved. However, this result also indicates that the portfolio investment motive appears to be present in the Indonesian immigrants' remittance behaviour. The coefficient implies that holding everything else constant, a 1% increase in the Malaysian interest rate will reduce remittance by 0.47% and 0.38% for model 1 and model 2, respectively. Furthermore, evidence suggests that the favourable Malaysian economic conditions, such as a well-developed financial and banking system, good corporate governance and regulatory frameworks, and incredibly stable political and macroeconomic environments, may encourage Indonesian migrants to invest their savings in the Malaysia to obtain higher returns. As a result, the amounts available to remit back to their families are less. The finding is in line with Barua *et. al* (2007), Lianos (1997) and El-Sakka and McNabb (1999), while it is in contrast with Swamy (1981) and Elbadawi and Rocha's (1992) findings, suggesting that there is a room for Indonesian government to play an active role in attracting more remittance flows. It also lends support for Glytsos' (1996) conclusion that migrants are less inclined to take higher risks when it comes to their investment decision making.

The aggregate stock of Indonesians in Malaysia is another significant factor in explaining remittance flow. Its positive and significant coefficient indicates that a 1% increase in stock will result in a 0.5% increase in remittance sent to Indonesia, signifying that the expanding stock of migrants generates larger amount of remittance sent. The finding has provided further evidence on the strong link between international labour migration and remittance, strengthening the fact that the remittance of Indonesian workers continues to be of growing importance to the Indonesian economy. Moreover, the finding lends weight to the postulations that remittance is the main source of income and foreign exchange, as well as being far more stable than other flows by exhibiting its stability over time. This is in line with Swamy's (1981)'s and Elbadawi and Rocha's (1992) finding.

With regards to the overall significance of the model, the ‘goodness of fit’ measure of the R-squared for Model 1 is 0.71 implies that 71% of the total variation of remittance sent is explained by its explanatory variables, and another 29% is accounted by randomness. The R-squared for Model 2, however, is much higher, 0.83, which indicates that this model performs better than Model 1 as 83% of total variance is explained by the model equation. This is further emphasized by the higher obtained value of R-bar squared in Model 2, 0.65, as compare to the 0.51 in Model 1.

The F -test is computed to test the overall regression; the test of the significance of overall relationship between the dependent variables and the set of explanatory variables. The p -value of the F -statistics obtained for Model 1 is 0.068 while for Model 2 it is 0.04, indicating that the null hypothesis of all coefficients being equal to zero is rejected at the 10% and 5% level of significance respectively. Therefore, both models of regression as an overall are significant. Nevertheless, the results from F -test further support the fact that Model 2 performs better than Model 1.

The results for the diagnostic testing are summarized in panel III in Table 3.7 where four tests are conducted to test for the presence of serial correlation of the macroeconomic and portfolio determinants. The tests used are the Breusch-Godfrey LM test, the test for misspecification of the functional form using the Ramsey’s RESET test, the test for the normality of the residuals in the model using the Jarque-Bera test and the test for the presence of heteroscedasticity using the White’s test. The diagnostic results reveal that both models perform satisfactorily as they fail to reject all of the null hypotheses, indicating that there is no serial correlation: the residual has a white noise, the models have correct functional forms, the residuals of the models are normally distributed and the data is homoscedastic.

3.7 CONCLUSION

Contrary to most of the prior empirical literature that have examined remittance from microeconomic viewpoints, this paper explores the determinants of remittance from the macroeconomic perspective. Several fundamental motives to remit are outlined and discussed; and empirical implications are elicited and analyzed in the context of remittance sent by Indonesian immigrants in Malaysia to Indonesia. One objective of this paper is to identify whether remittance is more responsive to the macroeconomic and political conditions in Malaysia or Indonesia, and another is to investigate which motive is more dominant in the migrant's decision to remit, namely the altruism or portfolio motives.

Using annual data sets of remittance flows from Malaysia to Indonesia over the 1994 to 2007 period, more than 70 percent of variation in remittance can be explained with the set of explanatory variables. Nevertheless, it is found that only a few macroeconomic variables are influential in the behaviour of remittance over time. Among the variables that are statistically significant in affecting remittance are the level of economic activity both in the host and home country represented by Gross Domestic Product (GDP). Previous evidence on the importance of this variable is confirmed where remittance is found to be responsive to changes in both the Malaysian and Indonesian economic condition, the volume is higher when the Malaysian economy is favourable as well as during the Indonesian economic downturn. The findings provide evidence in favour of altruism as a motivation for remittance flow. Furthermore, the insignificant Indonesian interest rate acts as an indicator that remittance is not sensitive to the investment climate in Indonesia, lending a support to the notion that remittance is not dominated by the portfolio investment motive and a large part of remittance is used primarily for family consumption. The findings also demonstrate that the 1997 Asian Financial Crisis also did not invoke a higher remittance flow to Indonesia, due to Malaysia's contracting economy that witnessed a massive number of migrants being made redundant from local factories and farms as well as the control on international financial outflow implemented by the Malaysian authorities.

However, the empirical evidence has demonstrated that the appreciation of the Indonesian rupiah currency is negatively correlated with the remittance flow; supporting the notion that remittances are a pursuit of wealth and profits. Moreover, the theoretical framework hypothesizes that the remittance for portfolio investment would be driven by calculated risks and marginal rate of returns, and the presence of portfolio investment motive for remittance manifests itself through a positive interest rate in the host country. This is the case with the Malaysian interest rate which appears to be positively and statistically significant; with the interpretation that Indonesian migrants prefer to save or invest in Malaysia rather than to remit it – an evidence that the investment motive is at play. Also, it is highly probable that incredibly stable political and macroeconomic environments in Malaysia may have attracted the Indonesian migrants' savings. Besides, it is possible that the underdeveloped banking and financial sectors in Indonesia together with financial exclusion hinder higher amounts of remittance to be sent through official channels, thus Indonesian migrants are more inclined to keep their savings in Malaysia.

Another significant factor that explains remittance behaviour is the stock of Indonesian migrants in Malaysia, as the empirical finding shows that an increase in the number of migrants from Indonesia leads to higher volumes of remittance sent, supported by the robust private transfer to Indonesia in the past decade. It is also probable that higher remittance also attracts many Indonesian migrants to migrate, which should be addressed by a future research.

In conclusion, based on the findings, it is clear that macroeconomic variables in both the host and home countries, namely Malaysia and Indonesia respectively, have significant impacts on remittance flows, implying that there is a room for appropriate government policies in influencing remittance flows. Also, similar to many previous empirical studies, the findings have demonstrated that a combination of different motives explains the Indonesian immigrants' remitting behaviour in Malaysia, where remittance flow to Indonesia is affected by both the altruistic and portfolio motives.

CHAPTER 4

ANALYSING THE IMPACT OF IMMIGRATION ON UNEMPLOYMENT IN MALAYSIA

4.1 INTRODUCTION

Unemployment, some economists believe, is a greater economic crisis compared to inflation as it is the impetus for greater social and political problems such as the degradation of the quality of life, family disintegration, violent crimes, broken human dignity and political revolution (Kesselman *et al.*, 2003; OECD, 2010). Unemployment is also responsible for income inequality and poverty, and since ancient Persia, the expansion of employment opportunities has long been regarded as a cure for many economic illnesses (Kooros, 2008: 198). The causes of unemployment, hence, are a contentious area of study, as many factors are believed to be attributable to the socioeconomic consequences of unemployment. However, in the globalized world where the flow of people from one country to another is an ongoing reality, some consider national unemployment to be attributable to immigration (Borjas, 2005; Gross, 2002).

The impact of immigration on the labour market outcomes of natives in the host countries is the center of much research in the U.S and Europe (see: Grossman; 1982; De New and Zimmermann, 1994; Feridun, 2004). The heated immigration debate continues, ignited by racial tensions and socio-economic disparities; with two extreme conflicting polar opposite opinions that divide economists into two threads. On one hand, immigrants are believed to have little or no discernible impact on the native employment as immigrants fill shortages that arise in certain occupational domains, mainly in unwanted, low-paying jobs as well as highly-skilled jobs (Höhn, 2005; Münz *et al.*, 2007). On the other hand, immigration is perceived to harm employment opportunities for natives in particular for those with low skills (Borjas, 2005), as it is assumed that natives and immigrants are easily substituted in production. In recent years, there have also been many stout defenders of the notion that immigration not only complements the natives, their presence

has also enlarged the native employment opportunities and heightened native real wages, such as Hercowitz and Yashiv (2002) and Ottaviano and Peri (2006).

Interestingly, as opposed to the public belief on the negative impact of immigration on native employment, the existing extensive empirical evidences repeatedly show that there is only a small magnitude in the displacement effects resulting from additional immigrants (Bauer *et al.*, 2005). Indeed, Friedberg and Hunt's (1995: 42) survey of reviews in the U.S context surmises:

“Economic theory is equivocal, and empirical estimates in a variety of settings and using a variety of approaches have shown that the effect of immigration on the labour market outcomes of natives is small. There is no evidence of economically significant reductions in native employment.”

Zimmermann and Bauer (2002) also arrive at a similar conclusion in their review of the impact of immigration on national unemployment in the European context. This view is also supported by recent surveys conducted by Gaston and Nelson (2001), Card (2005) and Dustmann and Glitz (2005). Card's (1990) celebrated natural experiment of the case study of Mariel Boatlift is an excellent illustration of the minute impact of even an unexpected large influx of immigrants on the native labour market.

Economists have long been puzzled by the absence of the impact of immigration on native employment. Microeconomic theory demonstrates that the inflow of immigration must depress wages and lower native employment, as will be discussed in the next section. The recent alternative explanation offered from the trade perspective suggests that instead of affecting wages and employment, the impact of immigration is channelled into a change in the output composition (Dustmann and Preston, 2004). Based on the Rybczynski theorem, immigration changes the host country's factor endowments, redistributes resources between sectors and expands it without affecting the existing native wage and employment (Gandal *et al.*, 1999: 3).

Additionally, the flexible market enables the economy to absorb the immigration shock through a range of adjustment mechanisms, which leaves the local employment intact. First, the internal migration of natives to other regions because of the perceived social and economic costs associated with immigration may dissipate any effect of immigration on the local unemployment (Borjas *et al.*, 1997; Card, 2001; Borjas, 2006 and Federman *et al.*, 2006). Second, the presence of immigration stimulates capital investment, therefore, over time, may even offset its impact on wages. Furthermore, the wealth brought by immigrants also improves employment expansions; thus provides more job opportunities for both natives and immigrants. Third, immigration brings changes in the composition of the host country's factor endowments, hence; induces firms to embrace more immigrant intensive technologies (Poot *et al.*, 1988; Lewis, 2003, 2004, 2005 and Gandal *et al.*, 2004), which may alleviate the impact of immigration on the local wages and employment. The final latent mechanism which is becoming a more influential justification in explaining this perplexing phenomenon relates to the role of immigrants as consumers who spend income on goods and services; consequently increases the native labour demand and disperse any negative effect on the native employment.

It should be noted that empirical evidences are scanty and the findings are mixed on each of the adjustment processes stated above. Freeman (2006: 163) believes that scholars have reached no consensus on the gravity of the native migratory response to the immigration shock. Longhi *et al.* (2005: 454) also emphasize the imperative need to meticulously determine and distinguish the many mechanisms involved in the adjustment process that prompts wages to return to their initial level and leave the native employments unharmed.

The next section reviews the empirical literature and the related theoretical background on the impact of immigration on unemployment in the host countries. Economists are well conscious that this issue is a matter of empirical investigation as the labour market is complex and immigration triggers different responses from various economic agents, as discussed above.

The aim of this essay is to examine and empirically analyse the relationship between unemployment and immigration in Malaysia since 1997. Thus, the core objective of this paper is to investigate the dynamic impact of immigrants on unemployment in the short run, if there are any, and the long run. The rest of this paper is as follows: section 4.2 examines immigration and Malaysia's unemployment rate. Section 4.3 and 4.4 discuss the literature and empirical evidence concerning the relationship between immigration and the unemployment rate. Section 4.5 presents the econometric framework including the theoretical background, econometric specifications and data descriptions for the empirical analysis conducted in this paper. Section 4.6 presents the empirical results, and is followed by the conclusion.

4.2 UNEMPLOYMENT AND IMMIGRATION IN MALAYSIA

Malaysia has witnessed an economic transformation between the 1970s and the 1980s where the manufacturing sector replaced the agricultural sector to become the new driving force of the economy, contributing to higher economic growth, income, and export earnings. Through the structural change in the economy, immigration essentially, became the major source of employment. During the 1990s, the manufacturing sector benefited from the new policy called The New Development Policy, which put more emphasis in job creation and manufacturing development. Within this dynamic understanding, more investments are aimed at improving the tertiary sector to achieve the targeted Vision 2020 in establishing a dynamic and robust economy (Government of Malaysia, 1991).

Such policy changes lead to rapid employment growth in both the manufacturing and tertiary sectors, which accounted for 84% of total employment in 1996 alone (Prime Minister's Department, 1996), and an increase to 86.7% in 2005 (Hassan *et al.*, 2010). It should also be noted that the recent property boom has led to higher labour demands in the construction sector. Another important growth area has been the substantial developments in the financial service sector, which created large opportunity spaces for employment in supporting such growth, particularly in the finance, insurance, real estate and business service sector (Ghani *et al.*, 2001: 48). Moreover, the export-oriented

industrialization policy encourages higher foreign direct investment to enhance the employment opportunities in Malaysia, which emphasizes on the high-value added, technology-intensive and capital-intensive industries (Doraisamy, 2002). Due to these rigorous and progressive development policies, an impressive averaged constant GDP growth of 8% from 1988 to 1997 resulted. During the 2000s, however, the Malaysian growth rate fluctuated between 4-6%, due to the international financial crisis, global economic downfall and slow global export demands (Press Release, 11/10/10).

The development of the labour market, however, does not match with unabated economic growth. Due to the small labour force, a chronic labour crisis has occurred in many sectors, particularly in manufacturing, construction, plantation as well as industries that relate to the science and technological base (AbuBakar, 2002: 12). The growing demand for both skilled and unskilled labour has forced Malaysia to allow a large influx of foreign labour to fulfil these needs, estimated at between 1.7 million to 2.3 million people for the 1997-2008 period. Clearly, Malaysia relies heavily on immigrant labour, particularly less-skilled workers to stimulate growth and aid structural adjustment without any major negative effect on the economy.

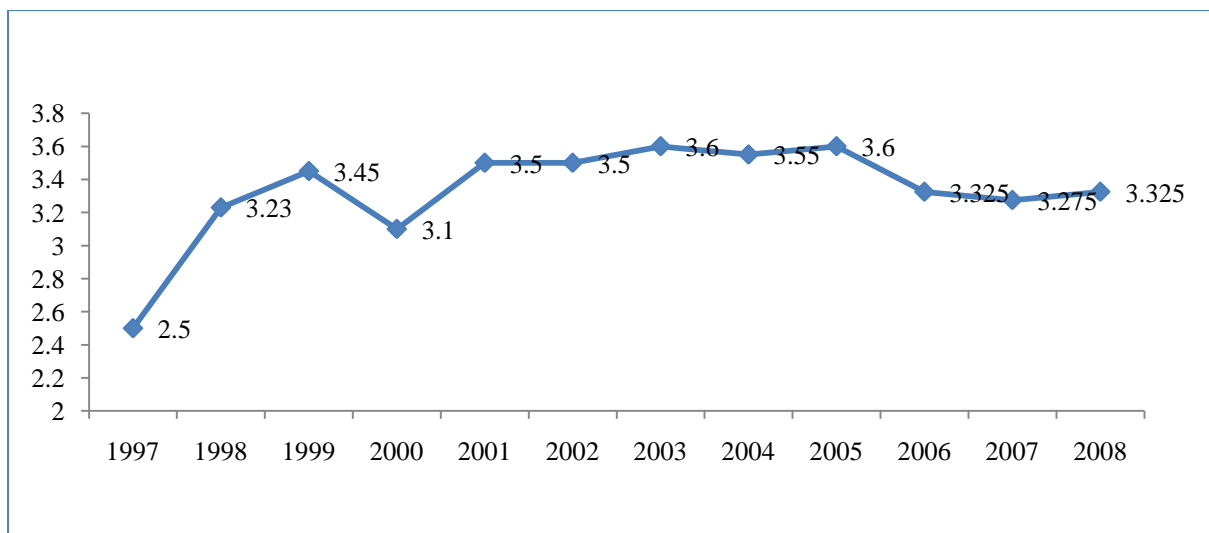
The Asian Financial Crisis, which began in the second half of 1997, led to a considerable downturn in the Malaysian economy. In 1998, it was reported that the country's Gross Domestic Product (GDP) suffered and contracted by 7.5 % (Ghani *et al.*, 2001: 47). In addition, the crisis also generated a higher unemployment rate. The Malaysian unemployment rate from 1997 to 2008 is depicted in Figure 4.1, which shows that unemployment rate increased from 2.5% to 3.23% in 1998, which reached its peak at 3.6% in both 2003 and 2005, implying significant job losses and the restructuring of companies.

In these recession periods, many rigorous recovery policies were adopted by the government, including the labour policy which disfavoured the immigration to make way for native labour. The official bans on foreign labour importation except high-skilled immigrants, retrenched and repatriated migrant labour, as well as the tightening of work

permit applications were among those policies, which led to a reduction in the total labour force by 1.7%. Between 1997 and 1998, the number of documented migrant labour declined about 35% in Peninsular Malaysia alone (Kanapathy, 2006: 3), which is demonstrated in Figure 4.2. It should also be noted that the other implications of the crisis includes the erosion of migrants' income and aggravated working conditions, as they were often in the worst bargaining position. Migrant labour are primarily employed in construction, manufacturing and low-end services, therefore they were the hardest hit by the crisis (Pillai, 1998: 265). Though they are usually viewed as a cheap source of labour to complement native workers and to support the country's growth policy, the view shifts radically during an economic recession as migrant labour begin to be seen as job robbers.

The effective implementations of monetary and fiscal policies by the Malaysian government, for example, two fiscal stimulus packages which totalled up to 2.25% of GDP, combined with the positive external sector performance, revived the economy slowly in 2000 (Kamer, 2004: 96), where the GDP growth was recorded at 7.9% and unemployment declined to 3.1%. However, the effects of the global economic crisis and the September 11 terrorist attacks in 2001 in the USA affected the Malaysian GDP growth, which fell to 0.7%, and consequently increased unemployment up to 3.5%.

Figure 4.1 Malaysia's Unemployment Rate

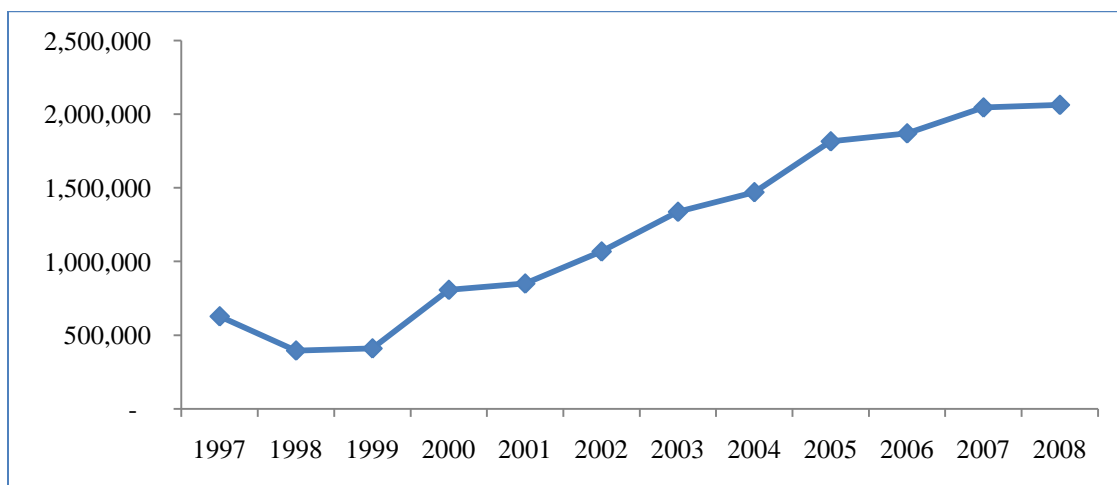


Source: World Bank Database Online

Malaysia's unemployment rate remained stable for the following years and fell starting from 2005 onwards. This reflected the recovering world economic climate from the slump, and the robust external demand, thus resulting in the boost in Malaysian exports and the generation of higher employment. Furthermore, Malaysia's growth in this new period was featured by the productivity driven economy, a shift from the investment driven economy. Focusing on the development of information and communication technology, (ICT) and human capital intensities in facilitating the labour productivity growth enabled the achievement and sustainment of national development (Government of Malaysia, 2001).

With the growth strategy in place, Malaysia continued to rely mainly on the foreign labour force to facilitate higher growth in economy. Looking at Figure 4.2, the recorded number of migrant labour in 1997 was around 630,000 and fell to a low of around 410,000 by 1999, due to the Asian Financial Crisis. Economic recovery improved the demand for migrant labour, which witnessed an increase to around 807,000 in 2000 and 1.06 million in 2002. The migrant labour flow kept increasing, despite some fears and the implementation of a wide range of labour policies which are discussed in the proceeding section.

Figure 4.2: Number of Immigrants in Malaysia



Source: World Bank Database Online

As of December 2008, this figure stood at 2.06 million, with no showing of slowing down, suggesting that the high demand for migrant labour will continue in the future with the expanding economy.

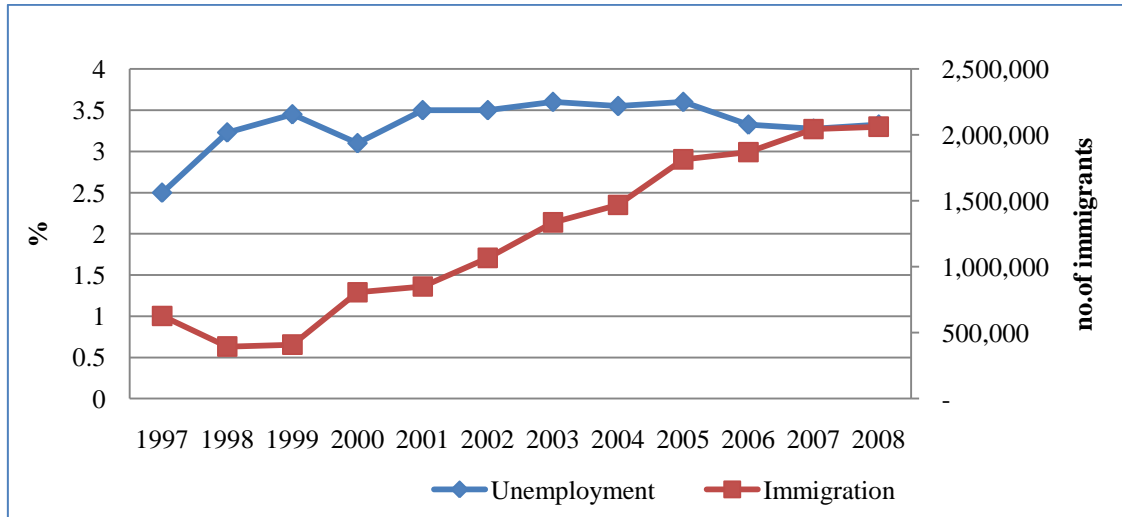
Malaysia was the home to more than a half million immigrant workers in 1997, which made up 11.4% of the total labour force (Pillai, 1999: 256). Nowadays, they account for over 20% of the total labour force. A breakdown of the nationality of immigrant workers shows that the largest numbers are from Indonesia, followed by Bangladesh, Philippines and Thailand. Most of them are less-skilled labour and they are concentrated at the lower level of employment, and dominate employments in sectors such as manufacturing, construction, plantations and services, particularly domestic services. The massive internal migration from rural to urban is resulted from the implementation of New Economic Policy, thus migrant labour, particularly from Indonesia and Thailand, were imported to overcome the labour shortage in the rural and plantation sectors (Kanapathy, 2005: 2). Also, opening up of manufacturing and services to foreign labour encouraged both long distance migration and feminization, with Bangladeshi labour employed in manufacturing and services sectors, and Indonesians and Filipino female labour concentrate on domestic services, such as the cleaning service and hotels (Pillai, 1999: 262).

