ECONOMIC ANALYSIS ON FOREIGN WORKERS AND ECONOMIC GROWTH:
A PANEL EVIDENCE

BY

BEH LING SHEN
CHEE SHI WEN
CHONG SIEW YONG
JENSINE CHOW QI JIET
SHAM SOOK YIN

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end of result of our own work and that due acknowledgement has been given in the reference to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

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Name of Student	Student ID	Signature
1. BEH LING SHEN	14ABB06948	_____
2. CHEE SHI WEN	13ABB06313	_____
3. CHONG SIEW YONG	14ABB07341	_____
4. JENSINE CHOW QI JIET	14ABB06947	_____
5. SHAM SOOK YIN	14ABB07338	_____

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TABLE OF CONTENTS

LIST OF TABLE

LIST OF FIGURE

LIST OF APPENDICES

ABSTRACT

Industrialization has brought a lot of foreign workers into a country, and this situation is an unavoidable event. Hence, the inflow of foreign workers may help to fulfil unwanted job vacancies that rejected by native workers. However, influx of foreign workers is actually bringing a lot of impacts that will affect the country's economic growth. One of the issues to be discussed in the chapter is whether substitute or complementary relationship occur between foreign and native worker in the labour market.

This study aims to investigate the impact of foreign workers towards a country's economic growth. We also examine the optimal point for remittances. By using panel data ranging from 1995 to 2009, we investigate the impact occurred due to the inflow of foreign workers towards the economic growth. Based on the empirical analysis in our result by using the best fit Fixed Effect Model (FEM), we found that there is evidence of a statistically significant positive impact of foreign workers to the economic growth and they affect the economic growth in both short run and long run. Furthermore, the study finds that there is a substitute effect among foreign workers and local workers.

CHAPTER 1: INTRODUCTION

1.0   Research Background

Nowadays, international migration has become a global phenomenon. Most developed and developing countries are heavily relying on foreign workers to work in their countries and this has caused the higher rate of foreign worker mobility among the countries. Due to several aspects of limitation in the country's human resources, it caused the foreign worker is needed to solve the labour shortage problem. According to Sin Chew News in 20th May 2017, there are 14 million of undergraduate students still facing the problem of finding a job due to fastidious of jobs, they are only willing to work in a good and comfortable working environment. Therefore, this becomes one of the factors why our country needs to rely on foreign workers in certain aspects and sectors. Besides, according to Ministry of Human Resources- Richard Riot Anak Jaem, he disclosed that we have 180 million foreign workers which are 15% of the overall employment rate in our country. The foreign workers mainly work for 3D works which are dangerous, dirty and demeaning work in manufacturing, agriculture and industrial sector.

Foreign worker also called as migrant worker, is a person has authorized with legal documentation to work in a country that is outside his or her origin of country within a specific time period only. However, many of the foreign workers are working outside their own countries illegally. Some researchers said that each of the foreign workers has different skills and productivity level. They divided into skilled and unskilled foreign workers. Skilled foreign workers always with a tertiary level of education while unskilled workers with lower education level.

Why do foreign workers choose to migrant? According to International Organization for Migration (IOM), they choose to leave their home countries to other country in order to get a better job. Normally, a person is moving out from his or her country to another countries because of higher unemployment rate, poverty, political instability and protects themselves from suffering of natural disaster in his or her home country (Goss & Linquist, 1995). A person decided to migrate when he or she feels that

the country has more job opportunities with higher paid (Harris & Todaro, 1970).

Most foreign workers who work for temporary will deposit their income back to their own countries. If the amount of inflow of foreign workers increases consistently, will it cause the problem of depreciation of currency become more serious? So why the countries still hiring the foreign worker when it will hurt the economic indirectly? There is still a lot of different perspectives towards the inflow of foreign workers into a country. Some of them agree for the inflow of the foreign workers and think that it is good to bring them in a country while some of them against about it.

1.1   Perspective towards Incoming of Foreign Workers

So, is the inflow of foreign workers good to a country? In fact, some of the researchers think that hiring foreign workers may help in the development of a country. For example, from the perspective of employer, cost of hiring foreign workers is lower than the local workers (Reddy, 2016). As the foreign workers were urgently needed of income and have a strong demand for the works, they are willing to accept relatively low income compare to the market price. When employers able to cut down on labour cost, they have more budget to expand their production and businesses to international market. As a result, it would help the development of the country. Besides, when a country accepts those foreign workers, it able to fill up those unwanted job vacancies in domestic. Most local workers are not willing to accept those 3D works which are dangerous, dirty and demeaning.

According to Reddy (2016), company was always facing the problem of inadequacy of supply of skilled local workers due to the higher cost of training facilities. Therefore, foreign workers are a good choice for company as they have diverse knowledge and technique compared to the locals and the expenses of hiring them are lower than hire local expertise. In addition, companies face few of connection matters when trying to expand businesses to other countries. Foreign workers act as a connection for companies which attempt to expand businesses in other countries as hiring foreign workers can help them to build a good representation and cultural understanding in another markets. It also provides extra internal help and assists in

overseas business ventures. The more important thing is it offers necessary contacts to begin a new industry in other country.

Furthermore, according to survey that conducted by Western Union, majority of the polled firm believed that inflow of foreign workers can help to improve country's stability and economy. According to European Recruitment Agency, they think that hiring skilled staff from overseas can boost the company's output. Hence, hiring foreign workers can help to boost the growth of the country. For example, Canada facing future labour shortage due to low population age and birth rate (Ramos, 2012). So, they are now strongly pushing the foreign worker program by bringing in more foreign workers to their country in order to settle the labour shortage problem and maintain the economic growth. Owing to country's better economic growth and could provide more job opportunities as well as good working environment which able to attract more people to come into the country and looking for a job. This brings benefits to companies as they are now having higher chances to hire the better quality of employer with lower hiring cost which can reduce the cost of production for the companies. Furthermore, training facilities are necessary for low-skilled workers to understand the company operations and related skills.

In the other way, some parties think that the incoming of foreign worker in a country induced negative impacts and caused some serious social problem. The main negative impacts that caused by the foreign worker are over-dependence on foreign workers, increment in criminal activities and social problems, also the existence of illegal workers (Abdul-Rahman, Wang, Wood & Low, 2012). Besides, it also caused the rise in wage differentials between high-income group and low-income group from the microeconomic view point (Aizawa et al., 2001). One of the prominent economists said that not only both demographic and social profile will change greatly in the coming years, it will also affect the income distribution of a country abundantly if the number of foreign workers keep increasing until seven million out of the 31.7 million of total population in Malaysia (Wong, 2016). Foreign workers become a substitute effect to the domestic workers occur in many countries.

According to The Telegraph by Lima Curtis reported that even government implemented a new policy Fair Consideration Framework (FCF) in Singapore. The

purpose of the policy is aim to protect the Singaporeans to be treated fairly from their jobs as many complaints have been received continually, complaining about the foreign workers are taking their job opportunities. Besides, some labour market researches had found that, indeed, immigration hurts U.S. workers. In a 2003 study, Harvard University economist George Borjas reported that increased immigration over the past two decades had "substantially worsened the labour market opportunities faced by many native workers," (Davies, 2013).

Figure 1.1: The relationship between GDP per Capita and Inflow of Foreign Workers from 1995 to 2009
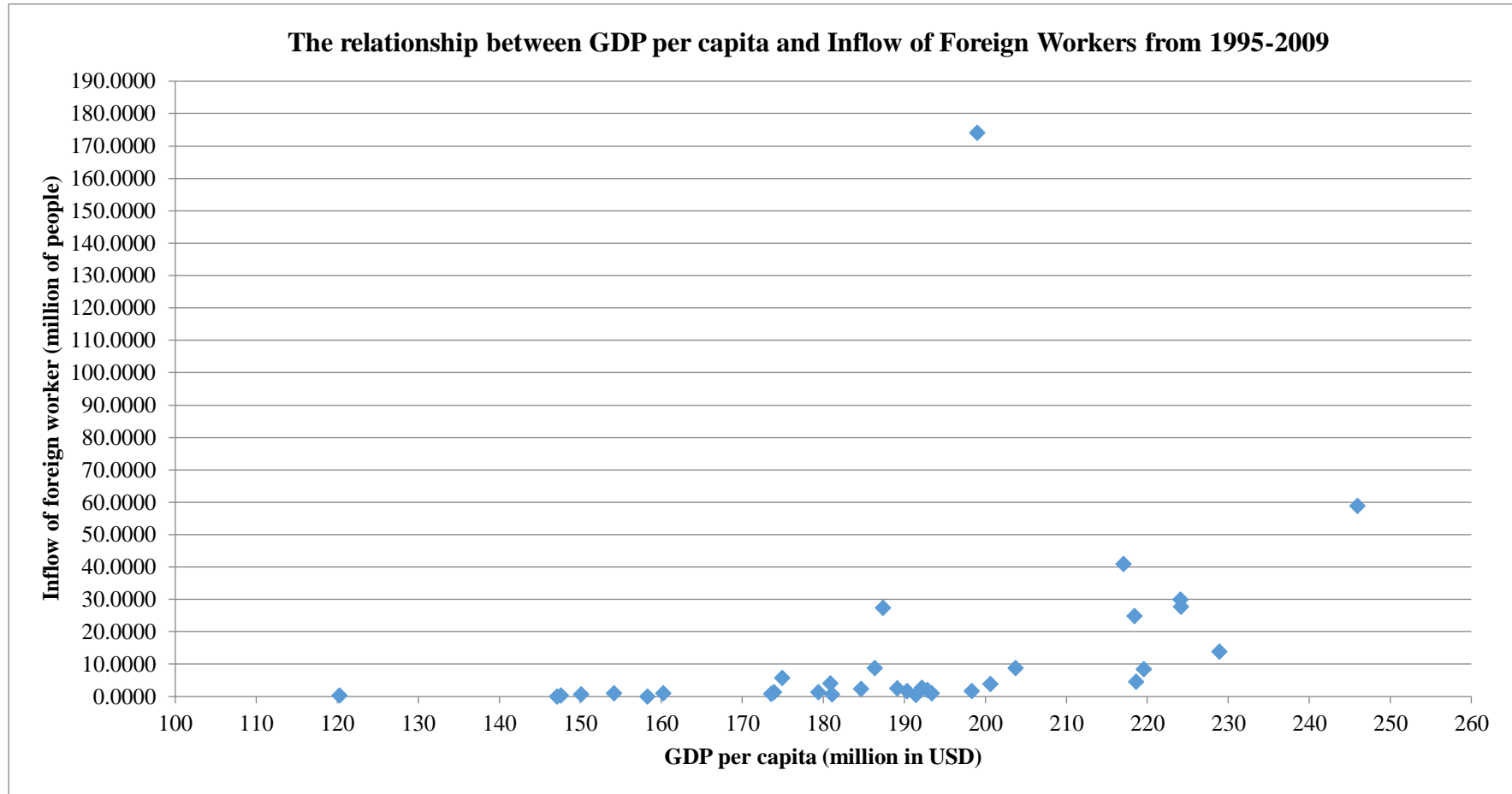
Sources: World Bank and Knoema

To investigate whether the inflow of foreign workers and GDP has any relationship, we plotted a graph by using the data of inflow of foreign workers and GDP growth from 34 various countries. From the graph above, we found that inflow of foreign workers does give a significant impact to the GDP of certain countries, however, some countries seem to be not much affected by the inflow of foreign workers. In the graph, we also observed that there have different impacts caused by the inflow of foreign workers to the GDP, which are both positive and negative. The different observations got from the graph above gives different explanations to the topic of our studies, which is whether inflow of foreign workers will influence a country's GDP growth. Hence, this motivated us to further study on this topic in more detailed ways.