Figure 4.2 also demonstrates an increase in the flow of immigrants to Malaysia throughout the period between 1999 and 2008. Many factors contributed to such phenomenon, among others are, first, the expanding nature of the economy over the years, a higher growth of per capita income and GDP, and also the political stability and good prospect in Malaysian employment market. Second, the multi-ethnic population in Malaysia helps smoothing the process of integration. And lastly, push factors such as severe poverty, a higher rate of unemployment and the political turbulence in the home countries of immigrants (Kanapathy, 2006: 3). Furthermore, the selective attitude of Malaysian native labour due to improved education levels, higher standards of living and a better access to upward social mobility has further contributed to an acute labour shortage and also encourages greater labour importation (Kanapathy, 2005: 6).

The accelerated numbers of immigrants have raised economic, social, political and security anxieties, especially the fear of native labour displacement and wage depression which lead to a higher rate of unemployment and poverty. In response, the government attempts to regulate the flow of migrant labour with measures such as border control, legalization campaign and the repatriation of illegal migrant labour. For example, in 2002, heavy penalties were imposed on both illegal migrant labour and errant employers, which included the Amnesty Program run from March 22 to 31 July 2002 to repatriate stubborn illegal migrants to their countries of origin. These policies have resulted in increased documented migrant labour as employers are hiring them through legal channels. However, severe labour market pressures and weak enforcement have undermined the effectiveness of these policies, as employers prefer to hire the migrant workers due to cheap labour costs, relatively flexibility, and also due to their cooperative and easily mobilized attitudes. Moreover, as mentioned above, low wages and hazardous working conditions prompt refusal from native labour to work in certain sectors, thus migrant labour are employed to fill the positions (Kanapathy, 2005: 9).

Figure 4.3 has plotted the relationship between Malaysia's unemployment rate and the amount of migrant labour. The 1997-1999 period witnessed an increase in the unemployment rate with a decrease in the number of migrant worker. Restriction and repatriation played an important role in this period. While the numbers of immigrants kept increasing, the rate of unemployment was slightly lower and increased later again between 1999 and 2001, and continued to stabilize since then. If the hypothesis stating that the immigrants substitute for the native labour force is to be accepted, the rate of unemployment should fall along with a decline in the immigration flow. This is, however, not the case in Malaysia, therefore, at first glance, it could be suggested that immigrants are not job robbers. However, misleading conclusions could be drawn if the observation is based only on the plotted graphs. It is hard to deduct the real relationship between these two variables without closer investigation involving econometric tests. The next section, therefore, will examine the theoretical literature on the impact of immigration on unemployment.

Figure 4.3: Malaysia's Unemployment Rate and No. of Immigrants



Source: World Bank Database Online

4.3 THEORETICAL LITERATURE

A general approach to study the impact of immigration on unemployment is a neo-classical competitive model of demand and supply implying, thus, that immigration has both supply and demand effects (see: Chiswick, 1982; and Greenwood and McDowell, 1994). This section, therefore, aims to survey the theoretical literature related to the topic. In doing so, the economic theory on the impact of immigration on the labour market is analyzed first, followed by a discussion on the impact of immigration within the general equilibrium framework. Next, the analysis of the link between immigration and aggregate unemployment is presented.

4.3.1 Labour Market Effect and Determinants of Output and Employment

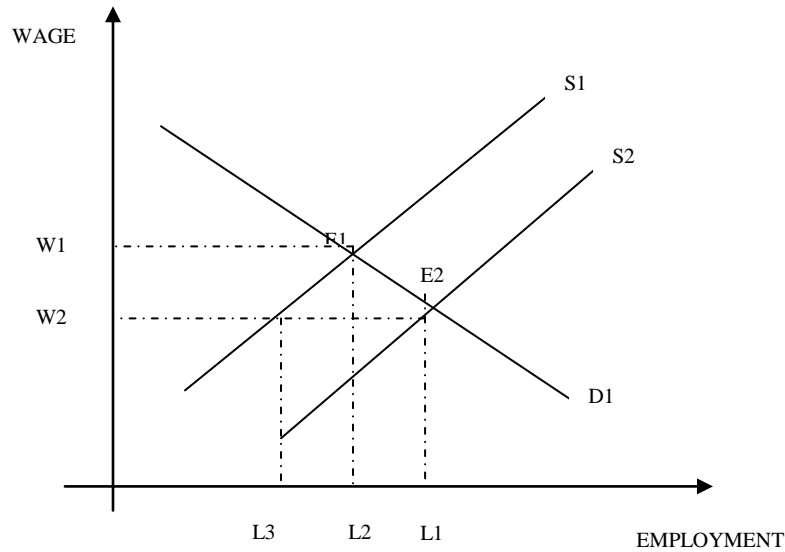
This section discusses the impact of immigration using a simple demand-supply partial equilibrium, similar to Feridun's (2004: 45) analysis. Accordingly, immigration will increase the size of population as well as the labour force, thus expanding the aggregate labour supply (Barwell, 2007: 52). In the case of homogenous labour, immigrants are the

perfect substitute for the native labour, and therefore immigrants aggravate job competitions and reduce the real wages. In this process, firms are more likely to substitute immigrants in place of native labour since their wages are cheaper, thus the earnings of native labour decrease. In short, the presence of immigration threatens the job opportunity for and worsens the earning of native labour.

In the case of heterogeneous labour, however, immigrants are seen as complementary labour to the native labour, which may lead to increase in the wages for the native labour. The fall in the real wages is due to the increased labour supply resulting from mass immigration will lead to increases in both demand for labour and return to capital. The latter boosts the rate of investment, consequently raising the stock of capital; and these further invoke a greater demand for labour (Feridun, 2004: 46). This kind of development occurs in the flexible market and mirrors the business spirit of the immigrant entrepreneurs (Beenstock and Ribon, 1993; Lavi, 1990).

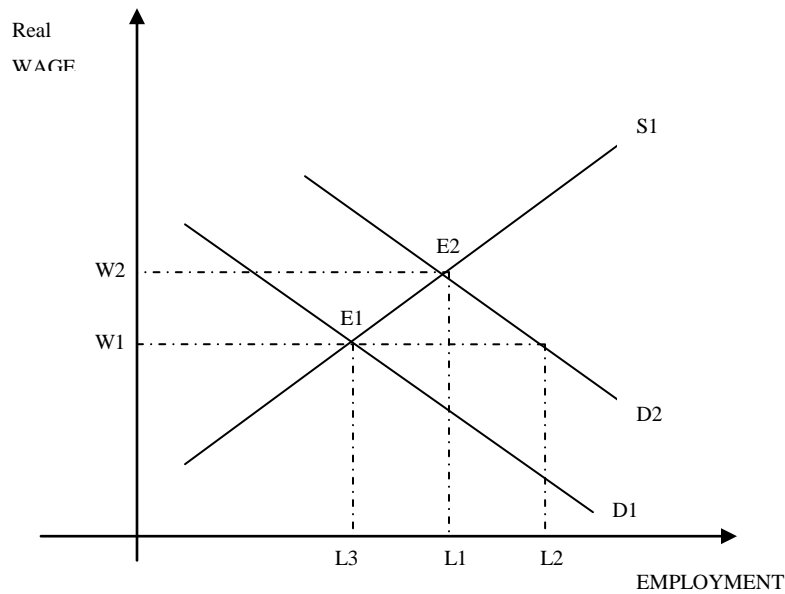
These case scenarios can be depicted in the Figure 4.4 and Figure 4.5 for the cases of perfect substitution for labour and the case of complementary labour respectively. In Figure 4.4, the upward sloping labour supply curve for native labour is S_1 and the downward sloping labour demand curve is D_1 in the host country's labour market. With the assumption of the fixed labour demand curve, the labour supply curve shifts to the right with the entrance of the immigrants, and consequently the wage rate falls from W_1 to W_2 but the employment rate increases from L_2 to L_1 . The amount of the native labour displaced with the immigrant labour is from L_3 to L_1 (Feridun, 2004)

Figure 4.4 – The Case of Homogenous Labour



On the other hand, Figure 4.5 illustrates a different scenario where the immigrants and native labour are complements in the production. This complementary case happens when immigrants fulfill the shortage of labour in host countries, particularly in the lower end of the skill spectrum. The employment gap is reduced and the labour market becomes more efficient as immigrants are employed to meet the demand for unwanted jobs by domestic labour such as dirty, difficult and dangerous employment, household services employment, farming, construction and tourism-related services (Münz *et al.*, 2007: 8). The immigration inflows will enhance the productivity of native labour, thus resulting in an increase for the demand for them, as depicted by the shift in the labour demand curve from D1 to D2, resulting in an increase in the wage rate from W1 to W2. The supply of the labour curve remains unchanged as the native residents may move to other places when the influx of immigrants arrives (Samuelson and Nordhaus, 2005). Thus, in this case, the presence of immigrants improves the employment possibilities (Elliott, 1991) and the earnings of the natives (Feridun, 2004). However, a greater caution should be taken as not all groups of native labour are equally positively affected by immigration (McConnell *et al.*, 2008).

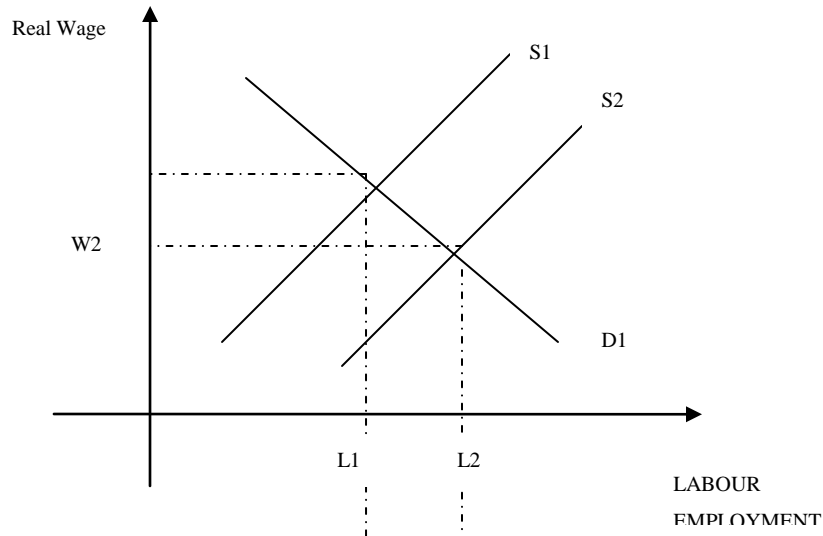
Figure 4.5 – The Case of Heterogeneous Labour



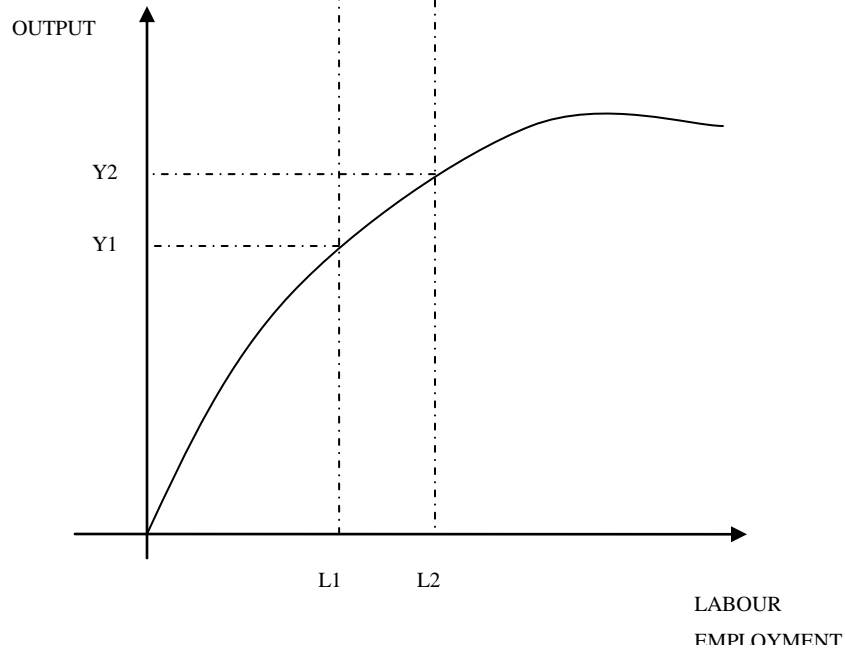
Immigration affects output growth principally through the changes it brings in the labour market, hence a subsequent increase in the production of goods and services. Immigration increases the amount of consumer spending such as spending on essential consumer goods and services, boosts the government spending such as public goods, raises the level of exports and imports and lastly, indirectly stimulates the companies' demands for labour and capital as a larger population will demand more goods and services. All of these will lead to an increase in the output level (Barwell, 2007).

By combining the labour market equilibrium and the short run production function, the level of output and employment can be determined. Figure 4.6 demonstrates the determination of the output and employment levels as a result of immigration (Samuelson and Nordhaus, 2005: 230). In Panel A, the demand for and supply of labour determine the real wage $(W/P)^*$ and the level of employment. The determined level of employment is then used in the production function in Panel B to determine the level of output. The level of output is quantified when the labour market is in equilibrium. It is where the level of output that is produced when the wage rates and prices have fully adjusted, and is supplied at the employment level of L.

Figure 4.6 – The Output and Employment Determination



Panel B



Panel A depicts the labour market in the host country that is similar to the Figure 4.4. Panel B illustrates the aggregate production function, and the potential GDP increases from Y1 to Y2 due to the higher employment from L1 to L2. Therefore, it is postulated that higher immigrants are associated with higher output. The issue of the nature of the relationship between these variables will be further investigated in the next section. As discussed before, immigration raises both the demand and supply side; therefore, the net effect on the native labour is a matter of the empirical investigation.

4.3.2 General Equilibrium Framework

An often neglected aspect in immigration-unemployment literature is the job-creation effect of immigrants. The oversight of focusing the analysis exclusively on the impact of immigration on native workers is the inability to see its impact on the broader economic perspectives of the country. Barwell (2007) proposed a coherent analysis on the impacts of immigration on the macroeconomic variables in the host country. Barwell suggested that the economic consequences of immigration will affect both the supply side and demand side, as immigrants play both roles as workers and consumers.

From the supply side point of view, the inflow of immigration boosts the sizes of the total labour force and the total population. Their job search characteristics, which are, among others, their readiness to work harder and longer (Blanchflower *et al.*, 2007), their willingness to undertake unwanted menial jobs, and their rigorous search for employment opportunities (Frijters *et al.*, 2006), increase even further the aggregate labour supply. The higher the labour force participation is, the higher the level of output produced in the economy will be, as shown in the Figure 4.6.

Also, the expanding labour force resulting from the presence of immigration generates an expansion of local industries that have a comparative advantage in term of producing more goods at cheaper labour cost. Furthermore, due to their weak bargaining position for wages and living conditions, their lack of skills in the local language and the need to meet the cost paid for their immigration, immigrants are more than ready to accept jobs

with a low pay. Consequently, as the wages paid are lower, firms will increase their demand for labour since the cost for hiring is lesser. Both immigrants and natives are then better off in terms of finding job opportunities, as these expanding employment opportunities also provide a higher possibility for natives to be hired (Ottaviano and Peri, 2006: 27). Furthermore, the wages of the native labour may increase due to the firms' decision to exploit its economies of scale (Romer, 1996; Brezis and Krugman, 1996) or as the immigrants and natives are complements each other (Ottaviano and Peri, 2005: 11). As a result, unemployment is expected to fall.

From the demand side point of view, in addition to contributing to the expansion of the economy, immigrants generate higher employment in the host country through their higher consumption demand, such as food, houses, education and health thus shift the demand curve of the product market upward. As these goods and services are produced and consumed locally, the surge in immigration enlarges the total domestic spending by drastically shifting the demand for these locally-produced goods and services, therefore, contributing to the local job creation. Aggregating these effects of demand, immigration significantly induces higher employment particularly in the industries that produce these goods and services, hence, counterbalance partially the outward shifts in labour supply due to their arrivals. In other words, immigration has further increased the demand for labour to produce the needed goods and services. Because immigrants are also consumers, they do, in a way demand their own labour. This job-creation effect generated by the influx of immigration eventually has a direct contribution to the aggregate demand. Therefore the impact is similar to Figure 4.5, where the presence of immigrants enhances not only the employment possibilities of the natives, but also their own chances to be gainfully employed. Once more, the unemployment rate is anticipated to decline.

These effects, however, are neither immediate nor constant over time and the magnitude of these effects is determined by the scale of the immigrants' participation in both the product and labour markets, as well as the adjustment processes in these markets after the immigration shock (Jean *et al.*, 2007: 2). Numerous studies such as by Borjas (1990), Greenwood and McDowell (1986), Hercowitz and Yashiv (2002), and Jean *et al.* (2007)

show that the integration process in the host countries increases gradually over time, spreads out to several years and does not reach its full scale without an intermediary. Disequilibrium between the demand and supply of labour occurs as immigrants change the skill composition of the labour force. Short run and long run adjustments are involved in the restoration of equilibrium, in terms of changes in wages and employment rates.

After discussing the theoretical conceptualization, the next section will discuss the findings of empirical research on the impact of immigrants on unemployment.

4.4 EMPIRICAL LITERATURE

The concern over whether immigration reduces employment opportunities for native labour has been empirically investigated in many countries, however, with conflicting results. None of the available empirical studies so far have focused on the unemployment-immigration relationship in Malaysia.

A frequent econometric approach to study the impact of immigration on the labour market is the area analysis, in which the production theory is used as a basis in deriving estimable unemployment specification. In this, the degree of substitutability or complementarity between the factors of production is determined by the parameters estimation of a production function with different non-labour and labour resources (Hamermesh, 1986). Many studies have analysed the potential existence of substitutability among labour input using characteristic such as age, gender, skill and educational levels, which will be discussed below.

A number of studies have employed cross-sectional data in verifying this theory. Akhbari and DeVoretz (1992: 604), for example, use translog specification of the production function in determining the impact of immigration on the Canadian labour market for 125 Canadian industries. Their findings include that first; in general, there is no job displacement effect on the Canadian labour by the influx of immigrants which is a direct contrast with Roy's (1987) finding, and second; immigration and physical capital are not

complementary inputs in the production, indeed the Canadian native workers are. They postulate that the cause of this absence of complementarity between capital and immigrants is due to their high levels of educational attainment. Grossman (1982: 599), on the other hand, acquires contradictory results for the U.S. data, where capital is a complementary for all labour groups, more in particular with immigrants rather than native workers. However, their outcomes suggest that the displacement effect does take place in the economy, even though it is small but significant.

The Labour Segmentation Theory argues that immigrants are likely to be concentrated in a limited range of industries or employments, and therefore do not compete directly with the native labour thus imposes no effect on the unemployment rate (Martin, 1986). However, a series of Canadian studies conducted by Roy (1987, 1988 and 1997) in determining the impact of immigration on job displacement using the production function approach shows that when immigrants are disaggregated by occupations and countries of origin, some immigrant groups directly compete or substitute the native labour, while others complement each other. In his latest study, Roy (1997: 158) finds that Canadians and Europeans are substitute labour in services, processing works and clerical employment while complement to occupations related to the natural sciences.

Borjas (1983) examines the impact of labour market competition based on ethnicities in the U.S. Using the generalized Leontief production function, the findings include that Hispanic labour are complements to both black and white labour, but black and white labour are significantly non-complementary inputs in the production and could be close substitutes. His empirical evidence provides a strong affirmation for DeFreita's (1988) results, in which he finds that in both Hispanic male and female labour in the U.S, a majority of them are illegal, and have no significant effect on the employment of Anglo, Black and Hispanic native-born workers.

The literature of immigrants is more concerned with distinguishing skills between immigrant and natives group. Borjas (1987: 383) claims that less-skilled immigrants are more likely to harm less-skilled native labour, further prolonging the social and economic

miserias associated with the increased wage inequality. In his regression analysis that includes labour demand elasticities, Borjas presents evidence that immigrants are substitutes for the low-skilled native labour, while also being complements for high-skilled native labour. In other words, immigrants hurt the less-skilled native labour in the U.S. Card (2001: 57) also reaches a similar conclusion; the massive influx of immigration expands the labour supply, thus increasing the unemployment of less-skilled natives in the major cities in the U.S. On the contrary, Friedberg (2001: 1396) finds no evidence that the high-skilled immigrants from Russia negatively affect the native employment in Israel for the year 1990-1995. Other studies show that earlier immigrant cohorts in Germany (De New and Zimmermann, 1994) and seasonal workers in Austria and Germany (Winter-Ebmer and Zweimüller, 1997) are the most affected groups by the presence of immigrants.

Deviating from the basic partial labour market model, Ottaviano and Peri (2006: 20) argue that the general equilibrium approach, in which the physical capital adjustment is included, provides more accurate framework in analyzing the impact of immigration on the labour market. Also, they assume that native and immigrant labour are imperfect substitutes even within the same skill groups due to their differences in education, experiences *et al.* In the long run, capital inflows will completely offset the expansion of labour supply, thus dampening any adverse effects on specific groups.

Greenwood (1994: 218) claims that among many potential channels in which immigration may influence the labour market in the host country; change in the local demand for final goods and service is an important channel but has long been overlooked. Greenwood and Hunt (1995) estimate a structural model of the immigrant/native labour supply and demand and test whether or not demand is influenced by the immigrants' consumption. They find that both immigrants and native labour are substitute in the U.S production, but when the demand channel is taken into account, the effects on the native wages and employment are slightly positive. Another U.S.A study by Altonji and Card (1991) who analyse the impact of immigration on the local wages and employment in which

immigrants are consumers find that when immigrants consume a larger amount of their own output, a modest effect on the native employment is the result.

Hercowitz and Yashiv (2002) study the impact of mass Russian immigration to Israel in the 1990s using quarterly macroeconomic data. The total immigrants represents an 18% increase in the Israel's population in a decade. They adapt a simple model designed by Bruno and Sachs (1985) and Altonji and Card (1991), focusing on the dynamic effect which allows for the effects of both labour supply and demand sides. The findings show that in the early stage after immigration, the immigrants' participation in the product market as consumers is stronger than their participation in the labour market, thus boosting labour demand and native employment promptly. Later, the immigrants' participation in the labour market dominates; resulting in a higher level of native unemployment. In the long run, however, there is no significant evidence that immigration affects the native employment.

Withers and Pope (1985) in their Australian study use both conventional structure models and Granger causality in examining the relationship between immigration and unemployment levels for the period of 1948- 1982. They find that there is no statistical evidence of a significant effect of immigration on Australian unemployment. The causality from immigration to unemployment is uniformly rejected, however, the opposite causation is accepted, which is that unemployment causes immigration (*i.e.* deters immigration). They also claim that in the period of the 1980s, the unemployment rate would be higher in the absence of immigration. Other work by Withers and Pope (1993) also arrives at the same conclusion, which is that the immigration rate does not increase the unemployment rate during the Australian post-war period. Their study also establishes the fact that immigration does not significantly affect the structural unemployment, and during the cyclical duration, immigrants create at least as many jobs as they fill. These studies support the earlier empirical studies by Harper (1980) and Warren (1982) that employ more conventional economic analysis on frictional-structural unemployment.

There is a series of Canadian studies devoted to analysing the unemployment-immigration relationship at macroeconomic levels. Marr (1973), for example, finds that there is a

significant negative relationship between these series for the sample of 1950 - 1967, and argues that a higher unemployment rate causes a lower immigration rate. However, when the data for the period of 1956 to 1971 is disaggregated by regions, it is found that the hypothesis of high unemployment leading to lower immigration is true for other regions except immigrants from South America, Asia and the Central America regions. On the other hand, another study by Marr and Siklos (1994) using a nonparametric approach uncovers the fact that there is a positive relationship between present unemployment and past immigration in the sample of quarterly data for the year 1962-1990. The causality test is conducted through the vector autoregression approach (VAR), which includes the aggregate supply and demand factors. Their study has also detected the transitory and permanent effects of unemployment on immigration. As mentioned above, they find that before 1978, immigration does not cause changes in unemployment, but after 1978, immigration seems to be associated with the changes in the unemployment rate.

Another empirical work by Marr and Siklos (1995), which employs annual Canadian data from 1926-1992, composes of two time series methods which are Granger causality test and the unrestricted VAR model that are used in exploring the relationship between immigration and unemployment. The VAR model involves the time series regression of immigration, unemployment, real GDP and wages. The obtained results from Granger test are quite similar to their previous study; that past unemployment does not cause immigration, but past immigration does cause unemployment. They also find that immigration and unemployment rates are inversely related and when a substantial rise in immigration flow is hypothetically tested, the impact of immigration on unemployment is never large enough to cause the mass job replacement of natives by immigrants. Also, when the data is disaggregated into the immigrants' countries of origin and occupational group, the findings show that Asian immigrants are the hardest group hit with the unemployment shock.

Winegarden and Khor (1991) study the impact of undocumented immigrants on youth and minority groups in U.S labour market. 1980 U.S census data on the state distribution of the undocumented labour population is employed, and a simultaneous equation model

where immigration and unemployment are endogenous variables is estimated. The findings establish the fact that undocumented immigrants do not cause any substantial increase in unemployment among these vulnerable groups, although it is detected that there is a small amount of job displacement.

Feridun (2004) also uses Granger causality test in determining the causal relationship between immigration, unemployment and GDP per capita in Finland using a sample from 1981 to 2001. He finds that immigration causes both unemployment and GDP per capita, but there is no significant evidence of causality in the reverse direction. Adopting a similar method, empirical study in Norway by Feridun (2005) comes across different findings; immigration causes GDP per capita but has no significant impact on unemployment. More recently, a Swedish study by Feridun (2007) uses both the autoregressive distributed lag (ARDL) bounds testing procedure and Granger-causality within vector error correction model (VECM) for the period of 1980-2004. The ARDL's results suggest that in the long run, these variables are in a state of equilibrium. Granger-causality test's results reveal that there is strong evidence to support the long-run bidirectional causality between immigration and GDP per capita. However, there is no evidence to show that immigration causes unemployment; on the contrary, the results strongly suggest that unemployment causes immigration, and the unemployment rate is indeed an influential determinant of immigration in Sweden. The increase rate of Swedish unemployment rate is prone to impede upon the migratory process, consequently, the immigration rate will fall.

Gross (1997) investigates the ability of the British Columbian region to absorb the less-skilled immigrants during the periods of relatively high levels of unemployment. The impact of immigration on the dynamics of the regional labour market is investigated using a model which consists of a set of aggregate structural relationships for immigration, unemployment, labour force participation and real wage. It is found that in the short run, an increase in the immigration rate leads to an increase in the unemployment rate as high-skilled immigrants present more competition in the labour market. In the long run, however, Gross finds that immigration is negatively associated with unemployment and

that the unemployment rate is permanently lowered. These results suggest that immigrants are complements to the native labour and jobs created by them are more than the jobs being occupied, which is a similar conclusion derived from Altonji and Card (1991) in the U.S study, Chapman and Cobb-Clark (1999) in the Australian study and Gross (2002) in the French study.

Similar to Gross's finding, Sheehan (1982) in his Australian study finds that a higher immigration rate will result in an increased unemployment rate by more than the labour force in the short run, and a higher GDP, labour productivity and industrial structural shift to manufacturing and construction in the long run. The model used is the IMP macroeconomic model. He also claims that the leniency of the Australian macroeconomic policy in allowing large waves of immigrants result in a higher unemployment rate, and immigrants themselves will be more likely to be unemployed.

Islam (2007) studies the causal link between immigration and aggregate unemployment in Canada using the seasonally unadjusted quarterly data for the period of 1961-2002. Besides using Granger causality test, he also develops a VAR model to determine the short run and long run dynamic in a more general labour market framework. The model suggests that similar to the earlier studies mentioned before, there is no statistical causality from immigration to unemployment, but there is significant evidence that unemployment influences the subsequent immigration. Contrary to previous studies, Islam does not find any statistically significant short-run or long run relationship between immigration and unemployment, which means that immigrants do not have an adverse impact on the aggregate unemployment rate in either periods. He also finds that immigrants create jobs in both in the short run and the long run.

Another analysis of the short run consequences of immigration is provided by Angrist and Kugler (2003), where the product and labour markets play important roles in determining the impact of immigration on the native employment. Jean *et al.* (2007), on the other hand, present a more extensive empirical work on the impact of immigration on the seventeen OECD countries, utilizing the international and skill level aggregate data,

taking into account the dynamic impact and the role of labour and product market policies. The findings indicate that a 1% increase in immigration leads to a 0.2% increase in the unemployment rate in the first year, a 0.3% in the second year and a 0.4% in the third year later before reduces to a zero impact after six years. This suggests that in the short run, the aggregate supply effect dominates the aggregate demand effect, and eventually the immigrants do not have any permanent effect on the unemployment rate in the host countries.

Jean *et al.* (2007) also find that strong product market rules and regulations tend to deepen the unemployment effect due to a slower employment adjustment. On the contrary, the unemployment effects are negligible where there is weak employment protection law.

As can be seen from the preceding discussion so far, the previous literature does not demonstrate a clear link between immigration and aggregate unemployment. The array of results from both labour supply and demand effects are perplexing, as some studies demonstrate strong evidences that immigrants rob jobs from natives by substituting them thus resulting in higher unemployment rate, while other empirical studies clearly dismiss these unfounded claims by showing that immigrants complement natives and even cause higher job opportunities due to a strong increase in the local labour demand. Many studies establish the negative relationship between immigrants and unemployment variables in the short run, and also find no evidence of the influence of immigration on the native employment in the long run. These results have been criticized due to their chosen methodology, econometric specifications, and data used in the studies. The net effect of immigration on unemployment fundamentally depends on many factors, and as Borjas (1994) emphasizes the economic impacts of immigration will be differ across time and place, as well as it can be detrimental or profitable. Therefore, the impact of immigration is an empirical issue as it is difficult to determine a priori outcome. The summary of these studies are presented below in the Table 4.1. The next section will discuss on the econometric framework used in the Malaysian study.

Table 4.1: The Summary of Studies on Impact of Immigration on Natives' Employment

Researcher	Sample Period	Employment effect	Methodology
Akhbari and DeVoretz; 1992	1970; 125 Canadian industries	None	seemingly unrelated regression technique
Grossman; 1982	1982; USA	Unemployment fall by 0.08%	seemingly unrelated regression technique
Roy; 1997	1981; Canada	Negative effect for certain sectors	Ordinary least squares
Borjas; 1987	1983; USA	Negative effect for certain ethnicities	Ordinary least squares
DeFreita; 1988	(1980); USA	None	Two-stage least squares
Card; 2001	1990; USA	Employment falls by 0.12%	Ordinary least squares
Friedberg; 2001	1994; Israel	None	OLS and IV
De New and Zimmermann; 1994	1984-1989; Germany	Negative effect	Instrumental variable
Winter-Ebmer and Zweimüller; 1999	1988-1991; Austria	None	Probit regression
Winter-Ebmer and Zimmermann; 1997	Austria & Germany	Employment falls by 0.1%	Probit regression
Ottaviano and Peri; 2006	1990-2004; USA	None	Simulation
Greenwood and Hunt; 1995	1980; the USA	Employment raises by 0.2%	Simulation
Altonji and Card; 1991	1970-1980; the USA	None	Weighted least square and IV
Hercowitz and Yashiv; 2002	1990-1999; Israel	Negative effect a year later	Impulse response
Withers and Pope; 1985	1948- 1982; Australia	None	Granger causality
Withers and Pope; 1993	1961-1981; Australia	Employment raises by 0.32%	two-stage least squares estimation
Warren; 1982	1955-1973; Australia	None	Iterative Cochrane-Orcutt estimates
Marr and Siklos; 1994	1962-1990; Australia	Unemployment increase for 1978-1985 period	nonparametric multivariate spectral methods
Marr and Siklos; 1995	1926-1992; Australia	None	Granger causality test and unrestricted VAR
Winegarden and Khor; 1991	1980; the USA	None	simultaneous equation model
Feridun; 2004	1981-2001; Finland	Unemployment increases	Granger causality

Feridun; 2005	1983-2003; Norway	None	Granger causality
Feridun; 2007	1980-2004; Sweden	None	ARDL and VECM
Gross; 1997	1980-1995; British Columbia	Employment increases	Cointegration
Islam; 2007	1961-2002; Canada	Employment increases	VAR and Granger causality
Angrist and Kugler; 2003	1983-1999; EEA	Employment decreases between 0.02-0.07%	OLS, IV, 2SLS
Jean <i>et al.</i> ; 2007	1984-2003; OECD	Increase unemployment 0.2-0.4% then reduce	GMM estimators, IV and impulse response
Pischke and Velling; 1997	1985-1989; 328 counties in West Germany	Employment increases by 2%	OLS
Okkerse; 2005	Belgium	Unemployment increases by 0.24	Simulation
Galloway and Jozefowicz; 2008	1996-2003; 26 labour market regions in Netherlands	Unemployment increases by 0.04	OLS
Karam and Decalué; 2008	1998-1999; urban labour market in Morocco	Unemployment increases by 0.72%	CGE model

4.5 ECONOMETRIC FRAMEWORK

The fear of job replacement by immigrants is rooted in the firm belief that the number of employments is fixed. Thus, most of the past empirical studies focus on the integration process which is concerned with the relative performance of native and immigrant labour in the host country (for surveys see Borjas, 1994 and Longi *et al.*, 2005). The main shortcoming for these studies is that they do not include the demand effect of immigration as its inclusion may affect the native unemployment differently. This chapter comprises of a brief review of the theoretical model, outlines the econometric specifications and discusses research methodology.

4.5.1 Relationship Between Immigration and Aggregate Unemployment

The economic theory discussed above provides no clear prediction on the effects of immigration on the native unemployment. Many have attempted to contribute to the theoretical framework for the relationship between immigration and aggregate unemployment, among others are Harris and Tadaró's (1970) two-sector model of immigration and unemployment, Ortego (2000)'s model with search friction in the job market, Berry and Soligo's (1969) competitive labour market and Winter-Embler and Zweimüller (1996)'s two-tier bargaining model, but all of them yield inconclusive outcomes.

It is not the objective of this essay to fully develop a theoretical model of the impact of immigration on the labour market, but rather to uncover its dynamic effect with economic theory as a foundation. Thus, this section merely outlays the key aspects of the aggregate relationship between immigration, unemployment and real Gross Domestic Product (GDP) per capita.

In the literature of the impact of immigration on unemployment, there are two common questions which revolve around this issue. First, do changes in the unemployment rate cause changes in the immigration rate? It is expected that the rate of unemployment in the host countries to have a significant effect on the migration decision through the so-called 'pull-effect' (Ghatak *et al.*, 1996). A survey by Wither and Pope (1993) also establishes the importance of favourable employment conditions in the host country as a significant economic determinant of international immigration. Second, do changes in the number of immigrants lead to changes in the host country's unemployment rate? Attempt to provide a concrete answer to this question is but ambivalent. Marr and Siklos (1994), using the quarterly data for the 1962-1990 period, provide evidence that prior to 1978, the changes in the level of immigration do not affect the unemployment rate in Canada, but after 1978, the changes in the level of immigration contributes to the changes in the unemployment rate. Therefore, the direction of causation between immigration and unemployment could be direct or the reverse, and the causality test is required, for which Granger causality test is employed in many studies.

According to Granger (1969: 430), it is assumed that the needed information pertinent in the prediction of the explanatory variables is contained exclusively in the variables' time series data. Nevertheless, the drawback of such causation estimation is that it is simply a statistical analysis without a structural foundation drawn from the labour market (Gross, 1998: 4). Furthermore, causality analysis is argued to suffer the problem of omitted variable, and thus may lead to incorrect causal inference (Lutkepohl, 1982: 369). Therefore, a more general model such as those presented by Islam (2003), Gross (1998) and Marr and Siklos (1995) is adopted in this essay in determining the dynamic relationship among immigration, aggregate unemployment and real GDP per capita, which is:

$$\begin{aligned}
 U &= U(I, Y, \gamma) \\
 I &= I(U, Y, \alpha) \\
 Y &= Y(U, I, \beta)
 \end{aligned}
 \tag{4.4}$$

where U is unemployment, I is immigration and Y is Gross Domestic Product (GDP) per capita. γ , α and β represent vectors of exogenous variables which may be identical or different.

This model can also be written as :

$$Y_t = \rho_0 + \alpha_i Y_{t-i} + \varepsilon_t
 \tag{4.5}$$

where Y_t is a vector constitute the rate of immigration and the rate of unemployment representing the measurement of aggregate domestic labour market condition, and GDP per capita for the aggregate domestic activity. ρ is the vector of constant, which is exogenous, α_i is the matrices of parameters of endogenous variables and $\varepsilon_t \sim iid N(0, \Sigma)$.

Equation 4.5 reflects the general equilibrium framework where all variables of interest are symmetrically and endogenously determined. The supply and demand effects of immigration are captured in the equation as well as the feedbacks from the labour market and the product market. The full theoretical underpinnings of the labour market are

provided by Pissarides (1991) and Layard *et al.* (1991), while the exogenous demand impact of immigration is developed by Harrison (1983), which is discussed below. If the natural rate of unemployment is different across diverse demographic groups or skill levels in the labour market, any change in the demographic group or skill composition in the economy will affect the long run or natural rate of unemployment. Therefore, in theory, immigration will affect the long-run unemployment rate through the changes in the composition of the labour force.

4.5.2 The Theoretical Framework on the Exogenous Demand Impact of Immigration

Following Marr and Siklos(1995), Gross (1998) and Islam (2007), the theoretical framework on the job-creation effect of immigration provided by Harrison (1983: 12) is used. Harrison ingeniously analyses how an increase in an exogenous aggregate demand due to the increase in consumption by immigrants can affects the native unemployment in his Australian study. His theory formulation can be represented by:

$$U_N^\beta = U_N^\theta + I_N - O_N \quad (4.1)$$

Where U_N^β and U_N^θ are the native unemployment after and before the influx of immigration respectively, while I_N and O_N are the unemployment inflow and outflow respectively. Independent of their labour supply decision, immigrants generate employment through their consumption which is immediately profitable for native labour (see Simon, 1989; and Altonji and Card, 1991, for the further development of argument). At the fixed wages, the effect of immigration on the native unemployment depends on the migrants' spending on goods and services relative to natives'. Also, immigrants pose an adverse impact on the native's job search efficiency. The total impact of immigration on the native unemployment is therefore determined by the relative sizes of the demand and the adverse search effects (Gross, 1998: 10), which may be written as in equation 4.2, where unemployment is defined with respect to turnover:

$$U_N^\beta = U_N^\theta + jE_N - (jE_N + dI) \frac{jE_N + U_N^\beta}{jE_N + U_N^\beta + aI} \quad (4.2)$$

where, jE_N is equivalent to I_N , which is the native job turnover rate (t) times the number of natives employed (E_N); dI is the employment created by immigrants through their purchase of good and services; ' d ' (with $0 < d < 1$) is the average immigrant spending for consumption to the average native spending for consumption and the return of scale in aggregate production. ' d ' also may be thought of as new employment created by the arrival of immigration. ' I ' is the total of new immigrants, thus the sum of $(jE_N + dI)$ represents the total of new job vacancies. ' a ' (with $0 < a < 1$) being the relative possibility of natives and immigrants being hired, which implies the effectiveness of job searches by immigrants.

The first two terms on the right hand side of equation 4.2 are referred to as the total of the original native unemployment and job turnovers respectively. From these the sum of $(jE_N + dI)$ is subtracted, multiply by the total number of natives seeking employment $(jE_N + U_N^\beta)$, to the sum of the natives seeking employment plus the effective total number of immigrants seeking employment, $(jE_N + U_N^\beta + aI)$. When the 'pre' native unemployment is subtracted from the 'post' native unemployment, the resulting equation is:

$$U_N^\theta - U_N^\beta = \frac{(a - d)jE_N I - d I U_N^\theta}{jE_N + U_N^\theta + aI} \quad (4.3)$$

The necessary and sufficient condition for a decrease in the total native unemployment where:

$$(U_N^\theta - U_N^\beta < 0) \text{ is } (a - d)jE_N I - d I U_N^\theta < 0 \text{ or } d(jE_N - dU_N^\theta) > a jE_N$$

which is necessarily satisfied (but not only then) if $U_N^\theta > 0$ and $d \geq a$. The fall in the native unemployment due to the presence of immigration happens if the immigrants'

consumption is higher than their relative employment. More native labour will be hired to meet the increasing immigrants' consumption demands (Ortega, 2000: 94). The influx of immigration is not channelled on the increase in the labour supply as their propensity to find jobs is less (Islam, 2007: 2), perhaps due to their difficulties with language, social, cultural and institutional barriers (Girard and Bauder, 2005). However, Blanchflower (2007: 40) points out, it is presumably that the immigrants' consumption on non-durable, durable goods and services is less than the natives as they send remittances to their home countries, which may suggest that immigrants increase demand lesser than they increase supply.

After identifying the theoretical underpinnings of the study, the next section will discuss the data and econometric specification used in this study for the case of Malaysia.

4.5.3 Econometric specification

Deriving from equation 4.5 the estimation of expanded model of the impact of immigration on unemployment is:

$$\begin{bmatrix} UN_t \\ IMMI_t \\ GDP_t \end{bmatrix} = \begin{bmatrix} UN_{t-i} \\ IMMI_{t-i} \\ GDP_{t-i} \end{bmatrix} + [C_{t-i}] + \begin{bmatrix} \varepsilon_{UN} \\ \varepsilon_{IMMI} \\ \varepsilon_{GDP} \end{bmatrix} \quad (4.6)$$

Where UN_t is the Malaysian unemployment rate series, $IMMI_t$ is the Malaysian rate of immigration and GDP_t is the Malaysian GDP per capita. This model is based on the analysis of the multivariate time series; therefore, the vector autoregression (VAR) model is adopted. The VAR model treats every variable as endogenous, and as a function of the lagged values of all variables. The basic VAR model's general equation for this paper is:

$$UN_t = \delta_1 + \sum_{i=1}^k \alpha_{1i} UN_{t-i} + \sum_{i=1}^k \beta_{1i} IMMI_{t-i} + \sum_{i=1}^k \gamma_{1i} GDP_{t-i} + \varepsilon_{1t} \quad (4.7)$$

$$IMMI_t = \delta_2 + \sum_{i=1}^k \alpha_{2i} UN_{t-i} + \sum_{i=1}^k \beta_{2i} IMMI_{t-i} + \sum_{i=1}^k \gamma_{2i} GDP_{t-i} + \varepsilon_{2t} \quad (4.8)$$

$$GDP_t = \delta_3 + \sum_{i=1}^k \alpha_{3i} UN_{t-i} + \sum_{i=1}^k \beta_{3i} IMMI_{t-i} + \sum_{i=1}^k \gamma_{3i} GDP_{t-i} + \varepsilon_{3t} \quad (4.9)$$

where each of the error term (ε_{ti}) is assumed to be free from serial correlations or autocorrelations problem. The error term is also the vector of random innovations or shocks. These random innovations or shocks may contemporaneously correlate; but are also uncorrelated with their own lagged values and other variables as well. The variables' each current values therefore, depend on different combinations of the previous i values of other variables as well as the error terms.

All regressions represent the lagged variables UN_{t-i} , $IMMI_{t-i}$ and GDP_{t-i} as the cause factors of UN , $IMMI$ and GDP . The VAR model does not require heavy theoretical demands on the structure of the model and it allows the data itself to unfold the dynamic relationships between variables (Baffoe-Bonnie, 1998: 61).

It should be noted that Sims (1980) popularizes the use of VAR models in economics, and since then, it has been used widely and extensively in economics in determining the dynamic relationships among economic variables. Lütkepohl (1991) present the definitive technical reference for VAR models. Watson (1994), Lütkepohl (1999) and Waggoner and Zha (1999), on the other hand, provide surveys of the VAR method in economic studies. Discussions on each of these variables are presented below.

4.5.4 Variable and Data Descriptions

To reiterate, the main objective of this essay is to investigate whether the aggregate unemployment cause immigration in Malaysia, and vice versa. It should be noted that to date, there have been no empirical analyses of the impact of immigration on the aggregate unemployment in Malaysia, owing partly to the severe lack of data.

The primary source of data on immigration is collected by the Immigration Department of Malaysia, available only since 1997. Therefore, the period of study for this paper is

between 1997 and 2008, spanning 12 years. The variables employed are transformed into natural log to make the analysis of the empirical results easier. Its descriptions are further discussed below.

The unemployment rate refers to the percentage of the total labour force that is actively seeking jobs, however, remain unhired. The unemployment rate data is obtained from the World Bank Online Database.

The key variable in any immigrant-link empirical work is the immigrant stock as to capture any effects of immigrants on the aggregate unemployment rate. Following Islam (2007) and Feridun (2007), the migrant rate is measured by the total migrant stock as a percentage of the total population. The total migrant stock is the number of immigrants living in Malaysia in year t . The migration data is annual data from 1997 to 2008 obtained from the Immigration Department of Malaysia, while the total population data is obtained from the World Bank Online Database. The impact of immigration on the aggregate unemployment is difficult to predict a priori, as discussed in the theoretical literature above, thus is an empirical issue. If it is found that immigration affects unemployment negatively, it supports the hypothesis of the substitution effect. On the contrary, if immigrants affect unemployment positively, evidently the complementary effect and the demand-side effect are present.

Previous studies have employed GDP or GDP per capita, since these variables have significant impacts on the immigrants' employment (Islam, 2007; Gross, 1997; Feridun, 2004 and Marr and Siklos, 1995) as a higher GDP generates higher employment opportunities, thus increases the likelihood of the higher absorption of immigrants in the host country. It also represents the aggregate domestic activity and the product market. GDP per capita is defined by the value of all the final goods and services produced in a country in one year divided by its population (World Bank, 2009). Using the GDP per capita is a better measurement than using the nominal GDP since it is a better representation of a country's economic health and also acts as a rough guide to average living standards. Furthermore, the GDP per capita also allows the notion of migration to

be related to both GDP and population, unlike the GDP (House of Lords, 2008). GDP per capita is then used to represent the demand side of the market. Malaysian GDP per capita data is obtained from the World Bank Online Database. Below is a summary of the variables, their descriptions and sources.