1.2   Issues Incurred by Foreign Workers

The presence of foreign workers is one of the most critical issues that has received increasing attentions from media and national. This issue has given significant changes to the society of a country in term of social, economic and physical aspect. The discussion on public safety and public health connected to foreign workers are always a focused issue. Devadason (2013) stated that foreign workers are easily impressed to diseases and get into crime due to the inadequate working terms and conditions. To compensate for their meagre earnings, the most common criminal activities they may involve are such as theft, burglary and others. However, based on a statistics examined in Malaysia, the percentage of crimes involvement by foreign workers only 2% in total crimes with a ratio of 3.8 crimes per 1000 foreign population as opposed to 5.3 per 1000 population (Pak, 2010). It indicates that foreign workers commit less crime than the local.

From the perspective of economic, introduction of foreign workers able to contribute the impact on economic development. In Malaysia, foreign workers are one of the primary sources of labour for low-skilled sectors such as agriculture, construction and manufacturing to satisfy the demand of labour market. An economic study indicates that Malaysia's gross domestic product (GDP) could be raised by 1.1% as a result of a 10% net increase in unskilled foreign workers and create job opportunities as well as

boost wages for most Malaysians (Moreno, 2016). In the case study of Norway that conducted by Feridun (2005), they are experiencing a decline in labour supply due to the population aging process. This situation with more seniorities has forced Norway to import a large number of foreign workers to fulfill the tighter labour market. Even though Norwegian reliance on foreigners, GDP per capita of the country upturns when the level of migration increases. The above evidence indicates that the presence of foreign workers on the host labour market may not necessarily be harmful.

Malaysia is considered as a major foreign worker importing country in South East Asia. The inflow of foreign workers caused the rising of outflow of Malaysia Ringgit to other countries. According to Nicholas (2016), there are around 2.2 million migrant workers registered and it does not include undocumented workers. The Finance Minister revealed that a total of RM 119 billion has been sent back to their home countries since 2011. This has become a problem of Malaysia's economy which the Ringgit is not circulating inside its own country. At the same time, the value of currency would depreciate and it could break the economy from the aspect of currency exchange and also balance of payment (BOP). Hence, the aim of our study is to investigate the impact of inflow of foreign workers towards a country's economic growth and how big the impact is due to all the issues and different perspectives found towards the topic of the incoming of foreign worker.

1.3   Problem Statement

The issue of foreign workers towards a country's economic growth hits the headlines over the past decades. It is important to determine the impact of foreign workers on economic growth. Some researchers stated that foreign worker considers as one of the important input to a country which is facing the problem of labour shortage. From the perceptive of economic, in short term, they help to improve economic growth in term of productivity and stimulate the export trade. However, in the long run, overabundance in foreign workers could cause competition with native workers, this would reduce the local hiring in the host country. Not only that, the increase in the number of incoming of foreign workers to the country will also leads to the remittances

outflow increase as well. In addition, investors repealed their investments from host country due to the social issues happened frequency as a result of overcrowding in foreign workers. Consequently, reduction in foreign investments brings down the economy of the host country because influx of foreign direct investment (FDI) has strong positive relationship with GDP.

Moreover, many researchers have used different variables in determining the impact of foreign workers on economic growth but no consistent model is found. As a result, the impact of foreign workers on GDP is shown to be identical. Therefore, we will be select and reassemble the significant variables into our study model such as openness trade, health expenditures, and human capital index proxy as education level, remittances and few interactive terms. The structure of our model in this study is to determine the impact of foreign workers on economic growth and suggest some guidelines for politicians.

1.4   Research Objectives

1.4.1 General Objective

The purpose of carrying this study is to examine the determinant of GDP per capita in OECD countries based on the variables of foreign workers. Besides, the variables that influenced GDP strongly will also be examined in order to find out the relationship between the variables itself and the GDP.

1.4.2 Specific Objective

To be specific, we would like to:

   i.   Identify the relationship of GDP growth and foreign workers when foreign workers interact with labour productivity.

  ii.   Identify the impact of foreign workers on economic growth in short run and long run.

 iii.   Determine whether the foreign workers had caused the complimentary effect or competition in the country.

  iv.   Determine the optimal point of remittances for a country.

1.4.3 Research Question

In this section, we aim to study four research questions, they are:

   i.   What is the relationship of GDP growth with foreign workers when foreign workers interact with labour productivity?

  ii.   What is the impact of foreign workers on economic growth in short run and long run?

 iii.   Will the foreign workers cause the competition or complementary effect?

  iv.   What is the optimal point for remittances?

1.5   Hypothesis

In this study, there are seven hypothesis be used to determine the relationship between the macroeconomics factors towards the GDP growth in a country.

Foreign Workers

H_0: There is no relationship between foreign workers and GDP growth

H_1: There is a relationship between foreign workers and GDP growth

According to Ismail and Yuliyusman (2014), foreign workers have a significant relationship towards the output growth in both short-run and long-run. In their study, foreign workers are included to investigate the impact of foreign workers towards the Malaysian economic growth.

Health Expenditure

H_0: There is no relationship between health expenditure and GDP growth

H_1: There is a relationship between health expenditure and GDP growth

Piabuo and Tieguhong (2017) conducted a study to investigate the relationship between health expenditure and economic growth and concluded that there is positive and significant relationship of health expenditure on the GDP growth.

Human Capital

H_0: There is no relationship between human capital and GDP growth

H_1: There is a relationship between human capital and GDP growth

To investigate the role of factor human capital towards the GDP growth, Pelinescu (2015) done a study and concluded that there is statistically positive and significant relationship between human capital and GDP per capita.

Labour Productivity

H_0: There is no relationship between total labour productivity and GDP growth

H_1: There is a relationship between total labour productivity and GDP growth

Korkmaz and Korkmaz (2017) have conducted a study about the relationship between labour productivity towards the economic growth in OECD countries. According to result they found, there is unidirectional causality relationship among labour productivity and economic growth.

Total Labour Force

H_0: There is no relationship between labour force and GDP growth

H_1: There is a relationship between labour force and GDP growth

According study that conducted by Shahid (2014) about the impact of labour force participation towards the Pakistan economic growth, he concluded that there is relationship between labour force and economic growth.

Capital Stock

H_0: There is no relationship between capital stock and GDP growth

H_1: There is a relationship between capital stock and GDP growth

According to Tachiwou (2010), stock market is an important factor to influence the growth. In his studies, he concluded that there is positive relationship between the development in stock market and economic growth in both short run and long run.

Remittances

H_0: There is no relationship between remittances and GDP growth

H_1: There is a relationship between remittances and GDP growth

Akayleh (2016) stated that remittances outflow has negative and significant relationship towards the GDP growth. This is because when the outward remittances occurs, the demands for consumption and investment fall and causing the decrease in production and income subsequently. Thus, this will cause the reducing in government income and expenditure on infrastructures.

1.6   Significance of Study

In this study, we are intended to shed light on the relationship between foreign workers and the country's economic growth. There were several amounts of researches had been studied previously as well on this related topic. However, the variables that were used in those researches varied from our study as research that had been done

previously had ignored the variable of remittances which is also one of the key variables that may influence the economic growth. In order to make the study more accurate, we include and highlight the variables of remittances in our study. This will help governments and policymakers in decision making by understanding the impact of foreign workers that brings to a country's economic growth. Besides, it is very crucial for the policymakers and governments to understand the relationship of foreign workers with each independent variable which will influence the economic growth directly or indirectly in order to implement proper policy for a country. Moreover, in this research, we will provide a clear picture of impact of foreign worker towards country's economic growth in short run and long run as well as the optimal point of remittances that is appropriate for the country. A better understanding on this research finding may help governments and policymakers in their decision making.

1.7   Chapter Layout

The research proceeds with Chapter 2, reviewing the relevant literature by other researchers regarding foreign workers on economic growth. Chapter 3 presents the data, the methodology, and the model that will be applied in the study. Chapter 4 describes the result and discussion of our findings. Chapter 5 contains the major findings, recommendations and conclusion.

CHAPTER 2: LITERATURE REVIEW

2.0   Introduction

This study would like to examine the impact of foreign workers on economic growth. We will review past researcher's studies that are relevant to our research topic and the relationship between response variable and explanatory variables will be discussed in this literature review. In short, this literature review will provide a better idea to understand the interconnection of foreign workers as well as other related macroeconomic variables toward the GDP. It is very useful to help us in developing a relevant theoretical framework and formulating appropriate hypothesis for our research.

2.1   Foreign Labour

2.1.1 Optimistic Effect of Foreign Labour on Economic Growth

A number of studies try to estimate the impact of foreign workers on economic growth. Ismail and Yuliyusman (2014) examined that foreign labour impacted on Malaysia economic growth in both short run and long run by applying Autoregressive Distributed Lag approach. They discovered that the skilled and semi-skilled foreign labour have positive contribution to output growth while unskilled workers bring adversely effect. The results also highlighted Malaysia economy could take the advantages of the presence of foreign labour if they allowed working for a long period. This might due to the adaptation of foreign labour to local technology could easily take place. Furthermore, Christofides, Clerides, Hadjiyiannis and Michael (2007) also investigated how the production, output growth and level of domestic wages affected in Cyprus when employment of foreign workers. The Cobb-Douglas production function is used to be a benchmark for the analysis. The paper report that 54% of Cyprus's GDP growth for the period 1995 to 2005 are contributed by the increase in foreign workers. This proofs that foreign workers at Cyprus play an important role in the productive process in order to develop the economy.

Many nations thought foreign labour bring a lot of negative impact along their arrival. However, in the United Kingdom, foreign labour fill up the vacancies which due to lack of labour force and does not generate harm to the inflation and interest rate. They make the economy more stable. Although they fulfill those vacancies, they did not cause notable impact to salary level and unemployment. The reason is they are willing to do those work that local labour not interested especially in construction area and hotel services (New York, 2008). When foreign labour's productivity is higher, it will rise export and lead to an increase in national balance of payment of a country. Carbaugh (2004) state that the inflow of foreign labour to a country will enhance the country's export value which able to generate economic growth. In addition, some of the sector's Gross Domestic Product (GDP) improved by the foreign labour that they expand the economy of the country. Base on a research, it found that there is a significant correlation between the amount of foreign labour in a specific place with rising average income level.

Siow (2011) found that increasing in the inflow of foreign workers should focus increasingly on foreign talents because it can help country to improve productivity. The researcher said that skilled workers can speed up economic restructuring, enables higher GDP growth, innovation and entrepreneurship, however, lower skilled workers delays economic restructuring and consequence in lower productivity performance. In addition, Noor, Isa, Said and Jalil (2011) focused their research on the economic impact of foreign workers on labour productivity of manufacturing sector in Malaysia. The Cobb-Douglas production function applied to develop the model specification and the relationship between domestic and foreign workers was investigated by using Granger causality tests. The finding showed that foreign workers have a positive and significant impact toward the labour productivity. Moreover, the study also concludes that foreign labour are not the alternate for domestic labour since there has no causal relationship between them. Therefore, decreasing the number of foreign workers will not affect the domestic workers' performance level. (see also Thangavelu, 2016; Vincent, Ismail & Yussof, 2014)

2.1.2 Pessimistic Effect of Foreign Labour on Economic Growth

Hui (2002) and Pholphirul (2012) argued that more and more foreign workers flow into country will bring negative impact on productivity growth which includes income inequality problem will become more serious when there is wage depression which is below the wage distribution lower limit. Furthermore, influx of foreign labour will cause demand for the property accommodations increase which directly cause the price of local properties go up, especially small land areas of a country will have significant impact. On the other hand, many countries face growing emigration trend among nations following the inflow of foreign workers. According to the survey, 56 percent of respondents responds foreign workers in Singapore have taken away their job opportunities. Most nations believe that inflow of foreign workers threatened their job positions which induces them looking for a permanent job overseas (Hui & Hashmi, 2007).