Table 4.2: The description and source of variables

Variable	Description	Source
UN_t	The Malaysian unemployment rate	The World Bank Online Database
$IMMI_t$	(The immigration stock/Total population) * 100	The Immigration Department of Malaysia
GDP_t	The Malaysian GDP per capita (millions of USD\$)	The World Bank Online Database

4.5.5 Econometric Methodology

In general, the Vector Autoregression (VAR) approach uncovers the underlying correlation and dynamic structure of variables and assumes the accurate structure of the relationships is not known a priori (see Brandt and Williams, 2007, for detailed discussion), even though the chosen variables in a model are based on the theory. Rather than determining the estimates of the parameters, the VAR model captures the economic interdependencies among variables. As the sole objective of this paper is to investigate the impact of immigration on the unemployment rate, and given the lack of a theoretical consensus about how these macroeconomic variables are interrelated, the VAR approach allows the identification of the long run effects by taking into account the dynamic feedback between immigration, the unemployment rate and GDP per capita.

Furthermore, the VAR approach circumvents any biases that normally exist in the structural models and includes sufficient lags which reveal the full dynamic effects of immigration over time without introducing *ad hoc* autoregressive error terms (Manchester, 1989: 16). It is certainly desirable to include more variables to capture the better details of the economic relationship; however, the limitation imposed by the degrees of freedom problem due to a higher number of variables could not be overlooked

(Baffoe-Bonnie, 2004: 64). With 3 variables ($k=3$) and 2 lags ($L=2$) for example, the required estimation of parameters is 6 ($k*L$) for each equation. If the number of lags increases, so does the estimated parameters.

The VAR model requires all variables to be stationary with the intention of carrying out the joint significance tests on the lags of the variables. Thus, the unit root tests are imperative to determine the order of integration. Many methods for unit root testing have been developed, and each consists of advantages and disadvantages over one another, therefore, it is strongly recommended to perform several tests to strengthen the findings. Two unit root tests, the Augmented Dickey-Fuller (ADF) and the Phillips- Peron (PP), are selected for the purpose of confirming the stationary nature of the series in this study. The PP test is the extension of the ADF test, which is more robust in the event where the series residuals are weakly autocorrelated and heteroskedastic. Adopting a non-parametric correction for autocorrelation, this test is arguably more powerful than the ADF test for the aggregate data (Choi, 1992: 398). However, the conclusions reported by the PP test are qualitatively similar to the ADF test, as both tests are for the null hypothesis that a time series variable is non-stationary or $I(1)$.

The unit root hypotheses is:

H_0 = The time series data has a unit root (*i.e* non-stationary data)

H_1 = The time series data has no unit root (*i.e* stationary data)

One major limitation of the ADF and PP tests is that both tests have a very low power against $I(0)$ alternatives that are close to being $I(1)$ especially if the data span is short. This leads to the use of the third unit root test to address this shortcoming, the Kwiatkowski-Phillips-Schmidt-Shin Test (KPSS) in which its null hypothesis is the absence of a unit root and according to the classical hypothesis, null is accepted unless there is strong evidence against it (Kwiatkowski *et al.*, 1992: 160). In a way, the KPSS test complements the ADF and PP tests to check the presence of a unit root in macroeconomic variables.

These unit root tests are carried out using *Eviews*, which automatically generates the ADF, PP and KPSS statistics and its critical values for each variable. If the ADF, PP and KPSS statistics are bigger than their respective critical values, the null hypothesis is rejected, and *vice versa*. *Eviews* also provides the *p*-value for each test, thus the null hypothesis is rejected if the *p*-value is less than the critical values, *i.e.* at 0.01, 0.05 and 0.1.

If all the variables are stationary in level, a reduced form VAR is used. The estimation of the VAR model can be performed using the SURE (Seemingly Unrelated Regressions) method, however, as all equations consist of the same number of lagged variables, each equation can be effectively estimated using the OLS (Ordinary Least Square) technique and still produce identical results which are similar to the SURE technique (Chris, 2008). Since all equations have identical right-hand-side variables and the error terms are assumed to have zero mean, constant variance and are serially uncorrelated, the OLS estimations are, hence, consistent and asymptotically efficient. It is also equivalent to GLS given the identical regressors for all equations; thus, the simultaneity and contemporaneously correlated innovations are not an issue.

The model chosen is an unrestricted VAR model as VAR is an atheoretical model, thus the specification issues can be minimized. The requirement of the unrestricted VAR is that all variables should have the same lags used in all equations. The structure of the system and the estimation output is depend significantly upon the lag chosen, hence the determination of the appropriate lag length is carried out by employing multivariate information criterion such as Akaike's Information Criterion (AIC), the Schwartz Information Criterion (SC) and the Hannan-Quinn Criterion (HQ). The lag is selected with the smallest value of the criterion. The VAR model will be misspecified if the chosen lag length is too short, but suffers the loss of many degrees of freedom if the lag chosen is too long (Chen and Patel, 1998: 113).

With the inclusion of the determined lags in the VAR model, the significance of all the lags of each of the individual variables can be performed jointly with the *F*-test. *Eviews* reports the obtained (Wald) statistic for the joint significance of all endogenous variables

at that lag individually and statistically. The null hypothesis that all coefficients are zero is rejected if the p-value is less than the critical value.

To meet the requirement of the stability of the VAR model assumption, the inverse roots of the characteristic AR polynomial is calculated and analysed. If all roots have a modulus of less than one and lie inside the unit circle, the stability condition is satisfied, and the VAR model is stable or stationary (Hassan and Islam, 2005: 6). On the other hand, the unstable VAR model indicates that the influence of the shock for some variables may not reduce over time. The instability VAR model invalidates the result of the impulse response function, hence lead to erroneous conclusions and irrational economic policy recommendations.

Recalling that the error terms must be serially uncorrelated with a constant variance and zero mean, a battery of diagnostic tests is necessary to ensure the robustness of the estimated VAR model. The residual diagnostic tests employed are the serial correlation Lagrange Multiplier (LM) test, the Jarque-Bera (JB) test for normality of the residual and the White's test for detecting heteroscedasticity. The hypothesis of each test is presented below:

LM test:

H_0 = No correlation detected between error term.

H_1 = Correlation is detected between error term.

Jarque-Bera test:

H_0 = The error terms follow a normal distribution

H_1 = The error terms do not follow a normal distribution

White's test:

H_0 = No heteroscedasticity is present (the variance of error term is constant)

H_1 = Heteroscedasticity is present (the variance of error term is unequal)

To reject the null hypothesis, the p-value is again used, and similar interpretations are employed as described above.

In interpreting the economic implications of VAR results, the most widely used analytical techniques are Granger (1969) causality tests and Sims' (1980) innovation accounting techniques which are the Impulse Response Function and the Forecast Error Variance Decomposition, computed automatically by *Eviews* and *Microfit*. These techniques are more informative and assist with a better understanding of the economic relationship than the VAR regression coefficients or the R-square statistics.

Granger Causality examines the correlation between the current value of a variable and the past values of other variables. Suppose that the Y current value can be explained and predicted by its own lagged values and adding the X lagged values improve the explanation, it can be said that the variable X Granger cause Y ; or equivalently the coefficients of past X are statistically significant in the F -test (Granger, 1969: 430). In this essay, if immigration does not improve the prediction of unemployment, the coefficients on the lags of immigration will all be zero in the reduced form of the unemployment equation. This technique is also used to test whether or not a variable is exogenous. A variable is treated as exogenous if it is not influenced by any variables in the VAR model.

The interpretations of the coefficient estimations of the VAR model may follow the usual regression fashion; however, the individual interpretation of the coefficients may be tricky, especially when involving different signs. Furthermore, the generalization of the simultaneous dynamic VAR model hinders the usual interpretation of the coefficients as its magnitudes cannot not be associated with the effect of a shock to any variables that may persist over time. Thus, the widespread practice adopted is to estimate the Forecast Error Variance Decomposition (FEVD), where it determines the percentage of the forecast error variance in a variable attributed to its own shock and shocks to other variables over time (Ivanova *et. al*, 2003: 821). The Variance Decomposition analysis essentially presents the relative importance of each shock in affecting the variation of a variable in the VAR model.

The last technique employed in analyzing the effect of immigration on the unemployment rate is the Impulse Response Function (IRF) which is derived from the VAR model itself in uncovering the dynamic economic relationship between macroeconomic variables, as suggested by Sims (1980). The IRF specifically estimates the response of a variable to the shocks in the error term of other variables; and traces out such impacts over time. This technique also estimates the sensitivity of a variable to a change in another variable. Technically, through the dynamic structure of the VAR model, a shock to a variable is transmitted to other endogenous variables. Hence, the IRF illustrates the interaction among immigration, the unemployment rate and GDP sequence. In the stable VAR model, the impacts of the shocks shall decline to zero, and unlike in the unstable VAR, the response does not generally die out asymptotically (Lütkepohl, 2005: 263).

The next section will present and discuss the empirical findings on the economic relationships between immigration, the unemployment rate and GDP in the case of Malaysia.

4.6 EMPIRICAL FINDINGS

This section presents the estimated empirical results from the conducted unit root tests, the VAR estimation, the Diagnostic tests, Granger Causality tests, the Forecast Error Variance Decomposition (FEVD) and the Impulse Response Function (IRF) with the objective of testing the relationship between immigration and the unemployment rate in Malaysia. As the number of observation is only 13 and due to low degrees of freedom, the results obtained are indicative, not definitive.

4.6.1 Unit Root tests

The order of the integration among the identified variables is carried out by performing the ADF tests, PP tests and KPSS tests on a time series annual data for immigration in Malaysia, Malaysian unemployment rate and Malaysian GDP per capita. Table 4.3 summarizes the results of unit root tests for all variables. The test statistics from ADF are

presented in the second and third columns, the results from PP tests are reported in the fourth and fifth columns and for KPSS tests, the results are presented in the last two columns.

Table 4.3: Unit Root Tests

Variables (log level)	ADF test		PP test		KPSS test	
	Constant	Constant and trend	Constant	Constant and trend	Constant	Constant and trend
<i>UN</i>	-5.7640 (1)*	-4.4524(1)**	-5.7640*	-4.4524**	0.3322a	0.1820a
<i>IMMI</i>	-1.8649 (1)	-3.6590(2) ***	-0.1840	-3.6590 ***	0.4672b	0.1880b
<i>GDP</i>	-0.0107 (1)	-6.9930 (1) *	0.1230	-6.9930*	0.1711a	0.4473b

(i).The number of optimum lags is in the parentheses according to AIC.

(ii).(*) , (**) and (***) significant at 1% , 5% and 10% respectively.

(iii). a and b indicate the inability to reject the null hypothesis at the 5% and 1 % respectively.

As shown above, the null hypothesis of non-stationarity for the ADF and PP tests is rejected for all variables, indicating that these variables are stationary in level, which is denoted by I (0). These results are further strengthened by the results reported in KPSS tests where the null hypothesis of the stationarity is accepted for all variables, as the LM-stat is less than the 5% and 1% critical values. While the optimal lags chosen for the ADF tests are determined by the smallest value of AIC (Akaike Information Criteria) introduced by Akaike (1977), both the PP and KPSS tests are in accordance with the default Bartlett Kernel estimation and Newey-West bandwidth parameter methods, chosen due to the unknown number of lagged residuals to be used in constructing a consistent estimator of residual variance (Athanasios and Antonios, 2010: 36).

The results are not surprising given that all variables represent the rate, or the change, thus they tend to integrate at level. Hence, the conclusion from the combined results from all unit root tests are the variables in the level form I (0) which will be employed in the VAR estimations.

4.6.2 Selection of optimal lag

The next step is to choose the optimal lag for the VAR estimation, which proves to be one of the severe problems in the VAR model. Not only should the judgement of the optimal

lag length be based on the smallest value of the multivariate information criterion, other factors should be taken into account such as autocorrelation, heteroscedasticity and normality of the error terms (Liu *et al.*, 2008). The study by Braun and Mittnik (1993) demonstrates the importance of the determination of the optimal lag length by showing the inconsistent impulse response functions and the variance decompositions derived from the VAR estimation when the lag length differs from the true lag length. The VAR lag order selection criteria is performed and Table 4.4 presents the results from all the criteria, namely AIC, SC and HQ, where the numbers with asterisk represent the smallest value indicating the optimal lag length. All the information criteria points out that the lag of order 1 is sufficient enough to generate the white-noise error terms. Thus, the appropriate lag length used in Granger causality and the VAR models is VAR (1). Another test performed; a VAR lag exclusion Wald test (Table 4.5); confirms the results of the VAR lag order selection criteria, in which one lag is jointly significant for the VAR model, thus the VAR is estimated with one lag.

An attempt has been made in estimating the three variable VAR model with a lag length of two, however, this has been plagued with the autocorrelation and serial correlation problems, thus the estimation of a VAR model with a lag length of one is proceed.

Table 4.4: VAR Lag Order Selection

Lag	logL	AIC	SC	HQ
0	24.92655	-3.986645	-3.878129	-4.055050
1	51.50514	-7.182752*	-6.748685*	-7.456371*

- (i). *represent lag order chosen by the criterion
- (ii). AIC: Akaike information criterion
- (iii). SC: Schwarz information criterion
- (iv). HQ: Hannan-Quinn information criterion

Table 4.5: VAR Lag Exclusion Wald Tests

	GDP	IMMI	UN	Joint
Lag 1	260.4376 (0.0000)	119.1181 (0.0000)	9.413312 (0.0000)	334.5125 (0.0000)
df	3	3	3	9

Numbers in () are p-values

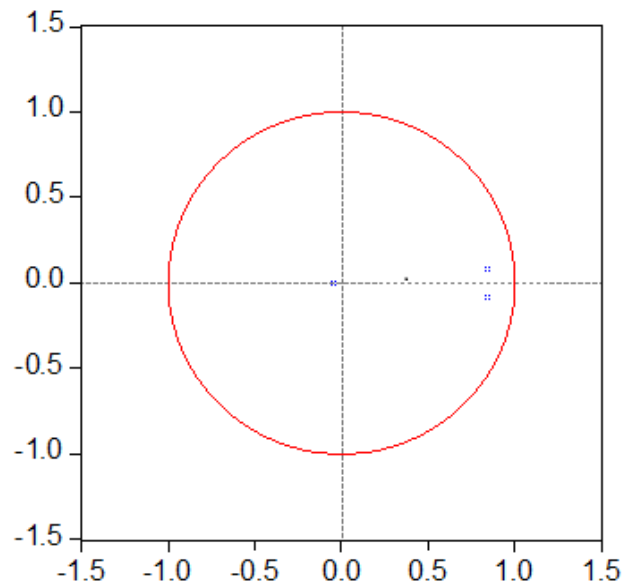
4.6.3 Stability and Stationarity

The stability of the VAR model is verified by plotting the AR roots graph (Lütkepohl, 1991: 16). Both Table 4.6 and Figure 4.7 depict the inverse roots of the characteristic AR polynomial, where it shows all roots have modules that are less than one and lie inside the unit circle respectively. The result implies that the VAR (1) model is stable, having satisfied the stability condition and corroborating the earlier findings of the ADF and PP tests. The process is stationary, thus the results of the impulse response function derived from the VAR model are valid.

Table 4.6: Roots of Characteristic Polynomial

Root	Modulus
$0.840643 - 0.083330i$	0.8448
$0.840643 + 0.083330i$	0.8448
-0.045140	0.0451

Figure 4.7: Inverse Roots of AR Characteristic Polynomial



4.6.4 The VAR estimation

The VAR approach is an alternative method to co-integration for capturing long-run equilibrium relationships (Quah, 1995; Hansson, 1999), thus the co-integration tests are not performed. Table 4.7 shows the results from the VAR estimation and is obtained with one lag for each variable. The p -values for testing the corresponding coefficients are not given in the VAR estimations. To examine whether the lagged variable has a significant adjusted effect on the dependent variable, the t-test is used. If the obtained t-statistic is greater than the critical value of $t_0 = 2$ or 1.96, the null hypothesis for the coefficient of the lagged variable being zero is rejected, leading to the conclusion that the corresponding explanatory variable has a significant adjusted effect.

Since the variables are I (0), the resulting VAR estimation is the long run equilibrium relation among macroeconomic time series variables, which are the following, where the t-statistics are presented in parentheses:

$$UN = 5.318391 + 0.244601 IMMI(-1) - 0.497728 GDP(-1)$$

[3.29200] [2.63169] [-2.66898]

$$IMMI = -10.27485 + 2.360587 UN(-1)$$

[-1.67217] [3.35650]

$$GDP = -5.680515 + 1.635290 UN (-1) - 0.258004 IMMI(-1) + 1.490460 GDP (-1)$$

[-2.56732] [6.45726] [-2.02682] [5.83559]

Table 4.7: VAR Estimations

Independent Variable/Dependent Variable	<i>UN</i>	<i>IMMI</i>	<i>GDP</i>
<i>UN (-1)</i>	-0.210524 (0.18491) [-1.13853]	2.360587 (0.70329) [3.35650]	1.635290 (0.25325) [6.45726]
<i>IMMI(-1)</i>	0.244601 (0.09294)	0.356210 (0.35351)	-0.258004 (0.12729)

	[2.63169]	[1.00765]	[-2.02682]
<i>GDP(-1)</i>	-0.497728 (0.18649) [-2.66898]	1.004073 (0.70929) [1.41561]	1.490460 (0.25541) [5.83559]
<i>C</i>	5.318391 (1.61555) [3.29200]	-10.27485 (6.14462) [-1.67217]	-5.680515 (2.21263) [-2.56732]
R-squared	0.573517	0.944496	0.973826
Adj. R-squared	0.390738	0.920709	0.962608
F-statistic	3.137771	39.70604	86.81255

Standard errors in () and t-statistics in []

The rich dynamics in the VAR model are too complex to allow any interpretability of the behaviour of the system, thus the estimated VAR regression coefficients are usually left unreported (Martin, 2010: 12). The above results, however, show that the unemployment rate is heavily dependent upon immigration and the GDP per capita, but is seemingly independent of its own history, as the t-test is only statistically significant for *IMMI(-1)* and *GDP(-1)*. In other words, past immigration and past GDP have significant adjusted effects on the unemployment rate.

Table 4.7 also shows that the t-statistic of 3.357 indicates that the lagged value of the unemployment rate, *UN (-1)*, is highly significant and has an adjusted effect on immigration. Nevertheless, the immigration own past and the GDP per capita do not affect the immigration rate.

GDP per capita, on the other hand, is determined through a combination of its own history and the fluctuations of both the unemployment rate and immigration, where all the t-statistics for all variables, *UN (-1)*, *IMMI(-1)* and *GDP(-1)*, which are 6.45726, -2.02682 and 5.83559 respectively, are highly statistically significant.

The linear dynamics of a VAR model are better graphically illustrated through the Variance Decomposition analysis and the Impulse Response Function, and the dynamic

property of VAR model is tested using the Granger causality tests. The results are discussed below; nevertheless, the results of the diagnostic tests are presented first.

4.6.5 The Diagnostic Tests

The adequacy of the representation of the VAR model is checked through a battery of diagnostic tests. The first test to be carried out is the correlogram to check for the presence of the autocorrelation problem. Figure 4.8 below shows the matrix of pairwise cross-correlogram of the VAR model base on the statistical results presented in Table 4.8. Figure 4.8 presents nine correlograms, which show that none of the autocorrelation parameters are outside the interval with two standard error bounds, indicating that the autocorrelation problem is insignificant.

The alternative test to verify the presence of the autocorrelation problem is the multivariate autocorrelation Lagrange Multiplier test. The results from Table 4.8 indicate that the null hypothesis of no autocorrelation up to a lag 1, 2 and 3 cannot be rejected at the 5% significance level. Another test for autocorrelations, the Residual Portmanteau Test, is performed and Table 4.9 shows that the autocorrelation is not a problem.

Table 4.8: The Autocorrelation LM test

Lags	LM-Stat	Prob
1	8.5253	0.4822
2	4.7308	0.8571
3	2.8477	0.9700

Table 4.9: The Residual Portmanteau Tests for Autocorrelation

Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	df
1	9.6913	NA*	10.66041	NA*	NA*
2	15.8814	0.0694	18.22612	0.0326	9
3	19.8171	0.3432	23.63773	0.1673	18

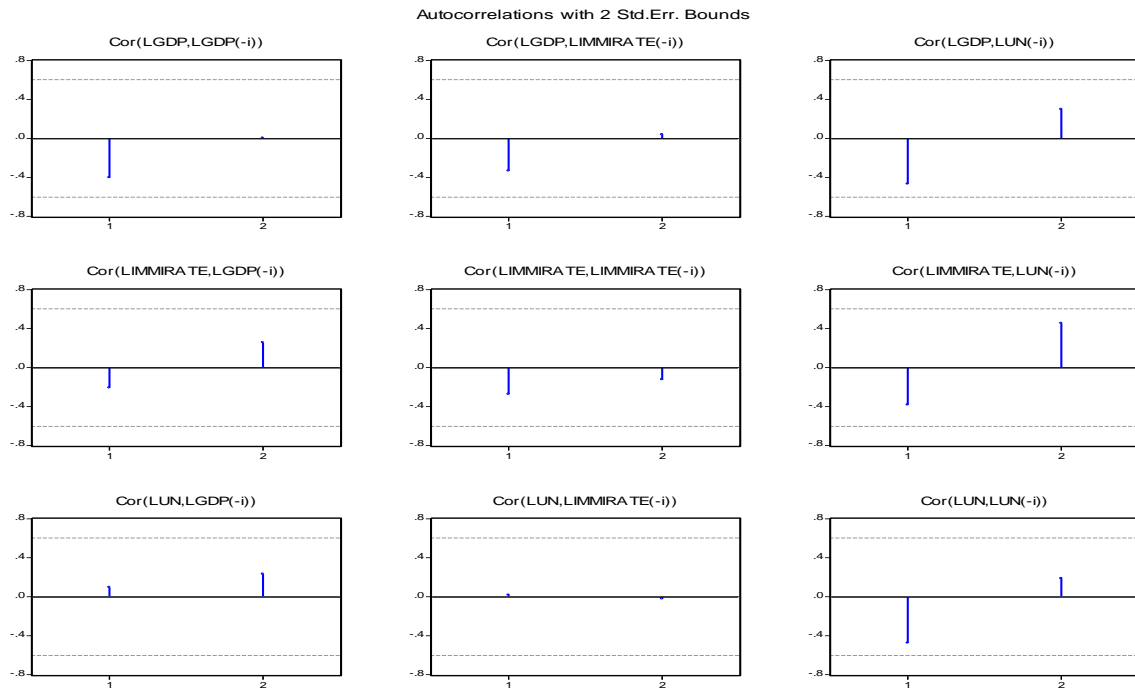
*The test is valid only for lags larger than the VAR lag order

The fourth residual test, the Jarque-Bera test via Cholesky (Lutkepohl) factorization is performed to test for the normality of observations and regression residuals. The results from Table 4.10 show that the null hypothesis for the residuals that are normally distributed cannot be rejected at the 5% significance level, as the p -values (Prob.) for all components are above 0.05, indicating that the sample is extracted from a normal distribution.

Table 4.10: The Jarque-Bera residual normality test

Component	Jarque-bera	df	Prob.
1	1.8349	2	0.3995
2	1.493	2	0.4869
3	2.3459	2	0.3141
Joint	5.5901	6	0.4706

Figure 4.8: Correlograms



The last test for the residual analysis is the White test for heteroscedasticity, which is performed to test whether the variance of the residuals, conditional to the independent variables, is constant. From Table 4.11, the results of both the White test without cross terms and the White test with cross term indicate that the null hypothesis of no heteroscedasticity cannot be rejected at the 5% significance level, as all p -values (Prob.) are above 0.05.