Moreover, Palel, Ismail and Awang (2016) found that local and foreign labour forces are negative but not significant to the labour productivity growth in the short run. However, both of them are positively related to labour productivity growth in the long run. They also mentioned that foreign labour contributes lesser compared to local labour towards the labour productivity. The study of Thangavelu (2012) shows that foreign workers productivity, skills and human capital decide their long-term growth. This will directly affect the domestic company's innovation and technology adoption capacity. However, in the short-run, the cyclical fluctuations and short-term shortages in the labour market can be resolved by the inflow of foreign workers, thus retaining the competitiveness of the labour market.

Thing will develop in the opposite direction when they become extreme. Excessive inflow of foreign workers particularly unskilled or semi-skilled labour is not under control, this will cause negative impact to domestic economic field, political stability and national threat. More and more illegal migrants' problems had brought negative effect to the wage structure and it becomes one of the major concerns. Many foreign labour's request on wages and working hours are lower than the locals, so employers more willing to employ them in order to reduce cost. In the long run, country's BOP and currency exchange rate will be harmed when currency value reduce

then soon it will affect reserve of the country (Utusan Malaysia, 2009). Furthermore, poverty rate will raise along with the inflow of foreign labour to Malaysia which due to their earning are equal or lower than the Income Poverty Line. This pulls down the Malaysia's living quality. At the same time, the existence of foreign labour also raise the criminal index point in Malaysia. There are 14,809 out of 37,446 prisoners in Malaysia are foreign workers which mean great majority them are illegals. Due to lack of efficiency of border wide control, cause criminal activities unable to control.

2.1.3 Complementary or Substitute Effect of Foreign Labour

Additionally, many of the researchers had the intention to look at the connection between domestic and foreign labour, whether they are substitutes or complements. A study conducted by Bachtiar, Fahmy and Ismail (2015) studied about the demand for foreign workers in the manufacturing sector in Malaysia. They stated that skilled and technical supervisor workers contributed positively to output growth and wage rates. It is a complement correlation to local workers in the production process. This results also supported by Dickson (1975), he found that inflow of foreign workers can improve the productivity of local workers; thus, boosting the increase in output. In short, he believed that the rate of economic growth could be encouraged due to the complementary relationship between both workers. Nevertheless, some results revealed that local and foreign workers are neither substitute nor complement to each other (Noor et al., 2011). This means that the reduction on foreign workers would not influence the performance of the domestic workers.

According to Jajri and Ismail (2006), they found that the relationship between foreign and native workers are more likely to be substitute rather than complement. The substitutability or complementarity rely on the number of statistically significant elasticity of substitutions is bigger in the light industry but not the types of industry. If a lot of unskilled foreign workers entering the secondary labour market in both non-cooperative and cooperative regimes, it helps to increase economy's welfare (Shimida, 2005). When the number of skilled foreign workers entering the primary labour market increase, it does not necessarily increase the economy's welfare. Ramesh, Charles and Peter (2012) argue that the phenomena of arrival of foreign workers in a country have

increased pressure on public facilities and services, such as health and education facilities. Furthermore, they also said that many companies employed foreign workers in lower scale salary in order to save cost. However, this scenario caused unemployment rate among local workers to increase and therefore at the same time, caused uncertainty to increase in such activities like crime, culture and illegal strikes.

The role of foreign labour become a major key for extension in many sectors on the enterprise side, especially among export-oriented companies in the manufacturing sector (Carpio, Özden, Testaverde & Wagner, 2015). A study by Sheldon (2000) stated that unskilled foreign workers support dying industries thereby slowing down the development of expanding industries, consequently, reduce economic growth of a country. Moreover, employed foreign workers caused the lowering of wages of domestic workers because hiring foreign workers is cheaper than hiring domestic labour. The arrival of foreign workers may bring negative influence to productivity growth from maintaining a wheeling group of low-skilled foreign labour. Besides, income inequality increased which occurring from wage depression at lower end of the wage distribution and percentage of illegal immigration and enforcement measures costs increased (Hui & Hashmi, 2007). The researcher also said that in order to control the nation's dependency on foreign workers to support the economic growth in the new millennium, it can lower the targeted growth rate accompanying the appropriate wage growth policy.

2.1.4 Qualification of Foreign Labour and Economic Growth

Besides, human capital is becoming more important to develop the economic growth. According to the research conducted by Jajri and Ismail (2010), the knowledge-based-driven of economic growth is vital as it can increase the competitiveness level of a country in order to face the world challenges. The main concern of this research is to determine the impact of labour quality on labour productivity and economic growth in Malaysia from the year 1981 to 2007. Authors used the effective labour and level of education among workers as measurement for the labour quality. From the results, the labour with secondary education was more effective in increasing the growth of GDP. To promote economic growth, they suggested that human capital investment should be

geared towards producing more efficient workforce in the labour market. From the study of Sirag, Nor, Adamu and Bui (2016), they found that human capital in the form of education does exert positive effect on GDP per capita.

2.2   Health Expenditures and Economic Growth

Foreign labour from underdeveloped countries without high-level of health and disease control will bring along higher rate of epidemical disease. In the year 1992, 30 percent of the 337 thousand foreign labour in Malaysia are HIV positive (New Straits Times, 1992). Empirical analysis of the relationship between health expenditures and output per capita has been explored by using different economic techniques. In general, the economy of a country will be more efficient if the government health expenditure increase. Recent study by Sirag et al. (2016) emphasized the effect of government health spending on GDP per capita in Malaysia with the time series annual data between 1970 and 2013. They employed super exogeneity test in their study because it could examine the possibility of regime shifts and how it may affect the economy. This paper concluded that health expenditure is a critical component to improve the level of human capital by making individual in a good health and increase their productivity eventually; thus develop the economic growth.

Then, Kurt (2015) uses the Feder-Ram model to test the direct and indirect effects of government health expenditures on Turkey's output level. Based on the results, the direct effect is positive to the economic growth while its indirect effect indicated a negative impact due to diseases, accidents and business interruptions on output of other sectors. Piabuo and Tieguhong (2017) conducted a comparative analysis between five African countries and the Central African States (CEMAC). Researchers applied co-integration tests, granger causality and panel data cointegration analysis to determine the relationship between health expenditure and economic growth. The empirical result portrayed there is a long run relationship between them for both groups of countries. In other words, increase in health expenditure will lead to higher economic growth.

2.3   Remittances and Economic Growth

Global studies on the effects of remittances on economic growth have shown mixed results which may have rising, declining and neutral effect (Ang, 2007; Waqas, 2013). Some of the studies suggested that there is a positive relationship between remittances and GDP whereas some are in opposite way (Ahmed, 2010). Migration of foreign workers are closely related to the money transfer issue either it is in the country that import or export foreign workers. Money transfer is also known as remittance, which means the money outflow from one country to another (Fauziana, 2016). Migration of foreign workers, just like an international trade, benefits both the exporting and importing country (Mensbrugghe & Roland-Holst, 2009). However, according to Ajis et al. (2014), they suggested that the country exports foreign workers will benefit more than importing country.

Meyer and Shera (2016) analysed the panel data from the year 1999 to 2013 to identify the impacts of remittances on economic growth. The researcher examined six countries in their study because they are receiving higher remittances inflow as compared with other regions. The multiple regression analysis results concluded that there is a positive impact between remittances and economic growth, and it increases at higher levels of remittances relative to GDP. This results also supported by Pappusamy (2014), which stated that when migrant workers sent remittances back to their families at their home countries, it will benefit to their own countries as these contribute to their countries' GDP.

Yaseen (2012) carried out a study on the impact of remittances on economic growth of MENA countries which are Algeria, Egypt, Jordan, Libya, Morocco, Oman, Syria, Lebanon and Tunisia from period 2000 to 2010. The empirical result suggested that remittances are positively and significantly correlated with the growth of MENA countries. Besides, other variables also indicate that there is positive and significant with the remittances in this study. Interactive term between financial development index and remittances has been added and the result showed that remittances are substitutability for financial systems. This is because remittances act as second-largest source of external finance for foreign direct investment (FDI) (Giuliano & Ruiz-Arranz, 2008). From Giuliano and Ruiz-Arranz (2008) and also Gupta, Pattilo and Wagh (2009)

study found that remittances boost growth by providing another way to finance investment and relieve liquidity constraints in the country with less developed financial system.

On the other hand, Ahmed (2010) analysed the time series data from 1995 to 2006 to examine whether remittances of workers help Bangladesh's economy to grow. The result shown that, those remittances inflow to Bangladesh have been statistically significant but create negative impact on growth which means that when there is higher remittances inflow to Bangladesh, will slower the economic growth. This study also included other variables such as exports, domestic investment and FDI. The result suggested that exports and domestic investment are positively affecting the economic growth whereas FDI has no substantial effect. In addition, remittances may increase the real exchange rate and create so-called "Dutch Disease Effect" in the exporting country. Due to the inflow of remittances to the local country, it caused the cost of production and selling prices rise. When the selling prices are increase, people tend to spend less and slow down the country grow (Yaseen, 2012).

From the perspective of importing country, remittances improved the labour market condition of the country through supplying of foreign labour, thus it increases in employment rate and production and this leads to economic growth (Ortega & Peri, 2009; Orrenius et al., 2010). In the research of Shafqat, Ahmad and Bano (2014), they conclude that foreign remittances affect the economic growth of Pakistan positively and have significant relationship with each other. Moreover, contribution of worker remittances can greatly influence the economic growth of Pakistan. Furthermore, many developing countries may face the problem of foreign exchange reserves shortage. Thus, remittances can act as a tool to provide a constant source of foreign currency in order to avoid balance of payment crisis (Lopez-Cordova & Omeldo, 2006).

2.4 Gap of Literature

By reviewing previous literature, most of the studies have discussed the impacts of foreign labour on economic growth solely in their respective countries, such as Pakistan, Bangladesh, Malaysia, Singapore and Switzerland (Waqas, 2013; Ahmed, 2010; Noor et al., 2011; Pappusamy, 2014; Hui & Hashmi, 2007; Siow, 2011; Sheldon, 2000) or in the geographical region levels, such as MENA countries (Yaseen, 2012). Hence, to strengthen the accuracy of the results, we have motivated to further investigate on this topic and choose more than 30 countries and 15 years of period in our study.

Not only that, according to previous studies on remittances, most of the researchers focus their studies on impact of remittance inflow towards the country itself, and the result showed are inconsistent and vary from each other. Waqas (2013), Meyer and Shera (2016) and Yaseen (2012) found that remittances bring positive impact toward the economic growth of the country. On the other hand, Ahmed (2010) suggested that remittances bring negative impact on economic growth of the country. However, fewer studies focus on the impact of remittances outflow that caused towards the economic growth of country itself due to taking too much of foreign labour into their labour market.

Furthermore, another study gap that we found from previous literature is determinant that been used to examine the relationship of foreign workers and economic growth in those studies are very few. It is not strong enough to support their result as economic growth can be influenced by various factors. Hence, our study involves variables that significantly influence the economic growth, such as total labour force, labour productivity, capital stock, foreign worker, remittances, expenses on health and human capital. On top of that, we even include interactive term between variables to further investigate the relationship between the variables towards the economic growth.

Therefore, we have intended to fill up the study gap by studying the issues with a broader vision and including other significant determinants of GDP growth in our study model in order to make our results more reliable and sound.

CHAPTER 3: Methodology

3.0 Introduction

This study investigated the impact of foreign workers and macroeconomic towards the economic growth. In this chapter, we will discuss and explain about the theoretical background of our study and the empirical model of our analysis in order to meet our study's objectives. Regarding the research methodology, this chapter will present the data source and data collection method, data description and data analysis. An appropriate methodology has been chosen to prevent misleading results.