Table 4.11: The White Test for heteroscedasticity

White Test	Chi-sq	df.	Prob.
No Cross Terms	42.29364	36	0.2177
Include Cross terms	62.27013	54	0.2056

In short, the residuals are independent, *i.e.* not correlated, distributed normally and homoscedastic, thus the results of the VAR estimation are valid. The next section will discuss the causality among immigration in Malaysia, Malaysian unemployment rate and Malaysian GDP per capita.

4.6.6 Testing the Causality Relationship

The Granger causality concept is based upon the ground that the cause cannot come after the effect. For example, if variable x affects variable y , variable x should help improve the predications of variable y . As all the unit root tests show that data is stationary in levels, the causality tests can be carried out in base on the VAR in levels. The Granger Causality/ Block Exogeneity Wald tests are performed to examine the causality relationships among the endogenous variables. These tests are also carried out to test whether any endogenous variables can be treated as exogenous variables. The Granger Causality/ Block Exogeneity Wald test uses χ^2 (Wald) statistics to test whether a variable is influenced by the values of other variables' past (lagged) jointly and significantly. The selected lag length in the causality tests is based on the VAR model.

The results in Table 4.12 corroborate with the findings of the VAR estimation above. A chi-square test statistic represents the null hypothesis that the lagged coefficients in the regression are equal to zero. The key interest in this paper is whether any changes in immigration will lead to changes in Malaysia's unemployment rate. The Granger Causality test findings in table 4.12 clearly show that both GDP and immigration Granger-cause unemployment, implying that the previous values of immigration and GDP help in the predictions of the current value of the unemployment rate. These results indicate that an increase in the immigration rate will result in a higher unemployment rate; however, a rise in the GDP per capita will generate higher employment, and therefore, the unemployment rate declines.

Table 4.12: The Granger Causality/ Block Exogeneity Wald

Dependent Variable: UN		Dependent Variable: IMMI		Dependent Variable: GDP	
Variable Excluded	Chi-square (p-value)	Variable Excluded	Chi-square (p-value)	Variable Excluded	Chi-square (p-value)
GDP	7.1234 (0.0076)	GDP	2.0039 (0.1569)	IMMI	4.1080 (0.0427)
IMMI	6.9258 (0.0085)	UN	11.2661 (0.0008)	UN	41.6962 (0.0000)
All	7.1850 (0.0275)	All	14.0999 (0.0009)	All	65.8010 (0.0000)

The *p*-values are given in parentheses

Further results in Table 4.12 suggest that the null hypothesis that unemployment does not Granger-cause immigration can be rejected based on the chi-square of 11.2661, with the *p*-value of 0.0008. In other words, the past unemployment rate has a significant effect on current immigration. However, it is evidently shown that GDP does not Granger-cause immigration, since the chi-square test statistic of 2.0039 and the *p*-value of 0.1569 lead to the acceptance of null, supporting the results found in the VAR estimation above that the past values of GDP do not have significant effects on the immigration.

With the chi-square test statistic of 4.1080 and the p-value of 0.0427 for IMMI with reference to GDP in Table 4.12, this indicates that IMMI Granger-cause GDP as null is rejected at the 5% level of significance. Similarly, the null hypothesis that the lagged coefficients of UN are equal to zero is rejected at 5% level of significance. Also, all variables are Granger-causal for the GDP at the 5% level of significance. These show that both immigration and unemployment Granger-cause GDP, reflecting that the inclusion of past values for immigration and the unemployment rate in the GDP equation provides a better explanation for the current value of the GDP.

Interestingly, unemployment in the immigration equation and immigration in the unemployment equation are statistically significant at the 5% significance level, as illustrated in as Table 4.12, suggesting the fact that unemployment in the preceding period has an explanatory power for immigration in the current period, and vice versa. Furthermore, it could be interpreted that the history of immigration is sufficient in the prediction of the future unemployment rate and *vice versa*. Therefore, it can be concluded that Granger causality run in two ways; first, immigration is significantly Granger-cause of the unemployment rate and second, the unemployment rate is significantly Granger-cause of immigration. Corresponding to the causality types recommended by Gujarati (1995), there is, hence, a bi-directional (or bilateral) causality between unemployment and immigration.

The results imply two convictions; first, immigration does have an adverse impact on the native employment; in that they tend to replace the native labour in the economy, thus leading to higher unemployment. As stated earlier, employees prefer immigrant labour to native workers due to their cheap labour costs, relatively flexible, cooperative and easily mobilized. Second, the concern over the aggregate unemployment leading to a drop in the immigration rate is verifiable historically. Immigration responds significantly to unemployment, where a high unemployment rate tends to deter the migratory process to Malaysia as the economic motivation for immigrants is to earn a higher income and in search for a better quality of life. Malaysia's high unemployment rates signify that there are less employment opportunities sprouting from labour surplus and shortages of lands

and capital investments. Thus, it is reasonable to justify that high unemployment rate in Malaysia causes a lessening in the flux of immigrants.

This finding, however, is in stark contrast with many previous empirical literatures, among other, Marr and Siklos' (1995) study on Canada, Konya's (2000) and Withers and Pope's (1985) studies on Australia, Feridun's (2004) study on Finland and Feridun's (2006) study on Norway, as these studies find either evidence of unidirectional Granger causality, running either from immigration to unemployment and vice versa, or no evidence on either immigration affects unemployment and vice versa.

Looking at Table 4.12, it is found that the causality relationship between GDP and the unemployment variables is also bi-directional. A higher GDP indicates higher economic activities which demands more labour to be employed. This will result in the expansion of employment and a contraction in unemployment. Meanwhile, a decline in the unemployment rate evidences economic progress, as more labour are hired to produce more goods and services. These results are in line with the Malaysian case studies by Mohd Noor *et al.* (2007) and Ting and Lingii (2010).

Nevertheless, there is a unilateral causation between immigration and GDP with causation running from immigration to GDP. This illustrates the importance of foreign labour in generating and sustaining economic growth in Malaysia. Once the immigrants' economic and social processes of adjustment and assimilation have taken place, immigrants will contribute to the growth of economy. Immigration accelerates economic growth through three channels; first, immigration improves the degree of openness as well as increases the demand for capital investment. Second, immigration promotes innovation and advancement, thus leading to higher total factor productivity, and third, immigration contributes to a greater allocative efficiency both in the short run and the long run, which may heighten the total factor productivity (Feridun, 2007: 38).

The evidence of causality from immigration to the GDP per capita points out that the growing Malaysian economy is not the dominant factor in attracting immigration. This

result is in contrast with the assumption of the Neoclassical Economic Theory of Migration that the maximization of the expected income is the central element in motivating the migratory process (Harris and Todaro, 1970). This result also implies that the push-factors are dominant over the pull of favourable economic conditions in Malaysia in influencing the influx of immigration, such as poverty, a lack of available jobs, political instability and low wages that compel immigration from countries such as Bangladesh, Indonesia, Philippine, Thailand and Nepal to Malaysia (Martin, 2009). In Indonesia, for example, 16.7% of its population that represents approximately 36 million people lives below the poverty line, which is 122, 775 rupiah in 2004 (ADB, 2006). While the main aim of this paper is not to examine this issue, this can be considered for future research.

This result contradicts many prior empirical studies. Morley (2006) finds a unilateral causation running from GDP to immigration, Feridun (2007) and Islam (2007) who both uncover the bidirectional causality between GDP and immigration, and Borjas (1994) who arrives at the conclusion that there is no relation between these variables.

Furthermore, the statistics in the last row (All) in Table 4.12 show that the null hypothesis of block exogeneity is rejected for all equations; signifying that all variables are jointly influenced by each other, and thus cannot be treated as exogenous variables. The null hypothesis denotes that the lags of a set of variables do not enter the equations in a VAR model for the remaining variables (Kutan, 1991: 290). This result reinforces the appropriateness of using a VAR model.

An attempt was also made to perform an alternative test for causality, namely the Pairwise Granger Causality Test, which uses the *F*-test. The results for the Pairwise Granger Causality Tests are presented in the Table 4.13, which show a startling contrast with the preceding causality test in Table 4.12. Looking at Table 4.13, the results reveal that immigration causes GDP per capita, but not *vice versa*; unemployment causes GDP per capita, but not *vice versa*; and finally, unemployment does indeed contribute to immigration, but not *vice versa*. It is, thus, tempting to discuss the differences between the

Pairwise Granger Causality Test and the Granger Causality/Block Exogeneity Wald test, however, in the context of the multivariate models, it is more preferable to adopt the latter test since the test applies to all lagged values of every individual explanatory variable (Favero, 2001, Calza *et al.*, 2006).

Table 4.13: Pairwise Granger Causality Tests

Null Hypothesis	Obs.	F-Stat	Prob.	Implication
IMMI does not Granger Cause GDP	11	3.960	0.0817	Reject null
GDP does not Granger Cause IMMI	11	1.2411	0.2976	Accept null
UN does not Granger Cause GDP	11	44.4313	0.000	Reject null
GDP does not Granger Cause UN	11	0.1489	0.7096	Accept null
UN does not Granger Cause IMMI	11	10.7472	0.0112	Reject null
IMMI does not Granger Cause UN	11	0.0349	0.8565	Accept null

Nevertheless, caution should be taken in interpreting the causality results presented in Table 4.13, as these Granger causality tests are a misnomer in that they do not represent the cause-and-effect relationship. It is more appropriate to label these tests as Granger-predictability; since they test whether the past values of a variable can help in predicting and forecasting another variable (Frank, 2009: 176). Also, it is imperative here to stress that these results should not be used to draw any inferences on the VAR's structural parameters. The forecast error variance decomposition (FEVD) is then carried out to establish evidence of a contemporaneous correlation among variables, while the impulse response function (IRF) is performed to uncover the sign of association between these two variables. The results and discussions are presented in the next sections.

4.6.7 Forecast Error Variance Decomposition

The forecast error variance decomposition (FEVD), developed by Sims (1980), analyses the impact of dynamic change in a variable on the variance of other variables. Frequently known as innovation accounting, this technique determines how orthogonal or independent shocks (or innovations/residuals) in one variable cause changes in others by

decomposing its forecast error into its own innovations as well the others (Brandt and Williams, 2007: 23). Technically, this is done by converting the VAR model into the Vector Moving Average (VMA) model, in which the present forecast errors are dependent on the past shocks (innovations). Although the residuals are not serially correlated, they may be correlated contemporaneously. This may result in an inaccurate estimation of the forecast error variance decomposition as the isolated shocks to a variable of interest cannot be truly determined owing to the contemporaneous correlation among the residuals of a VAR. Thus, the wide practice is to perform the Cholesky factorization to orthogonalize the shocks to solve this identification problem (Cornwell, 2009: 10).

However, the results of FEVD are highly sensitive to the variable ordering if the Cholesky factorization is employed (Wang and Rettenmaier, 2008: 208). Traditionally, the more exogenous variable is placed higher in the ordering. In other words, the first variable is assumed to be the least contemporaneously affected by other variables, the second variable is affected by the first variable, and so on (Abdullah and Hayworth, 1993: 54).

Choosing the ordering of the variables in this fashion leads to a certain degree of arbitrariness, unless the specific recursive structure is theoretically justified. Different variable orderings may result in a number of marked different conclusions, therefore, to overcome this problem, the generalized forecast error variance decomposition developed by Lee *et al.* (1992) and Lee and Pesaran (1993) is proposed, which is indifferent to the variable ordering and the shocks are not orthogonalized before generating the variance decomposition. Since the immigration literature does not provide any strong theoretical reasons to prefer one variable ordering over the other, the use of generalized decomposition is preferred.

Table 4.14 presents the results for the Generalized Forecast Error Variance Decomposition for each of the variable in VAR model for up to 10 period. Unlike the Cholesky Decomposition, the sum of the row values for the Generalized Decomposition does not have to be 1. The Generalized Decomposition provides the optimal value for

each variable's variance decomposition as an average of the Cholesky Decomposition values that would result from different variable ordering (Sari and Malik, 2003: 83). Furthermore, variance decompositions enable the relative strength of a causality relationship to be evaluated (Sims, 1980).

In Panel A, immigration shocks explain most of the variability in unemployment at around 11.8% upon initial impact, which is $t=0$, to over 30% in the next periods. GDP, on the other hand, only explains 2.9% of the variability of unemployment at $t=0$, but gradually rises up to around 21-23% for the periods of 4-10. These findings clearly demonstrate that unemployment is being gradually and significantly explained by the shocks in the immigration and GDP. Together, these variables explain 56% of the variation in unemployment at the 10th horizon while considering the verification of the importance of immigration and GDP variables in explaining or predicting unemployment. This also corroborates the findings from the VAR estimation and causality tests in the previous sections.

Unemployment dominates GDP in explaining the fluctuations in immigration, ranging from 11.8% at $t=0$ to 47% at $t=10$ as can be seen in Panel B. Similarly, GDP shocks only explain between 3-7% of the forecast variance of immigration. These findings show that immigration is largely explained by the shock in unemployment, but not by GDP. This is similar to the results from Granger causality test, where GDP does not have any influence on immigration and provide supports for the hypothesis that unemployment Granger-cause immigration.

Panel C shows that the share of GDP variance accounted for by unemployment dominates immigration especially for the 6-10 periods. Unemployment starts with 2.9% at the initial period, rises up to 14.3% in the second period and climbs up from 22% to 44% between the third and tenth period. Immigration, in contrast, starts slowly with only 3% at $t=0$, and begins to ascend at period 4 with 13% and steadily amounts up to 36% of the forecast variance of GDP in the last period. Again, these findings reinforce the earlier results from

the Granger Causality/ Block Exogeneity Wald test that both unemployment and immigration influence GDP.

In general, the long run variations in unemployment can be explained more by immigration than GDP, although both variables contribute towards high portions of the unemployment variation. Innovations in immigration are explained substantially by unemployment, but GDP plays very little role in accounting for fluctuations in immigration. Also, there is not much difference in the percentage of GDP forecast variance explained by innovations in both unemployment and immigration, indicating that both variables are important in explaining GDP. These findings provide further evidence on the existence of the strong relationship among unemployment, immigration and GDP, as outlined in the theoretical section previously.

Table 4.14: Generalized Forecast Error Variance Decomposition of unemployment/immigration and GDP

Generalized Forecast Error in	Forecast Horizon (t)	Proportions of forecast error variance due to innovations in		
		Unemployment	Immigration	GDP
Panel A: Unemployment	0	1.0000	0.1180	0.0285
	1	0.5339	0.3364	0.1324
	2	0.4347	0.3583	0.1698
	3	0.3926	0.3518	0.1937
	4	0.3735	0.3396	0.2101
	5	0.3660	0.3290	0.2208
	6	0.3647	0.3223	0.2270
	7	0.3665	0.3196	0.2298
	8	0.3696	0.3201	0.2302
	9	0.3731	0.3230	0.2292
	10	0.3762	0.3269	0.2275
Panel B: Immigration	0	0.1180	1.0000	0.0313
	1	0.3305	0.7941	0.0757
	2	0.4019	0.7539	0.0771
	3	0.4361	0.7448	0.0718
	4	0.4538	0.7457	0.0657
	5	0.4631	0.7497	0.0604
	6	0.4678	0.7542	0.0562
	7	0.4700	0.7583	0.0529
	8	0.4706	0.7618	0.0505

	9	0.4705	0.7645	0.0488
	10	0.4700	0.7666	0.0476
Panel C: GDP	0	0.0285	0.0313	1.0000
	1	0.1428	0.0092	0.6540
	2	0.2158	0.0302	0.5874
	3	0.2793	0.0765	0.5297
	4	0.3292	0.1329	0.4765
	5	0.3659	0.1889	0.4300
	6	0.3917	0.2389	0.3914
	7	0.4092	0.2811	0.3604
	8	0.4208	0.3155	0.3359
	9	0.4282	0.3429	0.3171
	10	0.4329	0.3644	0.3026

4.6.8 Impulse Response Analysis

As stated before, the deep understanding for the implied dynamic behavior of the VAR model is not provided by its estimated distributed lag coefficients. There are tendencies for the estimated coefficients on successive lags to be oscillated and there also exist the complicated cross-equation feedbacks.

Therefore, the graphs of impulse responses are computed to provide a superior tool to analyze the dynamic interactions between variables by examining the responses to shocks and to complement the Granger Causality results and the Variance Decomposition findings. While the Variance Decomposition provides the importance of a variable in explaining another variable, the Impulse Response Functions (IRF) produce information on the size of the shocks and the adjustment speed to the shocks (Sato *et al.*, 2005: 946). Specifically, the IRF shows whether the impact of a variable's shock upon another variable is positive or negative, or whether the impact is temporary or permanent, as this effect of a one standard deviation shock on the current and future values of the

endogenous variable can be traced out over time. The IRF is, therefore, arguably the most important tool in the VAR analysis.

In the present context, the IRF estimates how quickly unemployment adjusts after being shocked by an unanticipated change in immigration. In other words, the IRF shows how quickly the long run relationship between unemployment and immigration converges to its steady state value. The same analysis will apply to the cases of immigration and GDP. To compute the orthogonalized shocks in each variable and the dynamic responses to such shocks, the variance –covariance matrix of the VAR is factorized using the Generalized Impulse Response, developed by Pesaran and Shin (1998). Similar to the Generalized Variance Decomposition, this method is invariant to the variable ordering of the system.

The dynamic effects captured over ten period to a one standard deviation shock in each variable are computed, where the standard error band calculated from the asymptotic analytical formula is reported alongside. Since the primary focus of this study is to analyse the impacts of immigration on unemployment and GDP, only the graphs of impulse responses to the shocks of immigration are presented in Figure 4.9 and Figure 4.10 respectively. The rest of the responses are reported in Appendix B.

Figure 4.9 Response of LUN to Generalized One S.D. LIMMIRATE Innovation

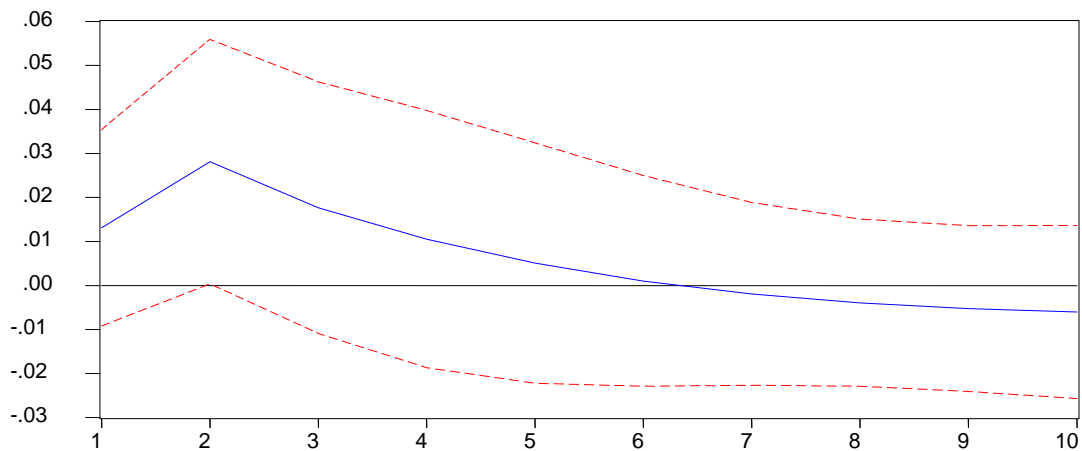


Figure 4.9 illustrates the initial reaction in unemployment to a one standard deviation shock to the residual in the immigration equation, which appears to be strongly positive and takes about two years to reach a peak and then starts to slow down before reaching its steady state equilibrium after six periods. Specifically, the immigration shock increases the rate of unemployment from 0.01% on impact to a peak of 0.03% after two period, and then declines and returns to a permanent 0% and negative beyond six periods.

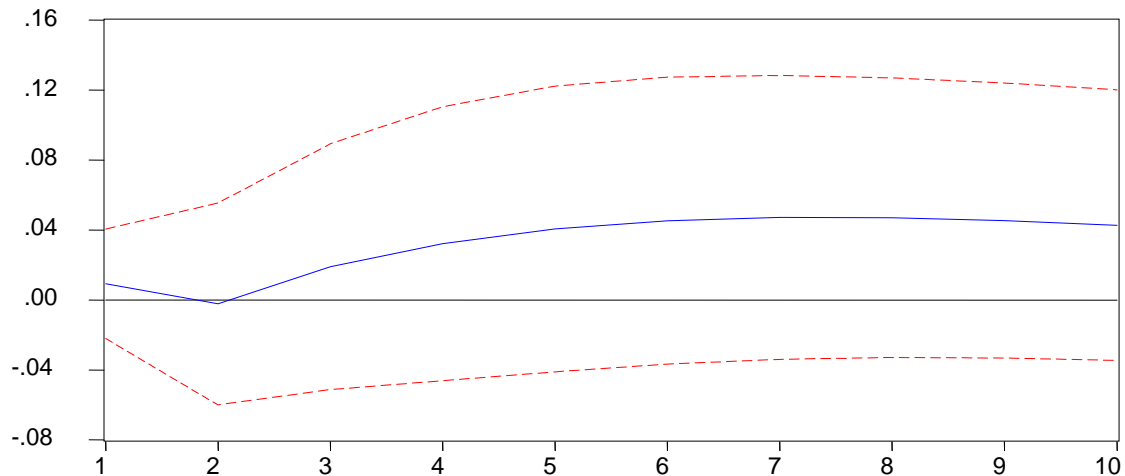
The interpretation of the result is that an increase in immigration does lead to an increase in the unemployment rate in the initial periods, but descend in the later periods. Similar to Jean and Jimenez (2007)'s findings, these results suggests that the impact of immigration shocks on unemployment is temporary. Initially, the immigrants' participations in the labour market dominate their participations in the product market, hence leading to an increase in the native unemployment. One of the many motivating factors which cause immigrants to become aggressive job seekers is their eagerness of to accept any lower-paid jobs in order to cover their basic needs, to pay for their immigration costs and to send more remittances to their families back home. Furthermore, this finding lends an additional weight on the postulation of immigrants serving as a substitute for native labour in Malaysia. As stated before, most firms would prefer to hire them as their wages are relatively lower, thus displacing native workers and resulting in the fall in the native employment. The negative effect of immigrants on the native labour force however, is relatively modest in magnitude as described above.

Concern over the displacement effect due to immigration is unfounded in the long run. After the second period, the immigrants' participation in the product market as consumers is much stronger than their participation in the labour market, which results in a fall in the native unemployment. This result also indicates that the aggregate demand effect dominates the aggregate supply effect. As outlined in the theoretical literature, immigrants generate a higher total employment in Malaysia through their higher consumption demands by buying products, which leads to a higher demand for labour, thus raising the native employment. The influx of immigrants serves to sustain private consumption, thus reducing Malaysia's dependency on external demand. Also, the presence of immigrants

expedites the expansion of local industries and boosts private sector investment as firms exploit its economies of scale and hire more workers. Thus, it is evident that immigration improves the employment possibilities of natives. Moreover, the hypothesis that immigrants tend to complement, rather than compete with, native labour in the long run is further supported by this finding. As stated before, Malaysia attracts many less-skilled immigrants from developing countries to fulfill the shortage of labour particularly for '3D' jobs – dirty, difficult and dangerous employments. The non-existence or the lack of competition between immigrants and native labour results in reduced employment gap, minimal labour market pressure and hence, declining unemployment.

It should, however, be noted that these findings are in stark contrast to the findings of Hercowitz and Yashiv (2002), Winkelmann and Zimmermann (1993) and De New and Zimmermann (1994) whose empirical results show that the native unemployment increases in the industries that have been dominated by immigrants labour. The finding in this study, however, is consistent with the findings from prior empirical works such as Greenwood and Hunt (1995), Altonji and Card (1991), Marr and Siklos (1995), Gross (1998) and Islam (2007), among others, who establish the fact that immigrants complement native labour, and that immigration has substantial impact on job creation for native labour in the long run.

Figure 4.10 Response of LGDP to Generalized One S.D. LIMMIRATE Innovation



Even though the main objective of this essay is not to investigate the impact of immigration on GDP per capita, the generalized impulse response of GDP per capita to a one standard deviation shock in immigration is nevertheless performed. It is found that there is a weak negative immigration shock to GDP per capita initially, approaching the steady state at the second period, and emerging strongly positive for the later horizons as shown in Figure 4.10.

The effect of the immigration shock is to decrease the GDP by 0.01% from the initial to the second period, and to rise to approximately 0.04% after the fourth period and beyond. Given that most immigrants are low-skilled labour, it comes to absolutely no surprise that the increase in immigration has a negative effect on Malaysian GDP per capita initially, as most immigrants in general are struggling to find the suitable jobs, adapting to a new culture and learning a new language (Islam, 2007: 2).

There are many alternative explanations for the adverse effects of immigration on the GDP per capita. First, the rising immigration population lessens the transitional per capita

economic growth, as a higher population has a detrimental effect on the capital labour ratio (Jones, 1998: 32). Second, the unanticipated immigration population will lead to a reduction in the human capital investment, and expansion in goods production for current consumption, an indication of a willingness to forego future consumption. This will result in the transitional growth path with a decelerated human intellectual asset relative to the balanced path (Robertson, 2002: 151). Third, in conjunction with the previous results, it is realistic to suggest the occurrence of the Okun's Law in the present case. The law upholds that GDP has a direct inverse relationship with unemployment. From Figure 4.9 and Figure 4.10, it is obvious that increase in the unemployment rate results in declining productivity, thus lowering GDP per capita, and vice versa. In a very simple notion, unemployed labour do not engage in any production, thus they do not contribute to any amount of GDP, and *vice versa*. This hypothesis is further supported by the causality results where there is a bi-directional causality between these variables.

However, the labour market disadvantages that are experienced by immigration will erode over time as shown in the result above. Once the process of labour market integration is complete, immigrants will be well-integrated into the society and economy, acquire required skills, improve their knowledge of the labour market and attain a certain level of language proficiency that improves their employment probability. Indeed, looking at the increase in GDP per capita after the second period, it is evident that immigration increases the overall productivity of the Malaysian economy, acts as productive resources and contributes to the greater utilization of land and capital, thus establishing the fact that immigrants play an increasingly significant role in expanding the Malaysian economy.

The IRF shows that there is a long run impact of immigration shocks on GDP per capita, which is consistent with most empirical studies such as Friedberg and Hunt (1995), Barro and Sala-i-Martin (1992) and Barrell *et al.* (2007), in which immigration has a positive though small impact on GDP. Nevertheless, this result run counter to the findings of Blanchard and Katz (1992) and Dolado *et al.* (1994) who find that immigration shocks reduce GDP.

These findings seem to suggest that immigration has moderate short-run effects on GDP, but the impact on unemployment can best be viewed as being permanent, as the adjustment to converge to its long run equilibrium is slow. However, these effects are not particularly significantly quantitatively, ranging from between 0.01% to 0.04% only. The IRF results show that the long run equilibrium exists, as both unemployment and GDP return to their states of equilibrium in the sixth and second period respectively. The speed of adjustment could also be an indicator of the market efficiency. Thus, it can be concluded that the labour market adjustment to the arrival of immigrants is slow either due to the higher adjustment costs or inefficient markets which could be due to the structural demand-supply mismatches in the labour market. On the other hand, the product market adjustment is relatively more efficient, in terms of resource allocation, the production and distribution processes and less price stickiness.

4.7 CONCLUSION

This essay examines the impact of immigration on the unemployment rate in Malaysia for the period of 1997-2008. Studying the influx of immigration to Malaysia from macroeconomic level offers an advantage from the analytical and econometric viewpoints, as the bias effect from internal native migration is mainly diminished, which may occur when studying the immigration impact focusing on a region. The concern in which immigrants are seen as job robbers are addressed in this paper and the econometric results provides some insights on the adjustment process of the labour market.

The VAR estimation results show that the unemployment rate is determined by immigration and GDP per capita; GDP per capita is heavily influenced by immigration and the unemployment rate, and that immigration seems to depend only on the unemployment rate. These results are further supported by the causality tests. While most studies find that there is no causality from immigration to unemployment, the statistical causality results in this study show that there is a bi-directional causality between unemployment and immigration, implying that migration does lead to unemployment and *vice versa*. The same goes for unemployment and GDP per capita, where both variables

influence each other's variations. However, there is a unilateral causation between immigration and GDP with causation running from immigration to GDP. The FEVD also provides similar results, corroborating the findings from the VAR estimation and causality tests, as evidenced by the existence of the strong relationship among unemployment, immigration and GDP.

The generated IRF is performed to determine the sign of the association between variables, the size of the shocks and the adjustment speed to shocks. It has been discovered that an increasing immigration affects unemployment negatively only in the short run, while no negative effect can be located for the long run relationship. In fact, immigration permanently lowers the aggregate unemployment, suggesting that employment growth outweighs workforce growth. Clearly, immigrants create more jobs than they fill in the long run. Furthermore, the findings derived from the econometric tests also show that immigrant labour serve as complements to native labour, instead of substitutes. The finding for the absence of fierce job competitions between these two labour force groups in Malaysia is consistent with many previous studies in the developed countries.

In addition to the lack of evidence in supporting the hypothesis of the adverse employment effects of immigration, the results reveal that immigrants contribute to a higher GDP per capita in the long run. Corresponding to the above deduction, the labour market integration of immigrants ensures a higher participation of immigrants in the domestic activity, thus leading to a higher GDP per capita where there is a dynamic and spillover demand effect of immigration. Also, a larger workforce contributes to a greater GDP per capita as postulated by the neoclassical growth model assuming the stock of capital responses quickly or the capital inflows being triggered by the presence of immigrants.

In conclusion, in the short run, it is found that the aggregate supply effect might dominate the aggregate demand effect, where immigration affects unemployment negatively. However, in the long run, immigrants affect unemployment positively, indicating the

presence of the complementary effect and the demand-side effect. These results also provide support for the general equilibrium framework that advocate the job-creation effect of immigrants. Therefore, the labour policy in Malaysia should be tailored to minimize the impact of immigration shocks by enhancing the adaptability of the labour and product markets. At the same time, these policies need to be flexible enough in facilitating the labour market to speedily revert to the steady-state equilibrium. As undoubtedly the costs associated with the economic and social adjustment and the integration of immigration are high on the native labour, it is imperative for these policies to be relevant, up-to-date and applicable in lessening these costs.

CHAPTER 5

CONCLUSION

5.1 INTRODUCTION

As one of the main debatable issues in the international debate scene, the impact of immigration remains a topic of continuing significance, which also constitutes the main aim of this research as well. A number of the aspects of immigration in relation to the Malaysian economy are empirically examined and explored in this study.

This chapter comprises of four sections where the first section presents the summary of each essay presented in the preceding chapters. The second section discusses the empirical and theoretical implications of the research. The third section explores avenues of policy recommendations in addressing the migration issues. And lastly, the fourth section discusses the limitations of the study and proposes a direction for future research.

5.2 SUMMARIZING THE RESULTS

This section examines, contextualizes and interprets each essay's findings in the context of the Malaysian environment and provides some constructive suggestions for realizing the promising rewards of immigration in Malaysia.

5.2.1 Immigration and Trade Linkage

Chapter 2 focuses on the effect of immigration on the bilateral trade in the context of the Malaysian case by considering the notion that immigrants are either trade diversion or trade creation, which has also been a long-standing puzzle in the international trade literature. Applying gravity models, the aim of the paper is to examine the Malaysian bilateral trade with the immigrants' home countries by testing it through a number of explanatory variables including the immigration stock, the size and the level of the

economic development of these economies, their distance, similar language and culture, the exchange rate, trade openness and trade agreements. While traditional trade theories provide a rationale for trade occurrence, they lack justifications in explaining the size and strength of trade flows in relation to immigration, reflecting their limited applicability. On the other hand, gravity model is able to address these issues effectively. Nevertheless, even though the explanatory power of gravity model is high, one should be cautious in applying the modelling results as the gravity equations are less reliable in term of capturing the dynamic effects of the trade flows (Helmets and Pasteels, 2005: 16).

The details of the empirical results on the Malaysian case are presented and discussed in Chapter 2. Table 5.1 provides a summary of the results concerning the key variable of this study: the immigration stock.

Table 5.1 Summary of the empirical results for immigration-trade nexus

Variable	Migration effect of increase by 10%	Implications
Export	Increase by 4.9%	Dominance of preference mechanism over immigrant-link mechanism.
Import	Increase by 7.2%	
Consumer export	Increase by 2.8%	Both mechanisms are behind the linkage between trade and immigration. Network effect plays salient role in facilitating exports.
Producer export	Increase by 5%	
Consumer import	Increase by 9%	
Producer import	Increase by 5.8%	
FTA_MIG export (impact of immigrants from countries that have Free Trade Agreement with Malaysia on exports)	Increase by 2.9%	No sharp distinction, trade agreements do not play important role in encouraging migrants to increase trade activities.
FTA_MIG import (impact of immigrants from countries that have Free Trade Agreement with Malaysia on imports)	Increase by 6%	
NFTA_MIG export (impact of immigrants from countries that have no Free Trade Agreement with Malaysia on exports)	Increase by 3%	
NFTA_MIG import (impact of immigrants from countries that have no Free Trade Agreement with Malaysia on imports)	Increase by 5.7%	
Malay_lang export (impact of the immigration from Malay-speaking countries on exports)	Increase by 3.3%	Greater cultural dissimilarity brings higher trade. Superior knowledge of home country plays significant role in reducing transaction costs, hence encourages higher trade volumes.
Malay_lang import (impact of the immigration from Malay-	Increase by 6.1%	

speaking countries on imports)		
NonMalay_lang export (impact of the immigration from non-Malay-speaking countries on exports)	Increase by 4.7%	
NonMalay_lang import (impact of the immigration from non-Malay-speaking countries on imports)	Increase by 6.9%	
DOM_MIG export (impact of immigrant workers in domestic-service sector on exports)	Increase by 2.2%	Evidence of the import-substitution activities presence in Malaysia, and export-substitution activities in home countries.
DOM_MIG import (impact of immigrant workers in domestic-service sector on imports)	Increase by 4.1%	
CONSTR_MIG export (impact of immigrant workers in construction sector on exports)	Increase by 2%	
CONSTR_MIG import* (impact of immigrant workers in construction sector on imports)	Increase by 0.4%	
MANUF_MIG export (impact of immigrant workers in manufacturing sector on exports)	Decrease by 1.5%	
MANUF_MIG import (impact of immigrant workers in manufacturing sector on imports)	Decrease by 2.6%	
SERV_MIG export (impact of immigrant workers in service sector on exports)	Increase by 3.8%	
SERV_MIG import (impact of immigrant workers in service sector on imports)	Increase by 8.4%	
AGRI_MIG export (impact of immigrant workers in agriculture sector on exports)	Increase by 1.5%	
AGRI_MIG import (impact of immigrant workers in agriculture sector on imports)	Increase by 2.8	

(*) is not significant

Among the significant observed characteristics of immigrants is the fact that many of these immigrants come from developing countries and are mostly employed in the 3D sectors (dangerous, degrading or dirty), therefore it is logical to assume they are relatively low-skilled labour. However, the high elasticities presented in Table 5.1 evidence that the immigrants in Malaysia strongly boost bilateral trade activities; as by taking into account the impact of immigrants, both imports and exports tend to increase linearly with the immigration flow. The theoretical literature predicts that high-skilled

immigrant labours are in a better position to have a greater effect on trade flows (Mundra, 2009: 8). However, this study shows that these low-skilled labour also do possess sufficient human capital in carrying and utilizing knowledge about their countries of origin hence increasing the trade volumes. Thus, the evidence in this study implies that education and skills levels play little role in promoting higher trade volumes in Malaysia.

The above results support the hypothesis that the bilateral trade between the host and home countries is positively affected by the presence of immigration. Immigration is indeed a strong bridge between the host and home countries.

Higher exports and imports levels contribute to higher Malaysian government revenues in terms of tariffs, import duties, sales tax, export duties and customs duties. In 2000, Malaysian government reduced duties on imported food from 5-20% to 2-12%. In 2003, all the tariffs on manufactured goods were decreased to 0- 5% between ASEAN members (AFTA, 2003).²⁶ This unquestionably bolsters the import activities as immigrants with their entrepreneurial skills take advantage of the tax reduction, as proven in this study. The extra tax revenues earned also enable Malaysian government to improve domestic welfare by funding more public expenditure and services, benefitted the country as a whole.

In general, imports elasticities with respect to the immigration stock variable are found to be considerably larger than the export elasticities, reflecting the dominance of the preference mechanism over immigrant-link mechanism. Nonetheless, since exports coefficients are positive in all specifications, it is crucial to emphasize the importance of the immigrant-link mechanism as it influences both imports and exports. Hence, it can be concluded that the most important effect of immigration on bilateral trade flows is possibly through the establishment of business and social networks.

The most notable business and social network in Southeast Asia is Chinese Diaspora. This closely knit and powerful Diaspora is bound together by a strong familial link,

²⁶ See: <http://www.aseansec.org/12025.htm>

common linguistic and cultural traditions, and astonishing ability and desire to expand and multiply profitable businesses (Grossman, 2010: 288). The Malaysian economy has been historically dominated by Chinese business groups, more resembling to family or individual businesses. Examples include Genting and Resorts World (Lim Goh Tong), Public Bank Bhd. (Teh Hong Piow), YTL Corp. and YTL Power International Bhd (Yeoh family), as well as Kuala Lumpur Kepong (KLK) Bhd (the late Lee Loy Seng family) which are now among the top 20 publicly listed companies on the Kuala Lumpur Stock Exchange (KLSE) in 2000 (Gomez, 2003: 60) and still manage to retain their places in 2010 (FTSE, 2010).²⁷ As Chinese Diaspora in Southeast Asia is about 20 million, their social network obviously contributes significantly to export and import activities. In Malaysia, Chinese Diaspora control at least 55 percent of its domestic economy, 22 percent of the Indonesian economy, 44 percent of the Thai economy, 22 percent of the Vietnamese economy, and 11 percent of the Philippines economy (Chinese Diaspora, 2008).²⁸ Their powerful business networks prosper not only for their companies, but also for the economies of their host countries.

It should also be noted that, the middlemen role played by immigrants through business and the social network is essential and fundamental to the distributive trade that encompasses the retailing and wholeselling activities, as the element of trust created will reduce the trade barriers, transaction costs and risks (Faist, 2008: 30). Moreover, local economic development could be further advanced by partnerships, more transactions and efficient operations, which are evidenced in the case Malaysia. The strong collaboration between immigrant entrepreneurs and local firms may result in further access to new markets, gaining competitive advantage, developing new product ideas and inventions and sharing the latest technologies and workplace innovations. For example, the Memorandum of Understanding (MoU) signed between Kuala Lumpur and Jakarta in 2009 will boost more of these collaborations in the areas of food crops, horticulture,

²⁷See: http://www.ftse.com/Indices/FTSE_Bursa_Malaysia_Index_Series/Downloads/FTSE_Bursa_Malaysia_KLCI_Research_Paper_0609.pdf

²⁸ See: http://www.newworldencyclopedia.org/entry/Overseas_Chinese?oldid=766818.

livestock, agribusiness and agro industries (Malaysia and Indonesia Ink MoU on Agriculture Cooperation, 2009).²⁹

It should also be noted that evidence on the existence of import-substitution activity in Malaysia indicates the exhibition of zealous entrepreneurial spirits. Besides providing commercial links, immigrants are also manufacture entrepreneurs. The reduction of manufacturing imports by 2.6% indicates the importance of this activity as it raises the level of economic activity, reduces the dependence of imports and, to certain extent, provides employments to their fellow countrymen. By acquiring, strengthening and maintaining the business links and contacts at their home countries, social capital is easily accessed. The minimum paid-up capital necessary, which ranges between RM250, 000 and RM10 million in Malaysia (How to Set Up a Company in Malaysia, 2006)³⁰, is able to be raised to set up exports and imports businesses and form business links with their home countries. Clearly, the pooled flow of capital brought by these immigrants expedites the process of entrepreneurship. The findings in this study indicate the importance of the existing social networks in facilitating immigrant entrepreneurs to establish businesses. However, rigorous data collection and analysis are needed to further support these arguments.

These inflows of capital and income generated from exports and imports activities, in turn, highlight the importance of financial services for immigration. Their high economic participations and contributions will result in higher demand for banking and financial services to cater for their particular and individual needs. It is therefore, necessary for Malaysian banking system to provide an easily accessible a wide range of financial services, such as saving and checking accounts as well as personal and business loans. Integrating immigrants into the financial mainstreams also provide them with an access to the asset building and credit-building opportunities. Advisory services such as those on the implication of fiscal and monetary policies, economic and financial planning,

²⁹ See: <http://www.developing8.org/2009/02/28/malaysia-and-indonesia-ink-mou-on-agriculture-cooperation/>

³⁰ See: <http://www.malaysia2u.com/viewtopic.php?t=31&sid=4a307c4f6ec6e8c698261a1c931dff13>

accounting and marketing advices, and training initiatives should be offered to improve their business performances.

Productive collaborations among banks, financial intermediaries, government agencies and non-profit organizations should be involved in identifying the national, cultural, ethnic, language and religious diversities in offering financial and mentoring assistance to those who are self-employed and micro-entrepreneurs. Understanding of these multifaceted dynamics is essential in supplying better financial services to immigrants. Applying the ‘know-your-customer’ policy (KYC) prevents generalizations, hence improves the specific banking products or packages targeting at different customer segments, which requires continuing learning culture on the part of bank personnel.

Another plausible explanation of the negative coefficient of immigrant workers in the manufacturing variable is that the local firms produce the home-countries products to meet the needs of immigrants who still retain traditional food preferences and the desire for accustomed goods from their countries of origin. If this argument is accepted, the productions, markets and job opportunities in Malaysia are to be increased, which will lead to a higher GDP per capita. Furthermore, the technology transfer enjoyed by the local producers due to the collaboration and strong partnership between immigrant entrepreneurs and local firms may have a positive impact on the local firms’ productivity and performance. In addition, local consumers enjoy a wide range of products which are unavailable and viewed as luxurious before, thus influencing their consumer lifestyle. In 2008, more agri-food products such as processed food, dairy products, beverages and tobacco and consumer products such as skin care items, herbicides and apparel are imported mainly from Indonesia (20.92%), Thailand (11.09%) and India (9.18%) to meet the consumer demands.³¹

If Malaysian government provides better access to commerce opportunities for these low-skilled immigrant labour, as well as collaboration with local organizations and businesses, these will not only result in increased trade volumes, it will also accelerate

³¹ See: “What is The Market Size, 2010”, Available at: <http://www.mifb.com.my/2010/english-fact-sheet>

higher economic growth, greater economic development and create the potential capacity to reduce economic inequality for both the host and home country. The partnership agreement on migrant labour among the Malaysian Trade Union Congress (MTUC), the Indonesian Trade Union Congress (ITUC/KSPI), the Bangladesh Mukto Sramik federation (BMSF), the Hind Mazdoor Sabha (HMS), the Indian National Trade Union Congress (INTUC), the Nepal trade Union Congress (NTUC), the General Federation of Nepalese Trade Unions (Gefont), the Pakistan National Federation of Trade Unions (PNFTU), the Trade Union Congress of the Philippines (TUCP) and the Vietnam General Confederation of Labour (VGCL) is one of the various collective efforts to improve the bilateral cooperation in Southeast Asia and to address emergent issues concerning the rights of migrant workers (MTUC Conference on Migrant Workers, 2005).

The findings have also demonstrated that even though most immigrants in the present study share similar cultures and thus enjoy similar consumption patterns with many Malaysians, immigrants still have a demand for goods produced in their respective home countries due to emotional attachments. Immigrants have displayed a strong home consumption bias, particularly for consumer imports, which have increased significantly by 9%. This signifies that their purchasing power is sufficient enough to accommodate their desired demands. At present, even though Malaysia has doubled its exports of food product over the last ten years, Malaysia is still a net importer of processed food, with an annual import in excess of RM15 billion. The annual average growth rate of 20% for imported food products is anticipated to be continued for the next five years (Food Industry in Malaysia, 2009).³² Evidently, the presence of immigration has contributed significantly to the upward trend for imports of consumer products. This increased consumption opens up more opportunity to have more trade channels. Malaysian companies need to develop marketing and production strategies to meet various demands in different markets. There are golden opportunities for every agent involved in reaping immense profits and economic gains associated with it.

³² See: http://www.foodbizmalaysia.com/IndProf/MFBD/MFBD_2009_IP01.pdf

In conclusions, this study provides empirical evidence for the important role immigration plays between the home countries of the immigrants and Malaysia, as the host country, which reinforces the findings of previous empirical research. The obtained results are consistent with the theories, providing additional proof against merely a spurious relationship between trade and immigration. The low-skilled immigrants manage successfully to develop and maintain the commercial link with their countries of origin, utilize and exploit their superior knowledge of their home countries to stimulate bilateral trade, and generate more incomes and employments via the export effect. As trade and immigration are complements, a greater liberalization of migration and the better integration of immigrants are perhaps the next steps to be considered in considering the realities of labour force in Malaysia.

5.2.2 Macroeconomic Determinants of Remittances in Malaysia

After discussing and empirically testing the impact of the immigrants on trade between Malaysia and the home countries of the immigrants, this section presents and discusses the findings on the remittances out flowing into the immigrants' home countries. Early theories postulated that the economic and social integration of immigration in the host countries will result in lesser ties and connections with their home countries. Nevertheless, globalization and technological innovations have reduced the transport and communication barriers (Castles, 2002: 1151), which enable immigrants to maintain strong relationships with families and relatives remaining at home. As a result, the amount of remittance flow is increased at an astonishing pace, drawing attention from many politicians, academics and economists. Remittances are the second biggest foreign transfers to developing countries, thus, given their significance as a potential engine of development; be it in economic, social and cultural, many have considered the understanding of its behavioural dynamics as imperative (Migration and Remittances Factbook, 2011).³³

³³ See: <http://siteresources.worldbank.org/INTLAC/Resources/Factbook2011-Ebook.pdf>

Chapter 3 provides the study of macroeconomic determinants of Indonesian labour's remittances in the context of the Malaysian case. The study is motivated by the existence of the large Indonesian Diaspora in Malaysia, and statistics shows that there are currently more than one million documented Indonesian labour. In attempting to empirically test the determining factors of remittances, using the ordinary least square (OLS) method, the remittance variable is regressed against a set of explanatory variables. It is found that altruism and portfolio investment are the main motives for remittances sent by Indonesian labour. Furthermore, results suggest that the immigration stock, the incomes of the host and home countries, the Malaysian interest rate, exchange rate and the Asian crisis are instrumental in inducing either higher or lower amount of remittances to Indonesia. In contrast, the inflation rates, the Indonesian interest rate and political stability are not significance in affecting the Indonesian remittance flows. Interestingly, contrary to the theory prediction, political instability in Indonesia seems not to have any statistically significant influence on the remittance behaviour. Despite the political turmoil and riots Indonesia experienced during the period in question, the flow of remittances remained steady throughout the time, which truly manifests the notion that Indonesian workers were, and still are altruistic in their remittance decisions.

These findings are consistent with many previous empirical studies, therefore, any economic and socio-political policies recommendation are validly derived. The details of the empirical results have been presented and examined in Chapter 3. Table 5.2 reproduces the results with additional explanations.