3.1 Theoretical Framework

In our empirical analysis, we use the simple and most common way which is the Cobb-Douglas production function. As shown below, the Cobb-Douglas production function has been transformed in this study.

3.1.1 Cobb-Douglas Production Function

According to Hajkova and Hurnik (2007), the Cobb-Douglas production function is always been used in most study as it can analyse the performance of supply-side and it acts as a measurement for country's productive potential. First, we use Cobb-Douglas production function in our study where the model takes into consideration of technology, labour and capital that affecting the countries' economic growth. We have fulfilled the criteria for developing a model based on the theory presented in Cobb-Douglas production function by including foreign workers into the respective model to represent labour input. We also include other elements such as human capital, remittances as well as health expenditures into the model to further investigate and explain the potential endogenous variables that would influence economic growth.

Original Cobb-Douglas Production Function:

$$Y_t = K_t^\alpha (A_t L_t)^{1-\alpha} \tag{1}$$

By log-linearizing Equation (1), we get:

$$\ln \frac{Y}{L_t} = \alpha \ln K_t + \ln A_t + (1-\alpha) \ln L_t \tag{2}$$

By transforming the Equation (2), we get:

$$\ln Y_{it} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln A_{it} + \beta_3 \ln L_{it} + \mu \tag{3}$$

Where Y denotes output per capita, K denotes capital, A denotes factor productivity and L denotes number of labour. While i represents as countries and t is time trend.

Based on the original Cobb-Douglas Production function (Equation 1), we transform the model from non-linear form to linear form (Equation 3) to estimate the coefficient of the variables in our study. From that, we intended to investigate the effect of capital, total factor productivity and number of labour on GDP per capita.

3.2 Empirical Framework

In equation (3), the model shows the effect of total labour productivity, capital stock and inflow of foreign workers on economic growth. Nevertheless, there are many other variables could become a factor to influence the economy. We might obtain bias result if only consider the standard model. Therefore, some impactful variables must be added into this equation for the purpose of getting an accurate estimation. Another key variable that may be omitted during the empirical process were represented by the error term in this study. We have rearranged and used new equation which is suitable to be used in our model. The empirical model of this study can be specified as below:

$$InGDP_{it} = \beta_0 + \beta_1 InTLF_{1it} + \beta_2 InLP_{2it} + \beta_3 InCS_{3it} + \beta_4 InFW_{4it} +$$
$$\beta_5 InREMI_{5it} + \beta_6 InHEALTH_{6it} + \beta_7 HC_{7it} + \mu_{it} \tag{4}$$

The expected model now has included total labour force (TLF), labour productivity (LP), capital stock (CS), foreign workers (FW), remittances (REMI), health expenditures (HEALTH) and human capital (HC). Where *GDP* denotes GDP per capita (millions in USD), *TLF* denotes total labour force (millions of citizens), *LP* denotes labour productivity (millions in USD), *FW* denotes inflow of foreign workers from OECD countries (millions of people), *REMI* denotes remittances outflow (millions in USD), *HEALTH* denotes health expenditure (millions in USD), *CS* denotes capital stock (millions in USD) and *HC* denotes human capital index. While *i* represents as countries and *t* is time trend.

In equation (4), μ represents the uncorrelated white-noise error terms. β_0 is the partial coefficients and $\beta_{(1,2,3,4,5,6,7,8)}$ represent the slope of coefficient where $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 < 0$, $\beta_6 > 0$ and $\beta_7 > 0$. Besides, we apply natural logarithm form to some independent variables since their values are too large. According to Asteriou and Hall (2007), most of the economic variables considered as underlying growth rate which the data may or may not be constant. Thus, using logarithm form will turn the data series into linear trend. Highly slewed variables would be reduced or being more approximately normal after the logarithmic transformation (Benoit, 2011).

3.2.1 Discussion of Dependent Variable

In this study, the dependent variable is GDP per capita. According to Mercado (2016), this variable is seen as an indicator to identify how strength of an economy. It can obtain when the gross domestic product divided by total workforce in a country. If GDP per capita shows a high number, this means that the economic performance is growing well and thereupon raising the standard of living of the country.

3.2.2 Discussion of Independent Variables

These independent variables had been chosen into our model because of the reason that showed below. According to International Labour Organization (ILO), the total labour force is defined as everyone who fulfilled the requirements regardless employed or the unemployed in a period of time. In short, it is the currently active population who are willing and able to work. Next, we have used GDP per hour worked as the measure of labour productivity which is average annual hours worked by persons engaged. It shows that how efficient the labour input produced the goods and services if associate with other factors of production and used in production process. Improvement in labour productivity is able to increase the economic growth by developing physical capital, new technology and human capital (OECD, 2002). Labour productivity allows an economy to realize the underlying trends, for example, it serves to develop and monitor the effect of labour market policies.

For capital stock, it reflects the net capital accumulation for a country during an accounting period, for example the production facility, tools, transportation assets and electricity (Investopedia, 2017). To keep pace with the times, a country will need to renew their capital stock in order to produce goods and services. To sum up, the larger the capital stock in an economy, the faster an economy can grow and this lead to the increase in national income. Additionally, the main variable that we have discussed more will be the foreign workers. A foreign worker is a person who travels to another country looking for work (Gale, 2008). Most of them would be engaged in the jobs that required manpower such as agricultural field with lower wages and substandard of living conditions. They may improve the innovativeness level through the supply of specific skills and competences, so we expect it to be positive towards economic growth. However, the number of foreign workers that we used in this research is only the number of outflow workers from the countries of the Organization for Economic Cooperation and Development (OECD) to rest of the world. Due to the limitation of data, a number of inflow of foreign workers from OECD countries has been selected to carry out this research.

Furthermore, the relationship between economic growth and remittances had always been investigated by researchers. Remittance is the funds that an expatriate sends to his or her home country by using wire, mail, or online transfer (Investopedia, 2017). Many studies had examined the impact of remittances on the receiving countries and ignored the effect of remittance on the sending countries. Therefore, we have considered outflow remittance as our independence variable to determine its impact on economic growth of the sending countries. Healthcare expenditure is a basic component of human capital investment. According to The World Bank, it refers to a total spending of health expenditures by the public and private which consists of the provision of health services in term of prophylactic and therapeutic, family planning activities, nutrition activities and emergency aid designated for health. Bedir (2016) stated that labour productivity, quality of life and general welfare would be raised when the health expenditures of a country toward an increasing trend. In brief, there has a positive relationship between health expenditure and economic growth.

According to the concept of the human capital, all labour is treated as different based on the skills set such as their knowledge and experience. Economist Theodore Schultz believed that the quality and level of production could be improved through the education and training (Ross, 2015). Hence, education becomes part of consideration factor in the workforce as human capital deemed to be a renewable source of productivity.

Based on the model in our research, each of the independent variables' unit measurement is different. Total labour force is measured in million and it is expected to has a positive relationship with the GDP per capita. Washington (2011) stated that when the size of the global workforce increased, it presents an opportunity to expand the economy and increase GDP. Total labour productivity is proxy by GDP per hour worked and expected it has positive relationship with GDP per capita. According to Andrew et al. (2008), the only source of growth in GDP per capita will be growth in labour productivity. Countries will difficult to improve their long run economic performance without improving their school quality (Hanushek, 2013). So, we expect the relationship between human capital and GDP per capita in our study will be positive.

The remittances in our model, we expect it negatively influence the GDP per capita. According to Akayleh (2016), the outflow of remittances and economic growth has a significant negative relationship. Next, we have expected the inflow of foreign workers in our study positively influence the GDP per capita. The study of Akayleh (2016) in Saudi Arabia shows that the non-Saudi labour have positive effect on Saudi GDP. A journal stated that a stock market has opportunities for growth, it positively significance corrected with real GDP per capita (Masoud, 2013). So, we expect the capital stock will positively affect the real GDP per capita.

Moreover, we expect there is a positive connection between health care expenditures and GDP per capita. According to study of Dritsakis (2005), the researcher found that health expenditures and GDP have a positive relationship but also between the ratios of health services prices index to the GDP prices index. Table below shows the unit measurement and expected sign of independent variables with GDP per capita.

Table 3.1: Unit Measurement and Expected Sign of Independent Variables with GDP per capita

Independent variables	Unit Measurement	Expected Sign with GDP per capita
Total Labour Force	Millions of citizens	Positive
Labour Productivity	Million in USD	Positive
Capital Stock	Million in USD	Positive
Human Capital	Index	Positive
Inflow of Foreign Workers	Millions of people	Positive
Remittances Outflow	Millions in USD	Negative
Health Expenditures	Millions in USD	Positive

3.3   Data Collection Methods

In this study, we have used a panel data which from 1995 to 2009, a period of 15 years in the countries of Malaysia, Argentina, Australia, Austria, Barbados, Brazil, Cambodia, Colombia, Costa Rica, Cyprus, Czech Republic, Ecuador, Estonia, Finland, France, Germany, India, Ireland, Israel, Japan, Latvia, Netherlands, New Zealand, Norway, Portugal, Poland, Romania, Russian Federation, Slovenia, Sri Lanka, Sweden, United States, Venezuela, United Kingdom. For the 34 selected countries, most of the countries are developed countries and labour importing countries, thus we would like to examine those impacts of foreign workers on the economic growth of the selected countries.

Moreover, we have chosen the time period ranging from 1995 to 2009 due to the limitation of data. Firstly, we have chosen time period from 1991 to 2011, but there is not much of data are provided for us to carry out the research, therefore we have to shorten the time period to 15 years. We have used secondary data to carry out this study.

In order to investigate the impact of inflow of foreign workers on the real GDP per capita, we have obtained data of real GDP per capita which is dependent variable and total labour force from the World Bank. GDP per hour worked as labour productivity, capital stock and human capital obtained from the Penn World Table. The number of foreign workers and remittances outflow are obtained from the Knoema. Last, health expenditure is obtained from the World Health Organization Global Health Expenditure Database. Table 3.2 shows the sources of data.

Table 3.2: Sources of Data

Independent variables	Sources
Total Labour Force	World Bank
Labour Productivity	Penn World Table
Capital Stock	Penn World Table
Human Capital	Penn World Table
Inflow of Foreign Workers	Knoema
Remittances	Knoema
Health Expenditures	World Health Organization Global Health Expenditure Database

3.4 Estimators

To analyse the model in the equation, we have used three basically types model which are pooled ordinary least square model (POLS), fixed effect model (FEM) and random effect model (REM). Each model will be described before we begin utilizing our methodology.

3.4.1 Pooled Ordinary Least Square Model (POLS)

So as to apply POLS model, we have to fulfill three assumptions, the first is intercepts are constant across observations. Second is slopes are constant across observations and third assumption is time invariant which means there is no time effect. Moreover, we must make sure heteroscedastic problem is absent in the model which mean independent variables are not correlated with the error term. Otherwise, the result gets from the estimators will become invalid and insufficient. There are two limitations exist in POLS model which are each of observations in term of effect and features across periods cannot be differentiated. Another limitation is if heterogeneity exist among observations across periods, the results will become biased, inefficient and inconsistent. For more understanding, we provide an example below:

$$Y_{it} = \beta_1 + \beta_2 X_{it} + \mu_{it} \ , i = 1, \dots, N, t = 1, \dots, T \qquad (5)$$

Assume there are K regressors (covariates), such that $\dim(\beta) = K$. Panel models mainly differ in their assumptions on u. u independent across i and t, $Eu = 0$, and $\text{var} u = \sigma^2$ define the (usually unrealistic) pooled regression model. It is efficiently estimated by least squares (OLS). Sometimes, one may consider digressing from the homogeneity assumption $\beta_i \equiv \beta$. This entails that most advantages of panel modeling are lost.