Table 5.2 Summary of the empirical results for macroeconomic determinants of remittance of Indonesian labour in Malaysia

VARIABLES	MODEL 1	Accordance expected sign	MODEL 2	Accordance expected sign
STOCK IMMI	0.56	Yes	0.52	Yes
GDP MSIA	7.14	Yes	3.33*	Yes
GDP INDO	-3.2	Yes	-3.17	Yes
INT MSIA	-0.47	Yes	-0.38	Yes
EX RATE	-0.82*	Yes	-1.11	Yes
ASIAN CRISIS			-1.45	No

(*) not significant

In general, remittances flow is positively associated with key macroeconomic variables such as the Indonesian stock and the Malaysian income, while being negatively related to the Indonesian income, the Malaysian interest rate, exchange rate and the Asian Financial Crisis.

Looking at Table 5.2, the host country's growth is the prime driver of remittances volumes. In other words, the larger flow of remittance due to favourable economic situation in Malaysia indicates that more Indonesian labour are being employed, and with a higher income earned, they manage to remit more to their families back home. The result also suggests that the growth of the Malaysian employment rate is relatively high, exceeding the growth of the labour force. Higher employment opportunities also reflect a high level of economic activity in the country. Since Indonesian labour are mostly employed in the service, domestic service, rural agriculture, manufacturing and construction sectors to alleviate the labour shortage, this indicates that these sectors enjoy higher growth rate and profit margins. This also implies that economic growth is positively reflected in the lifestyle of Malaysians as well; which results in higher demands for the service sector and, in turn paves the way for an increased demand for immigrant labour.

Another implication is that the immigrants' rapid process of integration into the Malaysian society due to their common languages, cultures, religions and ethnicity provides a better access to employments. This also highlights the existence of growing transnational social networks which help facilitate Indonesian labour into the labour market. Furthermore, it could be assumed that since immigrants are getting less wages but manage to remit more as the wages in Malaysia are distinctly higher than in Indonesia, which could be the strongest pull factor that leads migration.

The results also help to infer that if there is a contraction in income, the migrants' consumptions and savings will fall so as to maintain the sent remittance volumes, as Figure 3.4 (in Chapter 3) shows the increasing amounts of remittances over time regardless of the business cycles in Malaysia, except for the 1997 financial crisis.

Another influential variable which positively affects remittance flow is the migration stock. In theory, the immigration status and the level of human capital play prominent role in remittance pattern. Temporary migration of low-skilled workers is hypothetically generating higher remittance volumes than permanent migration of high-skilled labour (Page and Plaza, 2006: 260). This is evidently the case in this study, as the majority of Indonesian labour are working temporarily and are low-skilled workers. The result is in line with the prior expectation that the rate of remittance growth is 50% of the rate of the immigration stock

Referring to Table 5.2 above, it can be seen that a negative shock in the home country's income generates a higher remittance; approximately increase by 32% if the Indonesia GDP falls by 10%. The result implies that higher amounts of remittance are sent with the intention of maintaining the same level of utility for the families left behind. Given that the economic situations in Malaysia and Indonesia have positive and negative impacts on remittance flows respectively, these findings indicate that remittance is used for consumption smoothing and establish the fact that one of the motives for sending remittance is 'altruism'. However, the remittance sent for consumption smoothing purpose may have a negative impact on the home country's development and economic growth due to the moral hazard and asymmetric information that encourage dependency (Diaz-Briquets, 1991), as several studies provide evidence for this, such as Dandler and Medeiros's (1988) study on Bolivia, and both Ferán and Pessar's (1990) and Amuedo-Dorantes and Pozo's (2006) analysis on the Dominican Republic. Nevertheless, in the long-run remittances may affect economic growth through several channels, such as a heightened aggregate consumption, financial development, human capital development and better healthcare as theorized by endogenous growth theories (Garcia-Fuentes, 2009); as well as having a direct impact on the alleviation of poverty and unemployment rates (Jongwanich, 2007). Since the results in this study evidence altruistic remittance behaviour displayed by the Indonesian labour towards families and close relative at home, this can generate an indirect impact on poverty alleviation and human development, as the remittances helps the families back home to have a better life

including giving access to education. Hence, to enhance the positive impact, directly or indirectly, the Indonesian government should design positive economic, political and social development policies.

The findings in this study also show that remittance is also not responsive to the rate of return for financial assets in Indonesia, given the significance of the Malaysian interest rate variable and the insignificance of the Indonesian interest rate. If it is accepted that this is the case with the Indonesian remitters in Malaysia, it could be argued that remittances are primarily motivated by altruistic behaviour as discussed above, and not utilized for capital development and business investment purposes in Indonesia.

However, probing deeper into relevant issues also yields other pictures, Indonesian remitters may prefer to send remittances through unofficial channels not only due to the underdeveloped Indonesian financial sector, the high costs and risks involved, the lesser degree of openness of the financial border and the high corruption, but also due to different exchange rates in official channels such as banks as compared to the higher rates in the secondary or shadow economy. In 2005, on a scale from 10 (highly clean) to 0 (highly corrupted), out of 158 countries ranked, Indonesia was placed as the 137th worst country in the Corruption Perception Index (CPI), with a score of 2.2 out of 10, while Malaysia was ranked at 39th with the score of 5.1.³⁴ In 2010, with a score of 2.8, Indonesia was ranked at 110th out of 178 countries, while Malaysia was at 56th with a score of 4.4.³⁵ As the evidence shows, Indonesia demonstrates more corruption than Malaysia. Remittance is vulnerable to the corrupt remittance service providers and corrupted government officials that exhibit rent-seeking behaviour in the form of excess taxes or duties, thus unofficial channels of remittance are preferable in order to avoid taxes, commission and fees (Yujuico, 2009). Since there are an estimated two million undocumented Indonesian labour in Malaysia, sending remittance through unofficial channels is a necessity due to its simplicity and lack of transparency as they do not have bank accounts.

³⁴ See: http://www.nationmaster.com/graph/gov_cor-government-corruption#definition

³⁵ See: http://www.transparency.org/policy_research/surveys_indices/cpi

It should also be stated that the remitters may prefer to save it in Malaysia due to her political and economic stability in comparison to Indonesia, as discussed in section 3.5.3.5. The volatility of the Indonesian Rupiah is an additional factor in influencing the remittance behaviour. The data demonstrates that the Malaysian Ringgit is far more stable in the foreign exchange market, and evidently Indonesian labour favour holding their saved remittance in the form of the Ringgit.

The empirical evidence presented in this study further demonstrates the importance of the interest rate in Malaysia as one of the macroeconomic determinants of remittance, where the portfolio investment motive is also evidently behind the remittance transfer as remittance falls when the Malaysian interest rate increases. The finding also implies that there are possible wide range of policies and banking services to absorb the immigrants' savings in Malaysia. Moreover, the findings that Indonesian labour is responsive toward the financial incentive in Malaysia but not in Indonesia implies that they have a higher degree of confidence in the Malaysian banking system and other financial institutions. Even though the Indonesian banks are the most profitable in the region (Laeven, 2005: 17), the Malaysian banking sector is clearly winning the trust of these immigrants due to its secure and efficient system. Thus, there is a scope for improvement in the Indonesian government's role in managing the remittance management system and for the banking system in both countries.

Since remittance is a form of money outflow, Malaysian government should construct a policy to promote a higher amount of savings by Indonesian labour in Malaysia. The access to banking services hence should be improved to make it more feasible and attainable. Lowering the costs for opening and maintaining saving accounts will encourage immigrants to put more of their savings into Malaysian banks. The mainstream banks and financial institutions need to advertise and educate migrant labour on the Malaysian banking systems, credit and products that best meet their specific needs and enable them to save and invest for their future. In addition, the banking policy should aim at providing security and a convenience of access to financial services in order to attract a higher participation in this market segment. With such supports, not only will the demand

for the banking system by immigrants will, more undocumented immigrants will become highly motivated to legalise their status, making it easier to control and reduce any associated social, economic or political problems resulting from their presence. Therefore, public and private institutions must work together to advance the development of the banking and financial markets that present high potential demands and further growth by involving immigrant financial inclusion.

Even though global remittance volumes are resilient to global recession, the evidence proves that this was not the case in Malaysia. When the Asian Financial Crisis occurred in 1997, among the hardest-hit countries were Indonesia and Malaysia. A financial crisis is without a doubt the cause of higher unemployment rates at national and sector levels. To reiterate, many Indonesian labour in Malaysia are employed in the industries that are susceptible to the crisis, hence the collapsed demand and downward wage pressure lead to rising retrenchments and reduced remittances. Moreover, being of a young age and being less-skilled make them the most vulnerable class of labour, and losing jobs either compels them to return home or to involve in irregular activities in the black economy, born out of their desire to stay and their reluctance to face even higher home unemployment prospects. Consequently, this may lead to overstay visas and illegal immigration. Undocumented migrant labour are generally perceived to bring more harms than benefits to both sides, including bringing higher government expenditure. However, until the data is available, it cannot be assumed that the above hypothesis is true. A further explanation of remittance reduction due to the financial crisis is the numerous monetary measures taken by Malaysian government in controlling and preventing the financial outflows, including remittance flows (Sundaram, 2006: 495).

The empirical results also demonstrate that exchange rate variable becomes significant only after the financial crisis dummy is included. Apparently, the exchange rate's volatility may not play a substantial role in influencing the Indonesian remitters' decision to remit in time of economic prosperity, further supporting the hypothesis that remittances are motivated by altruism. On the other hand, the inclusion of the exchange rate variable reveals that the appreciation of real exchange rate results in less remittance

being sent home when the Rupiah's value becomes stronger, reflecting the occurrence of the wealth effect taking place. In other words, the exchange rate depreciation generates incentives to increase the amount of remittance sent to Indonesia to offset the decrease in the purchasing power of the receivers, thus the remittance behaviour is consistent with the portfolio investment motive. These awareness of and the interest in the movement of foreign exchange enables the remitters to take advantage of the situation in order to maximize their benefits. Clearly, Indonesian immigrants earn higher real incomes in comparison to before in the situation where the Rupiah is devalued. Thus, due to the better state of the Indonesian immigrants' well-beings, they are able to remit more to be invested including real estates and human capital. This, in turn, gives rise to the investment multiplier effect which leads to higher productions and outputs and results in additional employment being created in Indonesia. Future studies should further examine the correlation between remittance and economic growth in the home countries.

Moreover, as the flow of remittance is significant to Indonesia, the Indonesian government needs to be aware that different macroeconomic and exchange rate policies may have unintended consequences on remittance. For instance, irresponsible macroeconomic policies as well as exchange rate restrictions and misalignments may result in less remittance being sent home or encourage the remittance flow through unofficial channels, as documented in El-Sakka and McNabb's (1999) study on Egypt and Akkoyunlu's (2010) study on Turkey. Therefore, sound macroeconomic and exchange rate policies are necessary for the sustainable inflow of remittance to Indonesia.

Due to its massive size and high growth rate, remittances present huge business opportunities and technological advances in both Malaysia and Indonesia. Remittance transactions have become innovative and competitive areas for commercial banks, money transfer service firms, postal organisations and financial institutions to provide multicurrency services. Currently, the leverage mobile technologies have been adopted into the global remittances space due to their ubiquitousness, lower costs, faster speed and relative ease of use (Srinivasan and Deshpanda, 2010: 3).³⁶ Furthermore, mobile

³⁶ See: <http://www.infosys.com/FINsights/Documents/pdf/issue7/mobile-money-transfers.pdf>

money transfer does not require a bank account for remittance transactions. This new technology development offers lucrative markets for all market players. Thus, cooperations and collaborations from various partners are needed for remittance business advancement, particularly in tackling the issues such as the standard technology platform for all mobile devices, network coverage, security risks and appropriate regulatory laws. Given the fast and growing numbers of Indonesian migrants and mobile phone devices, the mobile phone remittance is anticipated to be the most preferred channel (International Finance Corporation, 2010).³⁷ If the banking system in Malaysia is able to take full advantage of capitalizing on mobile technology by tailoring their objectives, concepts, strategies and options towards its implementation, the remittance businesses will become a great vehicle for national development. Also, there is a scope for partnership possibilities between the major service providers in Malaysia, Telekom Malaysia and Indonesian's major operators, Bakrie telecom and PT Telkom for the development of mobile phone remittance.

In conclusion, the findings in Chapter 3 are consistent with the theories, are in line with the previous empirical studies and provide a better understanding of the macroeconomic determinants of remittance flows from Malaysia to Indonesia by Indonesian migrant labourers. The implementation of the Malaysia- Indonesia remittance Corridor is likely to further strengthen the strong historical relationship between Malaysia and Indonesia. With further coherent policies and partnership between these countries on improving the remittances management system, every market player will reap substantial benefits.

5.2.3 Aggregate Unemployment and Immigration in Malaysia

After discussing and empirically testing the macroeconomic determinants of Indonesian labour's remittance in Malaysia, this section presents and analyses the findings on the impact of immigration on Malaysia's unemployment rate. Mass immigration arrived to

³⁷ See:

[http://www.ifc.org/ifcext/eastasia.nsf/AttachmentsByTitle/Mobile_banking_report/\\$FILE/Mobile+Banking+Final+Report.pdf](http://www.ifc.org/ifcext/eastasia.nsf/AttachmentsByTitle/Mobile_banking_report/$FILE/Mobile+Banking+Final+Report.pdf)

Malaysia particularly from its neighbouring countries has raised many fears notably on the negative impact of labour market outcomes. Many studies related to other migrant attracting countries have supported this fear on the rationale that immigrants tend to substitute the natives in employment and lower the wage rate. However, numerous empirical researches, as mentioned in Chapter 4, have established that these fears are unfounded due to, among other, the job-creation effect of migration. Immigrants have a tendency to complement natives, generate higher demand through their own demand, expand local industries, and increase the overall national welfare.

Chapter 4 has provided empirical evidence on this subject in the context of the Malaysian case. Using the VAR estimation to uncover the dynamic relationship among immigration, aggregate unemployment and real GDP per capita, the major findings include immigrants affect unemployment rate negatively in the short-run, while affect positively in the long-run. Thus, the key conclusions consist of the fact that immigrants are indeed complement the native labour and generate the demand-side effect, as outlined in the theory.

The details of the empirical results in relation to the Malaysian case have been presented and discussed in Chapter 4, which includes Vector Autoregression (VAR) estimation, causality tests, forecast error variance decomposition (FEVD) and impulse response analysis (IRA). As discussed extensively in chapter 4, many factors are believed to contribute to these results. A reduction of the aggregate unemployment rate and rising economic growth in the long run by the presence of immigration reflect the smooth adjustment processes in both the labour and product markets. It could be concluded that the Malaysian economy is flexible and competitive enough to the effects of immigration shock, and to absorb their arrivals without incurring a large cost to the economy in general. Table 5.3 provides the summary of the results.

Table 5.3 Summary of the empirical results for impact of immigration on unemployment rate

METHOD	RESULT
VAR	Unemployment rate depends heavily on Past immigration and past GDP per capita.
	Immigration depends heavily on the unemployment

	GDP per capita depends heavily on a combination of its own history and both unemployment rate and immigration.
Causality results	Both GDP per capita and immigration Granger-cause unemployment
	Unemployment rate Granger-cause immigration.
	Both immigration and unemployment Granger-cause GDP per capita.
Forecast Error Variance Decomposition	Unemployment is significantly explained by the shocks in the immigration and GDP per capita.
	Immigration is significantly explained by the shock in unemployment, but not by GDP per capita.
	GDP per capita is significantly explained by the shock in both unemployment and immigration.
Impulse Response Analysis	The immigration shock increases the rate of unemployment from 0.01% on impact to a peak of 0.03% after two period, and then declines and returns to a permanent 0% and negative beyond six periods
	The effect of the immigration shock is to decrease the GDP by 0.01% from the initial to second period, and rise to approximately 0.04% after fourth period and beyond.

The findings in this study show that it only takes two years before the full job-creation impact of immigration takes place in Malaysia. In the short-run, immigrants affect native employment negatively, as they substitute the local labour in the Malaysian economy. In the long run, the job-creation effect of immigration enhances economic growth and development.

To reiterate, Malaysia has pursued aggressive economic growth policies such as that of the Second Malaysia Plan (1971), which focuses on the urban and industrial development, leading to the emergence of industrial zones in the Klang Valley, Pasir Gudang and Penang (Navamukundan, 2002: 115). Due to a small population, these rapid expansions of economy, particularly the manufacturing and construction industries, have created shortage of labour at all levels in Malaysia. Consequently, Malaysia has turned to more labour importation from neighbouring countries to meet the increasing demand in the labour market. Companies with a minimum paid up capital of RM100,000 and a total sales of RM2 million are allowed to employ immigrant labour on the ratio of one migrant worker to one native worker (Economic Report 2004/2005,2005).³⁸ As a result, there

³⁸ See: http://apmrn.anu.edu.au/regional_members/malaysia.html

were almost 2 million documented migrant worker employed in Malaysia by the year 2008.

Furthermore, this accelerated economic development has resulted in substantial rural-to-urban immigration, especially in the east coast states of Kelantan, Terengganu and Pahang, as only 20.4% of the 6.1 million population were urban in 1950, rising astonishingly at 65.1% of the 25.3 million population in 2005 (Jali et al., 2006). Better economic opportunities in the cities and the low quality of life in rural areas are among the many contributing factors, leaving many traditional industries such as plantations, forestry and agriculture experiencing acute labour shortages. Owing to these labour shortages, 300,000 hectares of rubber holdings are estimated to be untapped, while 300,000 hectares of palm oil are not thoroughly harvested (Third National Agriculture Policy (1998-2010), 1999).³⁹ Also, the literacy rate among Malaysian women was 95% in 2008⁴⁰, thus the rising status of Malaysian women in terms of education has created a demand for migrant women to perform household tasks such as domestic chores as the new generation of Malaysian women prefer to work in high-paying jobs (Skeldon, 1999).⁴¹ Immigrants, thus, are highly demanded to sustain these industries. Moreover, issues such as low wage levels and the harsh conditions of employments offered in these industries have further reinforced the need to employ immigrants as local labour are less willing to work in such conditions. Examples include the Philippines maids who work for ten hours at a monthly salary of RM540 and are entitled to two rest days per month; and Indonesian maids who earn between RM350-RM400 and work 16 to 18 hours per day without any rest days and no limit to their working days (Kaur, 2004). Together with the relatively low and stable Malaysian unemployment rate of around 3.5% annually, all factors discussed above have encouraged a massive inflow of labour, particularly from Indonesia, Thailand and the Philippines.

³⁹ See: [http://www.pmo.gov.my/dokumenattached/Dasar/29THIRD_NATIONAL_AGRICULTURAL_POLICY_\(1998_-_2010\)_-_EXECUTIVE_SUMMARY.pdf](http://www.pmo.gov.my/dokumenattached/Dasar/29THIRD_NATIONAL_AGRICULTURAL_POLICY_(1998_-_2010)_-_EXECUTIVE_SUMMARY.pdf)

⁴⁰ See: http://www.unicef.org/infobycountry/malaysia_statistics.html

⁴¹ See: <http://www.unescap.org/esid/gad/Publication/DiscussionPapers/02/series2.pdf>

As employers in Malaysia are profit-oriented and cost-conscious, they prefer to employ foreign labour rather than native labour, not only because of their cheaper cost, but also because they are more flexible and hard working. In addition, the presence of large pools of documented and undocumented immigrant labour have given the employers options to choose from, therefore, creating tough job competition between migrant and native workers. These employers' preference have thus generated higher level of native unemployment, as the findings in this study demonstrate that the unemployment rate increased by 0.02% within the first two years. Evidently, immigrant labour and native workers are substitutes in the short run. Due to many criticisms that Malaysian workers were being discriminated against immigrant labour in the Malaysian labour market, the new regulation on employing foreign labour was introduced in 2004. Among its stipulations include: the base of obtaining approval for employing foreign labour is to be on the need-only basis and the advertisement of job openings must be submitted to major local newspapers for at least two consecutive days to allow Malaysian labour to become aware of it (Kaur, 2004).

As migration is perceived as temporary in Malaysia, these immigrants' job searches are characterized by aggressive efforts since their main objective is to earn as much money as possible within a short period of time. Temporary migration is rooted historically from the 'contract coolie' system introduced by British colonialism during the 19th century (Hugo, 2004: 30-32). Therefore, they are prepared to work long hours with lower pays, and thus drive many native labour out of the labour market in the short-term. However, as Malaysian economy's growth is continuous and with the structural change being completed, it will then be possible to see that immigrant workers will not be considered as creating a 'crowding out effect' but rather complementarity. In recent years, this complementarity can be seen, as the immigrant workers mostly find employment in areas where Malaysian workers would not consider working.

Upon arrival, immigrants are at a disadvantage in comparison to the native labour. The income gap and the employment status differential, however, are diminished through time as demonstrated in Chapter 4. One of the many possible reasons is that social

integration enhances the economic adjustment process of these immigrants. The results suggest that, unlike in the US and some parts of Europe, employers and firms in Malaysia are less prejudiced and discriminatory in hiring immigrant (see, for examples, Bertrand and Mullainathan, 2004; Paterson, *et al.*, 2008; Wrench, 2007).

Other reason includes the weak labour unions in Malaysia contributing to higher portion of immigrants to be employed as they fails to function effectively in protecting the interests of native labour (Chew and Chew, 2006: 10). A high turnover rate of local labour is further resulted from their refusal to work in 3D jobs as opposed to immigrants. The situation is worsened with the local firms being geared towards maximizing profit, justifying the use of the cheapest available resources. Therefore, the government's proposed minimum wages and repeated calls to halt the importation of migrant labour by various activists with the objective of the nationalization of the labour market may lead to the incapability of local firms to handle the rising costs of engaging local labour as a replacement. In 2010, the Malaysian Trade Union Congress insisted on the introduction of a minimum wage of RM900, in addition to the cost of living allowance of RM300 to decrease the dependency upon migrant labour and to reduce native unemployment (Devadason, 2011).⁴² If the minimum wage is legally imposed, an increase in operation cost will undoubtedly result in Malaysia losing its comparative advantage, attracting less foreign direct investment (FDI) and leading to relocating by the foreign-funded firms to countries with cheaper labour cost such as China and Vietnam.

Besides mirroring the systematic adjustments where the both aggregate supply and aggregate demand respond dynamically, the result implies the importance of the role of powerful social capitals in the process of integration. New arrivals of immigrants face challenges in varied aspects of society, culture and economy. However, the social adjustment process appears to be much easier in this present study since the majority of these immigrants share similar languages, and most of them come from the same ethnic, racial and religious backgrounds as many of the native Malaysians. For example, Indonesians, Bangladeshis, Philipians and Thais make up the largest numbers of

⁴² See: <http://www.eastasiaforum.org/2011/01/11/policy-chaos-over-migrant-workers-in-malaysia/>

immigrants in Malaysia. A majority of them are Muslims and Buddhists; speak the Malay and Mandarin languages, as well as share roots and historical cultures with the Malaysian society. These factors facilitate the social integration of immigration, making the process of social integration to be less painful in comparison to their compatriots who migrate to much more culturally, racially and religiously diverse societies.