3.4.2 Random Effects Model (REM)

REM suppose that the intercept of each cross-sectional unit is a random picking up from a large population with a constant mean value. We can apply REM when random intercept of each cross-sectional unit is not correlated with the regressors.

$$\text{Cor}\ (\varepsilon_i, X_{it}) = 0$$

REM has three assumptions which are intercepts are different across observations, slopes are same across observations and there is no time effect. The advantage of using REM is due to the number of unknown parameters is lower than FEM. The percentage of multicollinearity problem happen in the model is lesser because of the number of independent variables have been decreased. We provide REM below to support:

$$Y_{it} = \beta_1 + \beta_2 X_{it} + \mu_{it} + \varepsilon_{it}\ ,\ i = 1, \dots, N, t = 1, \dots, T \qquad (6)$$

Where Y_{it} is the dependent variable observed for individual $i = 1, \dots, N$ at time $t = 1, \dots, T$, β_1 is the mean for intercept term, β_2 is the coefficient of X_{it}, μ_{it} is the combination between time series and cross-sectional error component and ε_{it} is the cross-sectional or individual-specific error component random or not constant. It assumed has normally distribution, $\mu_{it} \sim N(0,1)$.

3.4.3 Fixed Effect Model (FEM)

When the individual-specific intercept perhaps correlated with one or more regressors, we have to apply FEM. Basically, FEM model has three scripts. The first, second and third script have the same assumptions, intercepts are different across observations. The first and second script assumed that slopes are constants across observations while third script slopes are different. However, the first script and third script has time invariant and the second script has time variant. In FEM, dummy variables will be used to overcome the differing intercepts, slopes and time are not constant problems. There are two conditions to apply FEM. First, when error term and the independent variables are correlated.

$$\text{Cor}\,(\varepsilon_i, X_{it})\,\neq 0$$

Second, if slope observation is constant and time variant or the model's intercept is different across observations. Furthermore, there are two limitations when applying this model. One of the limitations is we cannot include too many dummy variables because it will cause higher K and will lead to larger degree of freedom. Thus, we will miss important information. Another limitation is FEM is not able to evaluate the impact of time invariant variables.

FEM equation is provided below:

$$Y_{it} = \beta_{1i} + \beta_2 X_{it} + \mu_{it}, i = 1, \dots, N, t = 1, \dots, T \tag{7}$$

Where Y_{it} is the dependent variable observed for individual $i = 1, \dots, N$ at time $t = 1, \dots, T$, β_{1i} is the mean for intercept term, β_2 is the coefficient of X_{it}, μ_{it} is the combination between time series and cross-sectional error component. It assumed has normally distribution, $\mu_{it} \sim N(0,1)$.

3.4.4 Model Comparison

Therefore, we decide to compare among three models in order to choose the best model in the equation. We use Likelihood test to compare among the Pooled OLS and FEM, if we reject null hypothesis, we choose FEM. Besides, we use LM test to compare Pooled OLS and REM. If we reject null hypothesis, REM preferable. The last pair of comparison, FEM and REM, tested by Hausman test. If we reject null hypothesis, FEM is more suitable than REM. Yet, Hausman test cannot involve time fixed effects, it only available under homoscedasticity (Schmidheiny, 2016).

Pooled vs FEM (Likelihood test)

To compare the suitable among Pooled OLS and FEM, we apply Likelihood test. We indicate

"$H_0: \mu_i = 0$" and "$H_1: \mu_i \neq 0$"

Assume our significant level () to be 0.01/0.05/0.1. We reject H_0 if P-value is smaller than. Moreover, we can reject H_0 if the test statistic is greater than critical value, otherwise, we do not reject H_0.

Pooled vs REM (LM test)

To compare the suitable among Pooled OLS and REM, we apply Langrange Multiplier (LM) test. We indicate

"$H_0: \mu_i = 0$" and "$H_1: \mu_i \neq 0$"

Assume our significant level () to be 0.01/0.05/0.1. We reject H_0 if P-value is smaller than. Moreover, we can reject H_0 if the test statistic is greater than critical value, otherwise, we do not reject H_0.

FEM vs REM (Hausman test)

To compare the suitable among FEM and REM, we apply Hausman test. We indicate

"$H_0: \text{Cor}(\mu_i, X_{it}) = 0$" and "$H_1: \text{Cor}(\mu_i, X_{it}) \neq 0$"

Assume our significant level () to be 0.01/0.05/0.1. We reject H_0 if P-value is smaller than. Moreover, we can reject H_0 if the test statistic is greater than critical value, otherwise, we do not reject H_0.

3.5 Deriving Long-run GDP Growth

We used lagged variable which is LNGDP(-1) to detect the short run effect of the impact of foreign worker on economic growth. Furthermore, we have done some transformation in our estimation procedure in order to get long run effect which can find out whether there is difference exist in the short run and long run. The transformation is conducted by following steps:

$$Y_{it} = \beta_0 + \beta_1 X_{it-1} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \mu_{it} \tag{8}$$

$$Y_i = \beta_0 + \beta_1 Y_{it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 In X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \mu_{it} \tag{9}$$

$$(1 - \beta_1)Y_i = \beta_0 + \beta_2 X_{2it} + \beta_3 In X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \mu_{it} \tag{10}$$

$$InY_i = \frac{\beta_0}{1-\beta_1} + \frac{\beta_2}{1-\beta_1} X_{2it} + \frac{\beta_3}{1-\beta_1} X_{3it} + \frac{\beta_4}{1-\beta_1} X_{4it} + \frac{\beta_5}{1-\beta_1} X_{5it} + \frac{\beta_6}{1-\beta_1} X_{6it} + \frac{\beta_7}{1-\beta_1} X_{7it} + \frac{\beta_8}{1-\beta_1} X_{8it} + \mu_{it} \tag{11}$$

From Equation (8) to Equation (11), it shows the transformation from short-run coefficient to long-run coefficient of each variable by eliminating the lagged variable. Equation (12) is our final long-run model which show as below:

$$InY_i = \frac{\beta_0}{1-\beta_1} + \frac{\beta_2}{1-\beta_1} InTLF_{2it} + \frac{\beta_3}{1-\beta_1} InLP_{3it} + \frac{\beta_4}{1-\beta_1} InCS_{4it} + \frac{\beta_5}{1-\beta_1} InFW_{5it} + \frac{\beta_6}{1-\beta_1} InREMI_{6it} + \frac{\beta_7}{1-\beta_1} InHEALTH_{7it} + \frac{\beta_8}{1-\beta_1} InHC_{8it} + \mu_{it} \tag{12}$$

3.6   The optimal point of Remittances

There are many previous studies indicated that the remittances has both positive and negative effects (Chami, Cosimano & Gapen, 2008; Azam, 2014; Edrees, 2016). Sending countries would take advantages on the outflow of remittances through the increase of export. Nevertheless, negative impact toward economic growth might emerge in the long term. So, we have reorganized our model to determine the optimal point of remittances toward the economy. The equation shown as below:

By deriving Equation (13) against remittances, we get:

$$lnY_{it} = \beta_0 + \beta_1 lnTLF_{it} + \beta_2 lnLP_{it} + \beta_3 lnCS_{it} + \beta_4 lnFW_{it} + \beta_5 lnREMI_{it} +$$
$$\beta_6 lnREMI_{it}^2 + \beta_7 lnHEALTH_{it} + \beta_8 HC_{it} + u_{it} \qquad (13)$$

By derivative of y with respect to lnREMI, we get:

$$\beta_5 + 2\beta_6 lnREM = 0 \qquad (14)$$

By rearrange the Equation (14), we get:

$$lnREMI = -\frac{\beta_5}{2\beta_6} \qquad (15)$$

By exponential both side of Equation (15), we get:

$$exp(lnREMI) = exp(-\frac{\beta_5}{2\beta_6}) \qquad (16)$$

$$REMI = exp(-\frac{\beta_5}{2\beta_6}) \qquad (17)$$

3.7   Conclusion

Overall, this chapter discusses the data sources, data collection and the methodologies to be used in the next chapter. We have choice pooled OLS, fixed effect model and random effect model as our methodologies and used the Solow growth model and Cobb-Douglas function in the study. Next, we also interpreted the long-run effect of foreign worker on the economy as well as the optimal point of remittances. In the following chapter, we will construe and elaborate the data analysis which showed the results have been done.

CHAPTER 4: RESULT AND INTERPRETATIONS

4.0   Introduction

In this chapter, we will focus on analyzing, interpreting and reporting the empirical result from previous methodology. We have first conducted Pooled Ordinary Least Square (POLS) to select the best independent variables based on the Cobb-Douglas Production Function. Random Effect Model (REM) and Fixed Effect Model (FEM) were then added to compare to the POLS in order to select the most efficient model for GDP. Langrange Multiplier (LM) test was employed to compare POLS and REM while Likelihood test was conducted for POLS and FEM. The final model was then formulated by using Hausman test to select the best model between FEM and REM. Furthermore, the long-run effect of exogenous variables towards GDP also has been examined as well as the optimal point of remittances by using transformation on the model. The outcomes of the interaction terms also discovered in this chapter. Lastly, a brief conclusion of the test results will be concluded in last section.

4.1   Baseline Estimation

In order to find out the best fit equation to explain the relationship between the dependent and independent variables, we have adopted multiple stages of regressions by fitting the initial model with additional independent variables.

Table 4.1 discloses the growth regression results with the Gross Domestic Product (GDP) as dependent variable for each stage. We start with Equation (1) where only total labour force (LNTLF) and labour productivity (LNLP) are on the right-hand side of the equation based on the production function. Equation (1) has high R^2 of 0.8958, indicating a well goodness of fit and both LNTLF and LNLP are found to be significant. Nevertheless, the sign of the coefficient of LNLP is negative.

Next, we proceed to the next stage, forming Equation (2) by including one additional variable which is capital stock (LNCS). The R^2 increase slightly to become 0.9809 which means that there is 98.09% the LNTLF, LNLP and LNCS is better fit to GDP. The sign of the coefficient of LNLP remain negative but it turns to become insignificant in Equation (2).

The most important factor which is our focus of study, foreign worker (LNFW), is not included in the equation yet. So, in the following equation (3), we introduce LNFW as the additional factor. R^2 has improved in Equation (3), but the LNLP still appear to be insignificant and negatively relationship with GDP in this equation.

Another variable, remittances (LNREMI) is introduced in Equation (4), R^2 increase around 0.005 to 0.9859 which means the introduction of this variable also enhance the goodness of fit in the model. Nonetheless, the LNFW becomes statistically insignificant together with LNLP in Equation (4). Since the R^2 rose as the variables are added into the model. We decided to include health expenditures in the Equation (5) which it has been proven to be statistically significant for all the variables except for the LNFW.

By moving forward to Equation (6), the human capital proxy as education level is next introduced into the model in order to improve the goodness of fit marginally. As a result, the significance of LNLP has improved from 10% to 5% significant level. Besides, the significance of foreign worker has changed from statistically insignificant to become statistically significant at 5%. Meanwhile, the goodness of fit has improved from 0.9891 to 0.9901.

In Equation (7), the openness trade (OT) is next introduced into the model. However, R^2 remain unchanged which means the introduction of this variable does not contribute to the goodness of fit in the model as it also appears to be statistically insignificant in this model. So, we decided to remove this variable in Equation (7).

After a few stages of testing with different variables, Equation (6) appears to be most appropriate equation to explain the effect of foreign workers on GDP with most of the variables statistically significant at 1% level of significance, only LNLP, LNCS

and LNFW are statistically significant at 5% significance level. Other than that, LNFW is found to have negative effect on GDP.