Another factor that speeds up the adjustment process of the immigrant economic integration in Malaysia is the ethnic networks which are responsible for distributing knowledge and information, providing contacts and help, and offering emotional and psychological support to the new migrants. Throughout its history, Malaysia has relied greatly on immigrants to perform economic activities. During the British regime, immigrants from China, Indonesia and India were brought in to supply the labour needed for tin, rubber and other industries (Hoong, 1984: 45). As a result, their settlements have paved the way to recent migration from Thailand, Bangladesh and Indonesia in particular, which has been driven by the increased Malaysian labour demand due to the economic expansion policies. The existing ethnic networks are vital in lowering the migration costs and raising the employment prospects in Malaysia. Strong connections to established ethnic community and the settlement close to relatives and friends help facilitate the socio-economic integration of immigrants; and thus further enhance their access to a variety of new economic opportunities. Their earning prospect is heightened due to the unique historical connections that help migrants enter the labour market and acquire the necessary and needed skills.

It could be argued that ethnic networks also provide essential physical and intellectual resources for ethnic entrepreneurs to venture into new businesses (Menzies *et al.*, 2000: 5). The pooled capital, business mentoring and business plan assistance are the examples of these resources. Also, strong ties and links with the countries of origin indicate the existence of formal or informal ethnic networks, which can be further exploited to enhance the business opportunities internationally. The presence of Chinese ethnic entrepreneurs, for instance, has made significant contributions to innovations and job creations in Malaysia, while maintaining the strong tie with their mainland. They have

also successfully expanding their businesses with assistance from their ethnic enclaves thus generating higher GDP per capita. In 2009 alone, the FDI from China to Malaysia was valued at USD1.7 billion, while the Malaysian outward direct investment to China was USD 2.8 billion (IMF).⁴³ Furthermore, these ethnic entrepreneurs tend to recruit labour that share the same ethnic background due to various reasons such as being less costly, mutual trust, an efficient recruitment process, versatility and their flexible nature. The use of co-ethnic employment, therefore, generates higher employment opportunities, reduces unemployment and social problems and prevents business failure (Frank *et al.*, 2004: 6).

The above factors justify the high labour market participation of immigrants in Malaysia, as shown in Chapter 5. Initially, their labour market participation is less than their product market participation owing to factors such as linguistic and informational barriers. Once they are fully adjusted, their participation in the product market as consumers dominate, thus increasing the GDP per capita and lessening the aggregate unemployment. In other words, the presence of immigration creates both labour supply and labour demand effects. Besides supplying their labour and earning income, they consume and spend their earnings on goods and services in Malaysia, which certainly include products they are involved in producing. The higher demands for goods and services in Malaysia, in turn, will boost the manufacturing, agriculture and services industries, generating more local and foreign investments as well as creating more jobs.

Considering employment statistics can help to reflect on the unemployment consequences of migration. The total employment in 1990 was recorded at 6.7 million, while in 2000, it was increased to 9.3 million individuals, and by January 2011, 11.2 million were employed (Department of Statistic Malaysia, Bank Negara Malaysia). 1.6 million new jobs were reported to be created during the period of 2001-2005, while 1.1 million were reported between 2006-2010. Sectors which employed the most immigrant labour were manufacturing and services, with 3.3 million and 6.3 million respectively in 2010 (Economic Report, 2010/2011). Further contributing factors to the growth of these

⁴³ See: <http://cds.imf.org/>

sectors were the application of the New Economic Policy (NEP) and the National Development Policy (NDP) which focused on the import-substitution development policy and the export-oriented industrialization policy.

These import-substitution and export-oriented industries are heavily financed by FDI. During the 1960s, the agricultural sector was predominantly invested by FDI, however, in 1970s, foreign investors shifted their attention to the manufacturing industry, motivated by the incentives provided by the Malaysian government, such as setting up the Free Trade Zones (FTZ) in five states (Kedah, Selangor, Penang, Johor and Kelantan)⁴⁴, offering tax incentives, tariff protection, abatements for exports and Research and Development training.⁴⁵ In 1980, a total of 40,351 employments were created by FDI, while this was 171,646 in 1990 (Yusoff *et al.*, 2000: 22). However, the total employment-related FDI created in 2008 was 101,173 jobs (MIDA, 2008: 15)⁴⁶, and worsened in 2009 with only 64, 330 jobs (MIDA, 2009: 2).⁴⁷ These staggering falls in job-related FDI in 2008 and 2009 are largely due to the global financial and economic crisis. If the proposed minimum wage of RM900 were to be applied in Malaysia, there is no doubt that the number of job-related FDI will be much worse in the future as Malaysia will no longer be an attractive destination for FDI due to pressure on wages that leads to increasing labour costs.

Since the cost of labour in the case of immigrants is cheaper, it will bring down the costs for production and produce higher profits for local firms and producers. Consumers, on the other hand, are able to buy goods at lower prices, thus increasing their standard of living. However, there is a danger of the increasing rate of inflation due to the higher demand generated by both immigrants and the local people. If it is not checked, it will

⁴⁴ See: <http://info.worldbank.org/etools/docs/library/251665/Yeow%20Teck%20Chai%20and%20Ooi%20Chooi%20Im%20-%20The%20Development%20of%20Free%20Industrial%20Zones%96The%20Malaysian%20Experience.pdf>

⁴⁵ See: http://www.wtec.org/loyola/em/04_07.htm

⁴⁶ See: http://www.mida.gov.my/en_v2/uploads/Publications_pdf/PerformanceReport2008/PerformanceReport2008.pdf

⁴⁷ See: http://www.miti.gov.my/cms/genArticlePdf?id=com.tms.cms.article.Article_998bbf8d-c0a81573-51705170-979ffb3

lead to price and political instability, inefficient resource allocation, less investment and economic growth in the long run.

In conclusion, the findings in Chapter 4 are consistent with the theories, in line with the existing empirical research and provide a better understanding of the impact of immigration on the unemployment rate in Malaysia. Addressing both issues of migration liberalization and migration integration will be the biggest challenge for Malaysian government and its institutions, as effective policies should be designed optimally to ensure a smooth market adjustment process.

5.3 EMPIRICAL AND THEORETICAL IMPLICATIONS OF THE RESEARCH

The rise in the manufacturing industry in Malaysia has produced larger demands for immigrant labour due to the continuous pursuance of economic development policies and the selective attitude of local labour in Malaysia. The increased industrialization of the Malaysian economy has witnessed the transformation from being initially a commodity exporter (for tin, rubber and palm oil) to becoming an exporter of manufactured goods (electronic components, electrical goods and appliances), as the share of secondary goods in total exports has increased from 40% to 80% of GDP from the mid-1970s to the end-1980s (Yusof and Bhattasali, 2008: 1). In addition to the expanding industrial base, the expanding informal sector has further created many service jobs, which has resulted in the rapid increase in labour demand, which exceeds the labour force's growth, leaving government with little optimal option other than to resort to having immigrants to do the lower paid, physically demanding and least desired jobs. Furthermore, given declining transportation costs and extensive existing transnational communities, immigrants from the neighbouring countries with lower economic development and progress, such as Indonesia, see migration as an opportunity for poverty escapism and higher income-earning opportunities in Malaysia.

The contribution of immigration to the Malaysian economy is significant, as demonstrated in Chapter 2 and 4, in creating economic dynamism. The mobility of labour among nations has expedited the desirable economic growth via opening more trade channels due to higher exports and imports demands, and through the job-creation effect of immigrants. With their growing income, immigrants are not only able to afford such imports of consumer goods to meet their preference needs, but they also manage to increase their savings in Malaysia and remit a huge part of their incomes to their families and relatives back home, as shown in Chapter 3. By playing both the roles of trade intermediaries and consumers themselves, the immigrants do not only generate more incomes and employments, but also help the economic relationships, political affinities and security ties between Malaysia and the countries of origin to continue to remain strong. The complementarity of immigrants and the native workers has thus diminished the groundless fear of immigrants as ‘job robbers’, and their smooth adjustment process of economic and social integration is also accelerated by the ethnic social networks and their cultural and religious similarities. Besides improving the new migrants’ employment possibilities, the powerful social networks are also accountable for enhancing the trade-creating effects of immigrants by lowering informal barriers.

The robust economic growth, therefore, is the centre of these interdependencies among immigrants, employment, trade and remittance. The growth rates in trade, migration and remittance have been catalyzed by the growth rate in the economy; its multiplier impact in turn affects favourably the development in both Malaysia and the sending countries. It is found that there is a positive relationship between immigration and bilateral trade flows, indicating that immigrants play a vital role in enhancing trade between Malaysia and the countries of origin. It is also found that the Indonesian workers’ remittances in Malaysia are positively affected by Malaysian economy, and are negatively affected by the Indonesian economy; implying the importance of the level of economic activities in both countries. Furthermore, it is found that in the long run, immigrants in Malaysia do not have an adverse impact on the labour market, signifying that the job-creation effect of immigration has taken place and results in further economic and employment growth in both the public and private sectors.

The existing array of theories and the mixed findings of empirical literature on the linkage between trade and immigration indicate that the issue is far from being conclusive. This study has provided empirical evidence in support of the gravity model which is derived from the General Equilibrium System, as opposed to the traditional trade theories such as Heckscher-Ohlin and Ricardian models, in explaining the linkage between immigration and trade in the Malaysian case, where immigrants and trade flows are found to complement, not substitute, one another. The findings of this study have contributed to major understandings in the trade creation impact of immigrants in Malaysia, the mechanisms involved and a variety of factors including product classification, trade agreements, lingual and cultural similarity and occupational groups.

For the study on macroeconomic determinants of remittances, the major findings have lent more support for the New Economic Model instead of the Neoclassical Model in predicting the remittance behaviour of Indonesian migrants in Malaysia. Remittance patterns are subject to, and influenced by, the strength of familial relationships and ties with the home countries, and are not confined to the individual migration behaviour. The findings of this study establishes the prevalence of the altruistic attitude and the portfolio motive among Indonesian migrant labour, and sheds new light on the role of key macroeconomic variables in determining the remittance flows.

The findings of the study on the impact of immigration on aggregate unemployment, on the other hand, yield to the predictions of the Segmented Labour Market Theory, where labour demands generated from the implementation of the Malaysian economic growth policy play a dominant role in inviting migration into Malaysia, and that immigrants and Malaysian native labour are complements in productions. Based on the General Equilibrium Framework, the demand effect of immigration is taken into account in studying the impact of immigration on the unemployment rate and the present findings offer a better understanding on how immigration tends to affect the economy and labour market in Malaysia.

5.4 POLICY RECOMMENDATIONS

The empirical studies in this study on the Malaysian case evidence the economic benefits from the presence of immigration; including greater gains from trade, lower aggregate unemployment in the long run and technology transfers between Malaysia and the immigrants' countries of origin. These findings clearly establish the significance of immigration as a valuable and indispensable resource in achieving the target of Vision 2020. Based on these findings, policy recommendations concerning the linkages between immigration and trade, remittances and unemployment are as follows:

5.4.1 Migration Integration

Malaysian government needs to allot more resources on better designing and implementing integration policies, instead of on ineffective security-based measures. Understanding and respecting cultural and religious differences are essential for social cohesion development, thus educating both immigrants and native people on these aspect is imperative. More programs on developing immigrants as active participants in society should be executed to further reduce racial and ethnic discriminations, xenophobia, hate crime and racism. This should be done in recognition of the contribution of immigrant communities for the economic growth of the country.

5.4.2 Migration and Labour Market

Immigration policies must be flexible and responsive to the changes in the labour market, provide incentives for employers to legally hire the foreign labour and offer labour protections to immigrant workers from being exploited by working in hazardous conditions with unjustly lower wages. The objectives of immigration policies and labour market policies must be in conjunction with the goals of Vision 2020: to achieve sustainable economic growth and enhance industrial competitiveness by augmenting technology, innovations, knowledge and skills.

5.4.3 Legal Migration

Flexible, economic, affordable and orderly legal migration channels should be created and promoted to ensure the foreign worker's safety and protections, as well as to combat human smuggling and trafficking, illegality and irregularity. Also, strong policy coordination between Malaysia and the immigrants' countries of origin should be established to maximize immigration's potential economic and social benefits.

5.4.4 Data Collection Systems on Migration

Designing a reliable data collection systems on migration is essential not only to provide relevant data for a better understanding of the migratory process and for formulating a sound policy response but also in measuring the economic and social impact of immigration in Malaysia. Therefore, further networking coordination is needed among the Ministry of Human Resources, the Immigration Department of Malaysia, the Department of Statistics Malaysia and institutional data collectors to collaborate on what data should be collected and what methods should be used to facilitate the systematic analysis of the social, demographic and economic impacts of immigration.

5.4.5 High-Skilled vs. Low-Skilled: Immigration Policy

In addition to the large contribution of low-skilled immigrants to the Malaysian economy, the demands for their labour will continue for the next decade thus it is unwise to adopt strict immigration law and policies. However, a maximum limit on the number of immigrants admitted should be established to minimize the negative impacts of their increasing population. On the other hand, the immigration policy should also provide better incentives to attract and retain high-skilled migrant labour as their contribution to growth and wealth are comparatively significant than the low-skilled migrant workers. Nevertheless, it is worth remembering that a deliberate policy may not be as effective as market forces and free-will in drawing higher number of high-skilled immigrants.

5.5 LIMITATIONS OF THE STUDY AND FUTURE RESEARCH

Similar to any study related to the immigration issues, the depth of this research is also gravely hampered by data limitation. Time series data is often scarce, thus the research's subjects is constrained to the available data. The efforts to collect data and information on immigration by Malaysian government and its institution were only begun since 1997, thus, the timing effect of immigration waves cannot be possibly investigated. Furthermore, if more and longer data series variables do become available, this research will be able to expand upon the issues argued in this research. It should also be stated that such secondary data based econometric studies can be expanded and supported by micro data collected through questionnaires, which can provide further insight into the issues discussed in this study. For example, such a study can help to determine the motives for remittance in a better manner than the inferences made from econometric studies, as the individual immigrant would directly state the motive through a questionnaire. Given these limitations, the following recommendations for future researches are discussed below in the respective topics.

5.5.1 Linkage between Immigration and Trade

Due to a lack of data, many essential areas in Malaysia immigration-trade link are unable to be investigated in great detail. Specifically, such data on trade barriers, the length of stays, the immigrants' levels of education and the immigration population according to states will provide more avenues in exploring the linkage. Furthermore, the subject of this study is the immigrants from ten countries, a majority of which are neighbouring countries. Other groups such as international students, ethnic entrepreneurs and visitors are also believed to have significant impacts on trade and they should be included in future studies to provide better understanding of the trade-immigration nexus in Malaysia. Future research could also look at the deeper issues of how the ethnic networks promote trade and how the information is transmitted precisely. Broader facets such as the linkage between immigration and trade policies, for example the export promotion policy and the import-substitution policy, are required to be examined to better understand the relation between trade and immigration. In addition, to provide a micro

aspect to the study, a survey-based analysis could be considered to reflect on the individual experience and preferences of the immigrants communities in relation to trade with their home country.

5.5.2 Macroeconomic Determinants of Remittances

The lack of data such as the remittance costs, the growth rate of immigrants' financial assets in the host and home country, and the black market premium hinders deeper examinations on the macroeconomic determinants of migrant remittance. It is also probable that higher remittances attract many Indonesian migrants to migrate, in which future research should also address this issue of a causal relationship. Furthermore, as it is complicated to clearly distinguish between motives, future research should also include other determinants that enable the capturing of other potential motives to remit. In addition, the study can be taken to the next stage to see the impact of remittances on the 'home country' with the objective of locating its economic and social impact, such as its impact on poverty alleviation.

5.5.3 Immigration and Aggregate Unemployment

Due to the lack of data, many essential areas in the Malaysian unemployment-immigration subject are prevented from being studied rigorously. Particularly, such data on wage rates, areas and male-or-female-based industries will provide more pathways in exploring the relationship. Future research could also look at the deeper issues of how the immigration policy introduced affects the influx of immigration, and subsequently the unemployment rate.

5.6 EPILOGUE

The research presented in this study is based on three essays each focusing on a particular dimension of the economic aspect of immigration; and hence each essay has a particular aim to fulfill. The first essay is conducted to examine the linkage between immigration and Malaysian trade flows, while the second essay is carried out to explore the

macroeconomic determinants of remittances of Indonesian labour in Malaysia, and the last essay analyses the impact of immigration on the aggregate unemployment in Malaysia.

As the preceding empirical chapters indicate, the valuable findings attained have answered the research questions, and hence this research should be considered as having fulfilled its aim and objectives.

APPENDIX A

SUMMARY OF INDONESIAN REMITTANCE MODEL'S OLS RESULTS

Variable/ Models	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Stock			0.090068					0.34376	0.27499
GDP M (pc)						16.5365	2.5408	16.8296***	19.6327***
GDP I (pc)	-6.4468***	-7.6806**	-7.3550***	-8.0426 **	-2.7076	-9.7466**	-8.4891 ***	-5.4673	-7.5536
MUP	-1.7332 **	-1.5961**	-1.4764***	-1.2882	-1.0869	-1.2436	-1.4874***		
Inflation					0.051361**			0.068549**	0.057722***
Interest M	-.41177***	-0.53963*	-0.5006***	-0.56505**		-.40479***	-0.56980**		-0.20596
Interest I									
Int Diff									
Ex. Rate				-0.38603					
Growth I	-0.059874					-0.15511			
Dummy	-2.7183**	-2.2795*	-2.1197**	-2.2870**	-2.4891**	-2.6798**	-2.1663**	-1.3740***	-1.2875***
Dum Pol									
GDP M									
GDP IND									
R-Squared	0.71809	0.68699	0.69110	0.70258	0.60930	0.79081	0.69057	0.73062	0.76563
R-Bar Squared	0.51672	0.53049	0.47046	0.49013	0.41395	0.58162	0.46955	0.53820	0.53126
F-Stat	P=0.064	P=0.036	P=0.084	P=0.075	P=0.080	P=0.065	P=0.085	P=0.055	P=0.088
DW Stat	2.3519	2.4321	2.3362	2.6527	2.2398	2.9252	2.4726	2.4450	2.8883
Serial Correlation	Fail to reject	Fail to reject	Fail to reject	Reject Null	Fail to reject	Reject Null	Fail to reject	Fail to reject	Reject Null
Functional Form	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject
Normality	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Reject Null
Hetero	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject

Note: (*), (**) and (***) Significant at 1%, 5% and 10%.

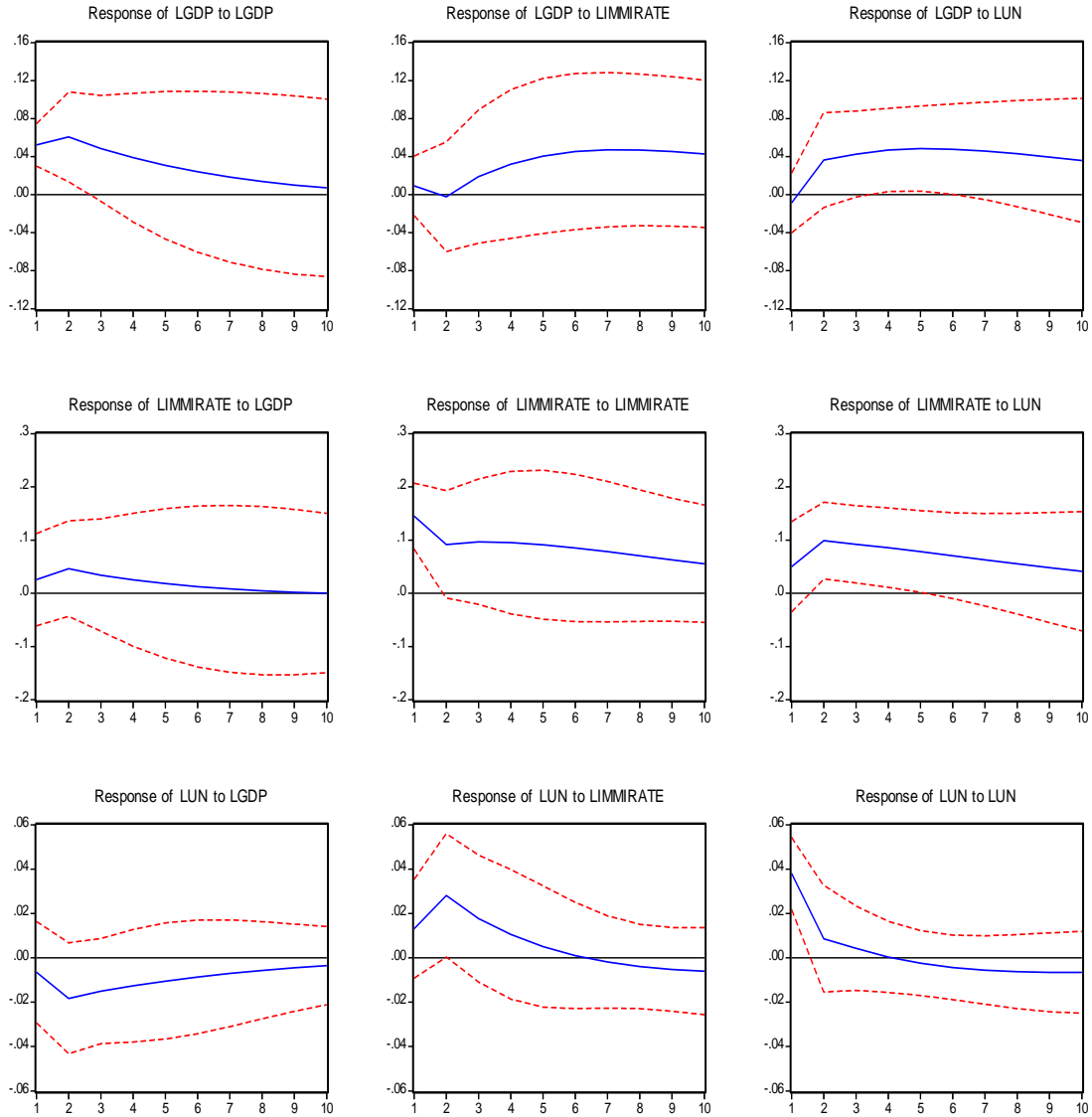
Variable/ Models	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
Stock	0.35511	0.33281						0.52422**	0.56113***
GDP M (pc)	17.5268***	16.4539***	17.9366***	12.9670	6.4657	0.58475	4.3505		
GDP I (pc)	-3.4353	-104.0789	-5.7094	-7.8884***	-6.4477	-146.6886	3.3750		
MUP				-1.0160	-1.2393	-1.6689***	-1.4649***		
Inflation I	0.063133***	0.069906**	0.078575**	.045812					
Interest M				-.38495	-0.55768**	-0.58137**		-0.3792***	-0.47114**
Interest I									
Int Different							-0.14349**		
Ex. Rate	0.93109			1.0890				-1.1129**	-0.81616
Growth I		1.0515				1.4755			
Dummy	-1.3963***	-1.0461	-1.7871**	-2.1671**	-2.0655***	-1.8074***	-1.7210***	-1.4521***	
Dum Pol									
GDP M								3.3320	7.1429***
GDP IND								-3.1674**	-3.1975***
R-Squared	0.74077	0.76618	0.64496	0.78111	0.70227	0.75842	0.70212	0.82541	0.71265
R-Bar Squared	0.48154	0.53237	0.46744	0.56222	0.40454	0.51685	0.48935	0.65083	0.50740
F-Stat	P=0.113	P=0.087	P=0.057	P=0.073	P=0.160	P=0.0951	P=0.076	P=0.040	P=0.068
DW Stat	2.811	2.2283	2.6768	2.9007	2.4567	2.0091	2.0062	2.6855	2.4265
Serial Correlation	Fail to reject	Fail to reject	Fail to reject	Reject Null	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject
Functional Form	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject
Normality	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject
Hetero	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject	Fail to reject

Note: (*), (**) and (***) Significant at 1%, 5% and 10%.

APPENDIX B

Impulse Response Result

Response to Generalized One S.D. Innovations ± 2 S.E.



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