Table 4.1: Growth Regression using Pooled Ordinary Least Square (POLS)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
C	33.1268***	0.2691	0.2856	1.3263	-2.2218***	-2.9057***	-2.9089***
	(21.7056)	(0.2827)	(0.3009)	(1.6023)	(-2.8355)	(-3.8532)	(-3.8543)
LNTLF	0.9706***	0.2371***	0.2343***	0.2772***	0.5150***	0.5625***	0.5690***
	(63.1753)	(14.1197)	(14.0348)	(18.6425)	(21.9473)	(24.0577)	(21.2476)
LNLP	-3.8826***	-0.1071	-0.0877	-0.1583	0.1728*	0.2256**	0.2192**
	(-19.2201)	(-0.9113)	(-0.7503)	(-1.5586)	(1.8510)	(2.5236)	(2.4266)
LNCS	--	0.7946***	0.7834***	0.6830***	0.4876***	0.4530**	0.4501***
		(47.4938)	(45.0379)	(40.1926)	(22.2683)	(21.1085)	(20.2315)
LNFW	--	--	0.0176**	0.0092	-0.0024	-0.0153**	-0.0159***
			(2.2909)	(1.2767)	(-0.4021)	(-2.5639)	(-2.6108)
LNREMI	--	--	--	0.0825***	0.0277***	0.0244***	0.0228***
				(12.8847)	(3.8440)	(3.5467)	(2.9878)
LNHEALTH	--	--	--	--	0.2867***	0.2689***	0.2738***
					(12.2030)	(11.9173)	(11.1416)
HC	--	--	--	--	--	0.1704***	0.1698***
						(7.0748)	(7.0411)
OT	--	--	--	--	--	--	0.0001
							(0.5029)
R^2	0.8958	0.9809	0.9813	0.9859	0.9891	0.9901	0.9901
Adjusted R^2	0.8954	0.9808	0.9811	0.9858	0.9890	0.9899	0.9899
F-statistic	2179.857***	8667.780***	6606.186***	7048.157***	7625.833***	7182.291***	6275.164***
D-W test Stat	0.0223	0.0189	0.0191	0.0414	0.0396	0.0443	0.1892

Note: The asterisks*, **, *** indicate rejection of the null hypothesis at 10%, 5% and 1% level of significance respectively. T-statistic in parentheses.

Where C = intercept, LNTLF = natural log of Total Labour Force, LNLP = natural log of Labour Productivity, LNCS = natural log of Capital Stock, LNFW = natural log of Foreign Workers, LNREMI = natural log of Remittances, LNHEALTH = natural log of Health Expenditure, HC = Human Capital and OT = Openness Trade.

4.2 From Pooled Ordinary Least Square (POLS) to Random Effect Model (REM) and Fixed Effect Model (FEM) Estimated

By matching POLS and REM, they have consistent results in sign and they are significant in each exogenous variables as well as the goodness of fit (R^2). From the Table 4.2, the REM results indicated that total labour force (LNTLF), labour productivity (LNLP), capital stock (CS), remittances outward (LNREMI), health expenditure (LNHEALTH) and human capital (HC) are statistically significant at 5% significance level. Instead, foreign workers (LNFW) are negative and insignificant with the coefficient of -0.0027. The goodness of fit (R^2) showed high of 0.9270 in this model.

GDP per capita (LNGDP) will increase by 0.4117 percentage point for each additional percentages point of total labour force in average, ceteris paribus. If labour productivity increases by 1 percentage point, on average, the GDP will raise by 0.3364 percentages point, ceteris paribus. Besides, for each additional percentage point increases in the capital stock and remittances outward, the GDP will increase by 0.5314 and 0.0342 percentages point respectively with holding each variable are constant. The increasing on one percentages point in health expenditures, on average, the GDP will rise by 0.1288 percentages point, ceteris paribus. An additional percentages point on human capital will increase the GDP by 0.0896 percentages point, ceteris paribus.

By comparing POLS and FEM, most of the results are similar except the foreign workers. From the FEM results of Table 4.2, the total labour force (LNTLF), labour productivity (LNLP), capital stock (LNCS), remittances outward (LNREMI) and health expenditures (LNHEALTH) are statistically significant at 1% significance

level. The foreign workers (LNFW) and human capital (HC) are statistically significant at 5% significance level.

By comparing POLS and FEM, most of the results are similar except the foreign workers. From the FEM results of Table 4.2, the total labour force total labour force (LNTLF), labour productivity (LNLP), capital stock (LNCS), remittances outward (LNREMI) and health expenditures (LNHEALTH) are statistically significant at 1% significance level. The foreign workers (LNFW) and human capital (HC) are statistically significant at 5% significance level.

GDP growth, on average will increase by 0.1998 percentages point for each additional percentages point of total labour force with holding other variable constant. This result is consistent with our expected relationship. When the number of workforce in the country increased, it could expand the economy (Washington, 2011). Every one percentage point increase in labour productivity will lead to the increase of 0.3562 percentages point in GDP. This is consistent with our theoretical expectation. Sharpe et al. (2008) suggested that the growth of labour productivity is one of the important sources to improve the GDP per capita. From some previous researches, it showed that labour productivity of foreign workers contributes larger growth to economy in the long-run (Palel et al., 2016; Thangavelu, 2012).

Furthermore, when capital stock increase by 1 percentage point, on average, the GDP will raising by 0.4264 percentages point, ceteris paribus. Capital stock is anticipated to have a positive impact on economic growth (Investopedia, 2017). GDP per capita is needed to produce goods and services in order to faster an economy and lead to increase national income.

The GDP will increase by 0.0087 percentages point when there is 1 percentage point increase on foreign worker, ceteris paribus. This result is consistent with our expected relationship as stated by Christofides, Clerides, Hadjiyiannis and Michael (2007), Carbaugh (2004) and Noor et al. (2011) who tells that there is a positive relationship between number of foreign workers and GDP per capita.

For each additional percentage point increase in health expenditure, the GDP growth will rise by 0.1824 percentage point with holding other variables remaining the same. This is consistent with our theoretical expectation. Health expenditure is expected to have a positive impact on GDP per capita (Sirang, et al., 2016; Kurt, 2015; Piabuo and Tieguhong, 2017). These researchers mentioned that increase the health expenditure will lead to higher GDP per capita in the long run. A good health worker will tend to increase their productivity, thus enhance the economic growth.

When the outflow of remittances increase by 1 percentage point, on average, it will lead to increase in GDP by 0.0295 percentages point. This result is inconsistent with our theoretical expectation as stated by Akayleh (2016) who suggest negative relationship between outflows of remittances on the GDP per capita. However, the possible reason for this situation is that when the remittances outward from the host country, it will cut down the consumption demand and discourages investors to invest into their host country. Investment decrease lead to the income falls and the investment activities tend to reduce further. This situation will keep repeating and create a multiplier effect in macroeconomics.

Other than that, human capital proxy as education level of foreign workers in our research. The GDP will increase by 0.1395 percentages point if the human capital increases by 1 percentage point with holding other variables constant. This result indicates that it has a consistent relationship with previous studies of Jajri and Ismail (2010) and Sirag, Nor, Adamu and Bui (2016) in which they found that higher education level provide more effective or exert positive effect on GDP per capita.

4.3   Model Comparison

We conducted POLS, REM and FEM at the same time in order to select the best model to explain the relationship between Gross Domestic Product per capita (GDP per capita) and foreign workers. Among these three models, we carried out several additional tests to choose the best model. Firstly, we carried out the Lagrange Multiplier test to compare the pooled OLS model with random effect model (REM). From the Table 4.2, the result stated that p-value (0.0000) is smaller than the significance level (α) at 1%, 5% and 10% respectively. Therefore, null hypothesis is rejected and it indicates that REM is more suitable than the pooled OLS model. Next, Likelihood test was conducted to determine whether pooled OLS model or fixed effect model (FEM) is more preferable. According to the result, the p-value (0.0000) shows that FEM is more suitable as compared to pooled OLS model as null hypothesis is rejected at 1%, 5% and 10% significance level. Lastly, we performed Hausman test to identify the best model between FEM and REM. From Table 4.2, we found that the p-value implied to reject the null hypothesis as the p-value (0.0000) is smaller than the value at the significant level 1%, 5% and 10% respectively. So, FEM is more appropriate as compared to REM.

Table 4.2: Estimation of Model POLS, REM, FEM

Model	POLS	REM	FEM
C	-2.9057***	-2.3439***	0.3481
	(-3.8532)	(-2.8895)	(0.3724)
LNTLF	0.5625***	0.4117***	0.1998***
	(24.0577)	(11.8256)	(3.4058)
LNLP	0.2256**	0.3364***	0.3562***
	(2.5236)	(3.4454)	(3.4659)
LNCS	0.4530**	0.5314***	0.4264***
	(21.1085)	(16.2661)	(10.2945)
LNFW	-0.0153**	-0.0027	0.0087**
	(-2.5639)	(-0.7019)	(2.1237)
LNREMI	0.0244***	0.0342***	0.0295***
	(3.5467)	(7.4256)	(0.1408)
LNHEALTH	0.2689***	0.1288***	0.1824***
	(11.9173)	(6.5327)	(8.1967)
HC	0.1704***	0.0896**	0.1395**
	(7.0748)	(1.9763)	(2.4993)
R^2	0.9901	0.9270	0.9991
ADJUSTED R^2	0.9899	0.9260	0.9990
F-STATISTIC	7182.291***	909.3627***	12478.83***
D-W TEST STAT	0.0443	0.3076	0.3648
LM TEST	49.2246***	--	--
HAUSMAN TEST	--	67.7801***	--
LIKELIHOOD TEST	--	--	1198.4627***

Note: The asterisks*, **, *** indicate rejection of the null hypothesis at 10%, 5% and 1% level of significance respectively. T-statistic in parentheses.

4.4 Relationship between GDP Growth and Foreign Workers when Foreign Workers Interact with Labour Productivity

Our estimation result indicates that foreign workers have positive and significant contribution result to GDP growth when the foreign worker interacts with labour productivity. From the Table 4.3, Model (1), the coefficient of foreign workers and total labour productivity is 0.1303 and the t-statistic is 4.7329 at the 1% significant level. Jajri and Ismail (2010) believed that the effective labour does play a role in determining economic growth. Human capital becomes more important because it would influence the labour's productivity directly, hence encourage GDP growth. They also stated that foreign workers with low-skilled or semi-skilled might provide less productivity. Therefore, high-income countries are desired in attracting high-skilled foreign workers in order to stimulate productivity as well as the economic growth. However, the presence of foreign workers helps the host economy maintain a positive growth when there is short supply in labour market. In developed countries, companies opt for hiring foreign workers as they are willing enough to work for the companies' benefit and then boost the economy indirectly. Due to the significant impact of foreign workers towards the labour productivity, the government may need a long time to decrease the dependency on foreign workers in order to achieve their economic goals.

4.5 Impact of Foreign Workers on Economic Growth in Short-run and Long-run

Based on the Table 4.3, Model (2), the result shows that the foreign workers are positively influence the economic growth in both short run and long run. It means that an increase in the number of foreign workers will lead to an increase in both short-run and long-run of economic growth. In our study, the coefficient of foreign workers is 0.0648 and with t-statistic 2.6171 which means foreign workers is positively affect the GDP per capita in both short run and long run. The increases or arrival of foreign workers create new possibilities for production, it would lead to consumer demand for

goods and services increases. According to Peri (2010), foreign workers may promote specialization and stimulate investment to expand the productive capacity of economy. This would help to produce gains and boosts income per worker. However, at the same time, it will decrease the job opportunity of local workers. According to Merler (2017), said that in the long run, high-skilled and low-skilled foreign workers will bring advantages to their own countries by increasing income per worker and their standard of livings. Foreign workers with high-skilled bring diverse talent and expertise, while low-skilled foreign workers would fill essential occupations for which local workers are in short supply and allow local workers to be employed at higher-skilled jobs.

4.6 Substitute or Complementary Effect of Foreign Workers

According to the Table 4.3, Model (3), the coefficient of foreign workers and total labour force is -0.0049 and the t-statistic are -2.0798 at the 5% significant level. This indicates that there is substitute effect among local labour and foreign labour. Jajri and Ismail (2006) proved that domestic job opportunities will be endangered by foreign workers as they can easily replace local workers especially in heavy industry. Watson (2012) states that, the reasons of workers shortages in Australian construction industry are lack of funding contributions apply to training and development, imbalance supply and demand level of labour and investment in apprenticeship system are less. These factors will cause the related industries forced to employ foreign workers to substitute unskilled local workers. Besides, cost of hiring them is lower due to cheaper salaries and they are willing to work the 3D works became the advantages for employers to employ them. Hence, decline in job opportunity for native workers has caused the increase in unemployment of the countries.

4.7 Optimal Point for Remittances

According to Table 4.3, Model (4), both logarithm remittances (LNREMI) and logarithm remittances square (LNREMI^2) are shown as positive sign which indicated that remittances are positively related with a country growth. It reached optimal point at 1.823676284E-20 which almost closes to zero. In short, remittances have an upward-sloping curve relationship with economic growth. The higher the foreign workers' remittances outflow will lead to higher economic growth. The result can be supported by Yaseen (2012), Datta and Sarkar (2014), Mensbrugghe and Roland-Holst (2009), Ortega and Peri (2009). According to these researchers, migration increases supply of labour to host country which reduces unemployment rate, increases production and thus improved the GDP. Furthermore, remittances outflow from the host country to other countries caused the real exchange rate drop which means the host country's currency depreciated. Thus, goods and services in that country become cheaper as compared to other countries; people always prefer to buy the cheaper goods and services, and hence the export quantity in the host country increases. As a result, the country sales are rise and it may create job opportunity and also higher employment, especially in the countries that are mainly taking part in export activities. Consequently, the economic growth of host country can be improved.

Table 4.3: Estimation Result of Interaction of Independent Variables

Model	(1)	(2)	(3)	(4)
C	2.6774**	-1.5231**	0.4163	0.3238
	(2.5790)	(-2.5808)	(0.4466)	(0.3449)
LNTLF	0.1289**	0.0404	0.1984***	0.1931***
	(2.1738)	(1.0625)	(3.3931)	(3.1006)
LNLP	0.3778	0.3139***	0.3357***	0.3656***
	(1.2450)	(4.9206)	(3.2621)	(3.4216)
LNCS	0.4112***	-0.0019	0.4314***	0.4282***
	(10.1181)	(-0.0617)	(10.4341)	(10.2399)
LNFW	-0.9751***	0.0077***	0.0498**	0.0091**
	(-4.6901)	(2.6171)	(2.4693)	(2.1220)
LNREMI	0.0254***	0.0001	0.0283***	**0.0268***
	(5.3015)	(0.0339)	(5.8571)	(2.7702)
LNHEALTH	0.1998***	0.0074	0.1765***	0.1813***
	(9.0562)	(0.4949)	(7.8984)	(8.0479)
HC	0.1645***	0.0993***	0.1711***	0.1398**
	(3.0004)	(2.7579)	(2.9672)	(2.5023)
LNLP x LNFW	**0.1303***	--	--	--
	(4.7329)			
LNGDP(-1)	--	**0.8812***	--	--
		(27.9402)		
LNTLF x LNFW	--	--	**-0.0049**	--
			(-2.0798)	
LNREMI^2	--	--	--	**0.0003**
				(0.3245)
R^2	0.9991	0.9997	0.9991	0.9991
ADJUSTED R^2	0.9990	0.9997	0.9990	0.9990
F-STATISTIC	12731.72***	33393.52***	12261.09***	12151.19***
D-W TEST STAT	0.4083	1.1798	0.3626	0.3651

Note: The asterisks*, **, *** indicate rejection of the null hypothesis at 10%, 5% and 1% level of significance respectively. T-statistic in parentheses.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0   Introduction

Our objective of this paper aims to investigate the impact of foreign workers on the economic growth. By using the data from 1995 to 2009 and taking 34 countries as our sample of study. We would like to investigate the results of the influx of foreign workers on the Gross Domestic Product (GDP) per capita of the importing countries by considering the other factors such as labour productivity, capital stock, total labour force, human capital, remittances and health expenditure. Therefore, in this chapter, we will summarize the findings of our study. The last part of research, we will discuss the limitations in our study and also some of the recommendations for future research in order to improve the further analysis.

5.1   Summary of Result

5.1.1 FEM is the Best Model to Explain the Relationship between Economic Growth and Foreign Workers

Our study attempted to answer the research questions which set in Chapter 1 according to the few tests that we have carried out in methodology and empirical findings. We have performed Likelihood test, Langrange Multiplier (LM) test and Hausman test between POLS, REM and FEM. FEM is the most suitable model to illustrate the impact of foreign labour to the gross domestic product (GDP) per capita. Based on FEM, the coefficient of total labour force, labour productivity, capital stock, remittances and health are all positive and significant at 1% significant level. However, foreign workers and human capital are positive and statistically significant at 5% significant level.

5.1.2 When Foreign Workers Interact with Labour Productivity which Improves the Economic Growth

Interactive term is the key to connect the independent variables which are formed to test the impact to the economy. Based on table 4.3, the result shows the positive coefficient (0.1303) that significant at 1% significance level. It means that the interplay between labour productivity and foreign workers carry out positive effect to the economy growth.

5.1.3 Foreign Workers have Positive Impact on the Economic Growth in Short-run and Long-run

Moreover, natural log GDP bring out the positive coefficient, 0.8812 significant at 1% significance level. This indicates that foreign workers bring favorable effect to the economic growth in the short run and also long run.

5.1.4 There is Substitute Effect among Local Labour and Foreign Labour

Next, the interaction among total labour force and foreign workers lead to a disadvantageous effect to the GDP growth according to negative coefficient (-0.0049) which significant at 5% significance level. So that we can suppose there is substitute effect exist among local labour and foreign labour.

5.1.5 Remittances and Economic Growth have an Upward Slopping Curve

Furthermore, remittances and economic growth own an upward slopping curve under positive coefficient (0.0003) insignificant at 10%, 5% and 1% significant level. We revealed the optimal point for remittances which is at 1.823676284E-20. Since optimal point is close to zero and it is an upward slopping curve, it means the more the remittances outflow, the more it can improve the country's economic growth.

5.2   Policy Implication

The impacts brought by the incoming of foreign worker to the global economic growth are having distinct effect from one country to another due to various reasons, such as the quality of foreign worker itself or the way of handling the issue from the particular countries. Hence, the incoming of foreign worker to each of the country might have varied result towards the GDP growth. In this case, a policy maker is taking an important role to identify the best policy to fit with the situation of their country itself.

From our findings, incoming of foreign worker brings a positive impact towards a country's economic growth in the situations when foreign workers interact with labour productivity and in both short run and long run as well. Moreover, the consequences brought by the foreign workers in term of remittances, we found an optimal point of the remittances that will boost the economic growth. Since the expansion of foreign workers and remittances of the country are good for the economic growth, we would suggest that government may take in more foreign worker into the country as long as the country is able to afford the amount of foreign labour and it is legitimate to the labour immigration law.

However, in the next finding we found that foreign worker also having the substitution effect to the employment of native workers. This indicates that foreign worker may substitute the vacancy of job to the native workers and this incurs competition between them. Hence, we would recommend government to put more

effort in identifying the appropriate amount of foreign worker that needs by the country to prevent the redundancy of incoming foreign worker. Apart from that, selecting the foreign labour's skill is also needed to fill up the labour shortage problem in particular sector. For instance, bringing in the foreign worker can fill up the gaps in term of the job vacancy which is been refused by the native workers.

Following by the consequences brought by the foreign worker in term of remittances, we found an optimal point of the remittances that will not harm the economic growth, as an increase in remittance beyond this point will bring the negative impact to the economic growth. Hence, government is recommended to maintain the remittances below the optimal point by controlling the number of inflow of foreign worker. In addition, government can reinforce in the labour immigration law and refine them before taking in so that the economic growth of a country can be enhanced. Consequently, bringing in foreign worker barely means a bad thing to a country, it might help to maximize a country's growth if a government able to handle it well.

5.3   Limitation and Recommendation

Every research has its own limitations that will influence their study. Likewise, even though our study has achieved the objectives but there are some limitations and shortcomings that we have found in our study throughout the whole research process.

One of the significant problems that we facing in our study is the issue of limited foreign worker data. We could not get the actual figure of the foreign workers for most of the countries. Thus, it may cause our study to have insufficient information to explain about the economic growth. We only considered a part number of foreign workers in the research. Furthermore, due to the policy of country, the number of illegal foreign workers is unable to be considered in the study. The immigration department of country is unable to track the number of illegal foreign workers that are without registration and biography records. However, these illegal might account for a large amount and they may work without permit license under a company, this may cause our result become inappropriate.

The limitations and shortcomings of the study discussed above suggested that it can be further extended and enhanced in some areas. First and foremost, the possibility for future studies would be an empirical study focusing on the effect of other factors that will influence the economic growth such as level of education of primary education, secondary education, and tertiary education since current study only considered the human capital as the education level. There might have some difficulties in obtaining the data; however, if future researchers considered on level of education, it will lead to a broader view and deeper perspective on the relationship between different levels of education and the growth of economic.

Second, by using panel data, a comparative research may conduct on those developing countries such as Indonesia, Pakistan, Myanmar, Philippines and so on to investigate the effect of remittances on economic growth in a broad way. In addition, future researchers can also carry out a study that not only to investigate how the economic growth influenced by the foreign labour's remittances, but also to support the truth of the effects of remittances on education, welfare, poverty reduction, health and standard of living in order to determine the overall significance and importance of foreign labour's remittances.

Last but not least, due to the constraint on data collection, future researchers are suggested to collect and obtain data from institutional database instead. There are many alternatives to obtain data such as World Bank Database, International Labour Organization (ILO), International Monetary Fund (IMF), and Penn World Table which provides not only annually data, but also quarterly and monthly data as well. Furthermore, government official website is also one of the alternatives to obtain the data. For example, Department of Statistic in Malaysia will also provide a lot of free and accurate data. The mentioned department is funded by the government to carry out those census annually, quarterly and monthly.

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Pooled Ordinary Least Square (POLS)

Dependent Variable: LNGDP
Method: Panel Least Squares
Date: 07/10/17   Time: 12:28
Sample: 1995 2009
Periods included: 15
Cross-sections included: 34
Total panel (unbalanced) observations: 509

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.905763	0.754116	-3.853207	0.0001
LNTLF	0.562462	0.023380	24.05774	0.0000
LNLP	0.225604	0.089397	2.523606	0.0119
LNCS	0.453025	0.021462	21.10845	0.0000
LNFW	-0.015319	0.005975	-2.563937	0.0106
LNREMI	0.024442	0.006892	3.546652	0.0004
LNHEALTH	0.268944	0.022567	11.91734	0.0000
HC	0.170369	0.024081	7.074836	0.0000

R-squared	0.990133	Mean dependent var		12.56436
Adjusted R-squared	0.989995	S.D. dependent var		1.817931
S.E. of regression	0.181834	Akaike info criterion		-0.555851
Sum squared resid	16.56490	Schwarz criterion		-0.489329
Log likelihood	149.4640	Hannan-Quinn criter.		-0.529768
F-statistic	7182.291	Durbin-Watson stat		0.044308
Prob(F-statistic)	0.000000			

Random Effect Model (REM)

Dependent Variable: LNGDP
Method: Panel EGLS (Cross-section random effects)
Date: 07/10/17   Time: 13:30
Sample: 1995 2009
Periods included: 15
Cross-sections included: 34
Total panel (unbalanced) observations: 509
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.343923	0.811172	-2.889549	0.0040
LNTLF	0.411683	0.034723	11.85618	0.0000
LNLP	0.336367	0.097628	3.445396	0.0006
LNCS	0.531419	0.032670	16.26611	0.0000
LNFW	-0.002669	0.003803	-0.701925	0.4831
LNREMI	0.034232	0.004610	7.425634	0.0000
LNHEALTH	0.128765	0.019711	6.532657	0.0000
HC	0.089617	0.045346	1.976287	0.0487

Effects Specification

			S.D.	Rho
Cross-section random			0.187982	0.9132
Idiosyncratic random			0.057968	0.0868

Weighted Statistics

R-squared	0.927037	Mean dependent var	0.998204
Adjusted R-squared	0.926018	S.D. dependent var	0.225904
S.E. of regression	0.061405	Sum squared resid	1.889082
F-statistic	909.3627	Durbin-Watson stat	0.307638
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.983803	Mean dependent var	12.56436
Sum squared resid	27.19210	Durbin-Watson stat	0.021372

Fixed Effect Model (FEM)

Dependent Variable: LNGDP
Method: Panel Least Squares
Date: 07/10/17   Time: 18:30
Sample: 1995 2009
Periods included: 15
Cross-sections included: 34
Total panel (unbalanced) observations: 509

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.348141	0.934744	0.372445	0.7097
LNTLF	0.199797	0.058664	3.405775	0.0007
LNLP	0.356244	0.102785	3.465905	0.0006
LNCS	0.426432	0.041423	10.29448	0.0000
LNFW	0.008722	0.004107	2.123731	0.0342
LNREMI	0.029541	0.004811	6.140814	0.0000
LNHEALTH	0.182357	0.022248	8.196694	0.0000
HC	0.139512	0.055821	2.499280	0.0128

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999063	Mean dependent var	12.56436
Adjusted R-squared	0.998983	S.D. dependent var	1.817931
S.E. of regression	0.057968	Akaike info criterion	-2.780728
Sum squared resid	1.572619	Schwarz criterion	-2.439804
Log likelihood	748.6954	Hannan-Quinn criter.	-2.647053
F-statistic	12478.83	Durbin-Watson stat	0.364773
Prob(F-statistic)	0.000000		

Langrange Multiplier (LM) Test

Lagrange multiplier (LM) test for panel data
Date: 07/10/17   Time: 18:07
Sample: 1995 2009
Total panel observations: 509
Probability in ()

Null (no rand. effect) Alternative	Cross-section One-sided	Period One-sided	Both
Honda	49.22461	2.001767	36.22252
	(0.0000)	(0.0227)	(0.0000)
King-Wu	49.22461	2.001767	28.54299
	(0.0000)	(0.0227)	(0.0000)
SLM	49.72487	3.101698	--
	(0.0000)	(0.0010)	--
GHM	--	--	2427.069
	--	--	(0.0000)

Likelihood Test

Redundant Fixed Effects Tests
Equation: FEM
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	135.199824	(33,468)	0.0000
Cross-section Chi-square	1198.462719	33	0.0000

Cross-section fixed effects test equation:
Dependent Variable: LNGDP
Method: Panel Least Squares
Date: 07/22/17   Time: 22:41
Sample: 1995 2009
Periods included: 15
Cross-sections included: 34
Total panel (unbalanced) observations: 509

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.905763	0.754116	-3.853207	0.0001
LNTLF	0.562462	0.023380	24.05774	0.0000
LNLP	0.225604	0.089397	2.523606	0.0119
LNCS	0.453025	0.021462	21.10845	0.0000
LNFW	-0.015319	0.005975	-2.563937	0.0106
LNREMI	0.024442	0.006892	3.546652	0.0004
LNHEALTH	0.268944	0.022567	11.91734	0.0000
HC	0.170369	0.024081	7.074836	0.0000

R-squared	0.990133	Mean dependent var	12.56436
Adjusted R-squared	0.989995	S.D. dependent var	1.817931
S.E. of regression	0.181834	Akaike info criterion	-0.555851
Sum squared resid	16.56490	Schwarz criterion	-0.489329
Log likelihood	149.4640	Hannan-Quinn criter.	-0.529768
F-statistic	7182.291	Durbin-Watson stat	0.188661
Prob(F-statistic)	0.000000		

Hausman Test

Correlated Random Effects - Hausman Test
Equation: REM
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	67.780132	7	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LNTLF	0.199797	0.411683	0.002236	0.0000
LNLP	0.356244	0.336367	0.001034	0.5364
LNCS	0.426432	0.531419	0.000649	0.0000
LNFW	0.008722	-0.002669	0.000002	0.0000
LNREMI	0.029541	0.034232	0.000002	0.0006
LNHEALTH	0.182357	0.128765	0.000106	0.0000
HC	0.139512	0.089617	0.001060	0.1253

Cross-section random effects test equation:
Dependent Variable: LNGDP
Method: Panel Least Squares
Date: 07/22/17   Time: 22:44
Sample: 1995 2009
Periods included: 15
Cross-sections included: 34
Total panel (unbalanced) observations: 509

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.348141	0.934744	0.372445	0.7097
LNTLF	0.199797	0.058664	3.405775	0.0007
LNLP	0.356244	0.102785	3.465905	0.0006
LNCS	0.426432	0.041423	10.29448	0.0000
LNFW	0.008722	0.004107	2.123731	0.0342
LNREMI	0.029541	0.004811	6.140814	0.0000
LNHEALTH	0.182357	0.022248	8.196694	0.0000
HC	0.139512	0.055821	2.499280	0.0128

Effects Specification				

Cross-section fixed (dummy variables)

R-squared	0.999063	Mean dependent var	12.56436
Adjusted R-squared	0.998983	S.D. dependent var	1.817931
S.E. of regression	0.057968	Akaike info criterion	-2.780728
Sum squared resid	1.572619	Schwarz criterion	-2.439804
Log likelihood	748.6954	Hannan-Quinn criter.	-2.647053
F-statistic	12478.83	Durbin-Watson stat	0.533040
Prob(F-statistic)	0.000000		

Estimation of Interaction between LNLP and LNFW

Dependent Variable: LNGDP
Method: Panel Least Squares
Date: 04/12/17   Time: 22:50
Sample: 1995 2009
Periods included: 15
Cross-sections included: 34
Total panel (unbalanced) observations: 509

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.912700	1.001429	2.908544	0.0038
LNTLF	0.177040	0.057703	3.068139	0.0023
LNLP	0.155421	0.106659	1.457174	0.1457
LNCS	0.349452	0.040474	8.633886	0.0000
LNREMI	0.029069	0.004653	6.246788	0.0000
LNHEALTH	0.205870	0.021294	9.667939	0.0000
HC	0.114482	0.053506	2.139599	0.0329
OT	0.001759	0.000291	6.052148	0.0000
LNFW	-0.902936	0.200758	-4.497633	0.0000
LNLP*LNFW	0.120480	0.026593	4.530454	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999171	Mean dependent var	12.56436
Adjusted R-squared	0.999097	S.D. dependent var	1.817931
S.E. of regression	0.054640	Akaike info criterion	-2.895387
Sum squared resid	1.391281	Schwarz criterion	-2.537833
Log likelihood	779.8760	Hannan-Quinn criter.	-2.755190
F-statistic	13377.66	Durbin-Watson stat	0.570669
Prob(F-statistic)	0.000000		

Estimation of Long-run Economic Growth

Dependent Variable: LNGDP
Method: Panel Least Squares
Date: 07/22/17   Time: 23:08
Sample (adjusted): 1996 2009
Periods included: 14
Cross-sections included: 34
Total panel (balanced) observations: 476

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.523121	0.590163	-2.580847	0.0102
LNGDP(-1)	0.881227	0.031540	27.94018	0.0000
LNTLF	0.040416	0.038037	1.062548	0.2886
LNLP	0.313890	0.063791	4.920619	0.0000
LNCS	-0.001891	0.030656	-0.061673	0.9509
LNFW	0.007748	0.002961	2.617051	0.0092
LNREMI	0.000106	0.003122	0.033920	0.9730
LNHEALTH	0.007432	0.015018	0.494885	0.6209
HC	0.099344	0.036022	2.757851	0.0061

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999683	Mean dependent var	12.58194
Adjusted R-squared	0.999653	S.D. dependent var	1.812430
S.E. of regression	0.033753	Akaike info criterion	-3.855380
Sum squared resid	0.494450	Schwarz criterion	-3.487843
Log likelihood	959.5804	Hannan-Quinn criter.	-3.710858
F-statistic	33393.52	Durbin-Watson stat	1.179823
Prob(F-statistic)	0.000000		

Estimation of Interaction between LNTLF and LNFW

Dependent Variable: LNGDP
Method: Panel Least Squares
Date: 07/22/17   Time: 23:06
Sample: 1995 2009
Periods included: 15
Cross-sections included: 34
Total panel (unbalanced) observations: 509

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.416278	0.932016	0.446642	0.6553
LNTLF	0.198366	0.058461	3.393141	0.0007
LNLP	0.335666	0.102899	3.262098	0.0012
LNCS	0.431412	0.041346	10.43409	0.0000
LNFW	0.049766	0.020154	2.469277	0.0139
LNREMI	0.028294	0.004831	5.857052	0.0000
LNHEALTH	0.176505	0.022347	7.898447	0.0000
HC	0.171083	0.057658	2.967218	0.0032
LNTLF*LNFW	-0.004892	0.002352	-2.079825	0.0381

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.999072	Mean dependent var	12.56436
Adjusted R-squared	0.998990	S.D. dependent var	1.817931
S.E. of regression	0.057763	Akaike info criterion	-2.786019
Sum squared resid	1.558186	Schwarz criterion	-2.436780
Log likelihood	751.0419	Hannan-Quinn criter.	-2.649083
F-statistic	12261.09	Durbin-Watson stat	0.548704
Prob(F-statistic)	0.000000		

Estimation of Optimal Point of Remittances

Dependent Variable: LNGDP
Method: Panel Least Squares
Date: 07/22/17   Time: 23:08
Sample: 1995 2009
Periods included: 15
Cross-sections included: 34
Total panel (unbalanced) observations: 509

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.323776	0.938647	0.344939	0.7303
LNTLF	0.193073	0.062270	3.100572	0.0020
LNLP	0.365607	0.106854	3.421552	0.0007
LNCS	0.428191	0.041816	10.23991	0.0000
LNFW	0.009139	0.004307	2.121981	0.0344
LNREMI	0.026816	0.009680	2.770194	0.0058
LNHEALTH	0.181262	0.022523	8.047878	0.0000
HC	0.139836	0.055883	2.502292	0.0127
LNREMI^2	0.000295	0.000909	0.324451	0.7457

Effects Specification			

Cross-section fixed (dummy variables)

R-squared	0.999064	Mean dependent var	12.56436
Adjusted R-squared	0.998981	S.D. dependent var	1.817931
S.E. of regression	0.058024	Akaike info criterion	-2.777025
Sum squared resid	1.572264	Schwarz criterion	-2.427785
Log likelihood	748.7528	Hannan-Quinn criter.	-2.640088
F-statistic	12151.19	Durbin-Watson stat	0.533017
Prob(F-statistic)	0.000000		