THE NEXUS OF FUNDAMENTAL MACROECONOMICS FACTORS AND BRAIN DRAIN IN MALAYSIA

BY

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DECLARATION

I hereby declare that the work has been done by myself and no portion of the work contained in this Thesis has been submitted in support of any application for any other degree or qualification on this or any other university or institution of learning.

_______________________________
Siti Nurul Nabila binti Othman Jiwa
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To my future kids, may this inspire you.

Nabila Othman
ABSTRACT

Brain drain is not only an issue in Malaysia but also known globally. The definition of brain drain is the highly trained emigration people from a country into another country where they could find a better opportunity. The rapid growth in the past has brought Malaysia to its present state that it is now a middle-income nation and has caused the skilled people the urge for a better standard of living, better hospitality and other general needs which will benefit them with direct impacts onto the labour market. Usually, these people feel like they could have a better life elsewhere once they are highly educated. Because most of the educated and intelligent people leave Malaysia, the country will face difficulties in maintaining a high intellectual standard because these people are the key to create a more educated and professional society. Therefore, this study will address the pulling factors of macroeconomic fundamentals of host countries on brain drain from Malaysia. The objectives of this study are to determine the pulling effect and examine the gender differences of macroeconomic fundamentals on brain drain in Malaysia.

Keywords: Brain Drain Phenomenon, Immigration, Developing Country, Developed Countries, Gender Differences
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Chapter 1
Introduction

1. Introduction

Brain drain could be defined in the most common way, which is the highly trained emigration
people education from a country to other countries with better opportunities. Brain drain
mostly could happen in developing countries because developed countries will offer
professionals or students who study abroad and graduate a better standard of living, quality of
life, better wages, more stable economy and access to more advanced technology.

Brain drain is not new to Malaysia. It is a problematic phenomenon because talent with
high education and professional degree are leaving the country, contributing to the economic
prosperity of other developed countries. There are three macroeconomics problems that could
be identified. The first one is Malaysia's economic growth. This has caused the slow
development of Malaysia, which causes the increasing number of migration to other countries.
Inflation, the second problem, has caused the talented ones to be less interested in contributing
their energy, work to the country because they are rather working overseas for the advantages
offered and the cost of living there. Unemployment is also a major problem that is happening
in Malaysia because of the pull-factor for the blue- and white-collar workers especially in
tertiary and quaternary sectors in developed countries. Macroeconomics fundamental evolves
around these three problems and affects each other. Based on Investopedia, the definition of
fundamentals are the basic qualitative and quantitative information that contributes to the well-
being of the economy or financial valuation of a company, currency and security. There have
been many problems that are currently happening in Malaysia that are and could affect the
GDP, supply and demand, monetary or fiscal policy or even international trade.

The push and pull factors are the major causes of brain drain (Mugo & Kamere, n.d.).
The push factor is where it forces the people to have a thought of leaving the country to any
other countries or even to the neighbouring countries. Meanwhile, the pull factor is where it
attracts the people to migrate to that particular destination. This push and pull factor
phenomenon occur in countries where talents and abilities are not being recognized and
rewarded. Plus, it could take place when people feel discriminated (sex), social class, and race
and based on their political interest.
The first factors are the push factors. Usually, Malaysian migrants will compare conditions between Malaysia and the Organisation for Economic Co-operation and Development (OECD) countries such as Australia, Ireland, the United States (US), the United Kingdom (UK), and New Zealand (NZ). Malaysian migrants eventually lose their confidence in the Malaysian government due to the political instability that has been happening in a couple of years. In fact, most Malaysian students who study abroad are expected to come back to contribute to Malaysian economy, however most of them do not return due to the good academic facilities and education obtained abroad. Lack of moral and low pay will force them to leave Malaysia, and an excess of Malaysian professionals in the home governance will cause a limitation of job hierarchy and professionals will think of having a permanent residence in the other OECD countries.

The pull factors from the six OECD countries are the second factors to cause brain drain. Many Malaysian students and professionals have moved to the US, Australia, and even Canada because of better facilities, higher pay and more flexible opportunities that are provided for them during their stay. Plus, Malaysian professionals are attracted to the organization structure that is flexible with vigorous leadership and also the booming economy and universities. Other than that, talented Malaysian people also migrate due to high remunerations and benefits, especially in the USA because of higher salaries and living standard to be compared to Malaysia.

1.1. Background of Study

1.1.1. Brain Drain

Based on a study, brain drain affects the human capital, health and education sectors (Srivastava, n.d.). Basically, it has both positive and negative impact on the economy and also to the people themselves. One of the positive effects is that the professionals would explore and push themselves in discovering new opportunities in the host countries because they feel like they do not want to feel burdened by their country’s limitations.

Based on Figure 1, career prospects, social injustice and compensation were the main reasons why Malaysian talented people migrate in 2011 (World Bank, 2011). When Malaysia and other developing countries are suffering economic loss, the development and production of talented people reduce. In fact, Malaysia's economy
would be affected and could no longer be able to compete globally due to the decreasing number of Malaysian talented people that could boost and improve the nation since they are valuable factor in the world economy.

![Brain drain is a symptom of underlying factors... productivity and inclusiveness are key](image)

*Figure 1: World Bank - Malaysia Economic Monitor*

### 1.1.2. Development of the Economy

Human capital is one of the important matters for Malaysia as it is heading towards a high-income nation by 2020. Due to its rapid development in various industries, Malaysia has transformed into an upper-middle-income nation successfully (Ghazali et al., 2015). First and foremost, we need more labour workforce such as engineers, doctors and other skilled people to operate and manage the resources. Besides that, international investors who have operated in Malaysia also demand more professionals, especially in technical experts. Malaysian who are born, raised, and educated are expected to work and give back what was given, however the mobility of labour increases and it encourages them to leave the country and seek employment in foreign countries due to globalization. Even though there are numbers of positive effects of brain drain, the negative effects weight more, so it is crucial for economists to study the issue. Brain drain has caused negative impacts such as shortage of skilled workers in Malaysia. Most organizations from developed countries demand and aim for skilled workers from developing countries for the cheaper labour cost in order to generate more revenue. Due to that, many of these talented people will fill up the
shortage of talented workers in foreign countries. This phenomenon will eventually cause us to lose our human capital and will slow down the development of our country. Hence, it is very important to retain these professionals in Malaysia for the sake of our country’s development.

Economically, short-run adjustment has to be made when Malaysia loses talented people, because of the increasing cost of human capital with physical capital and also unskilled labour for efficiency. It was estimated that 785,000 Malaysians are living overseas – two out of every three are likely to be professionals- and now, in the US, 26,179 Malaysians are believed currently working because the US is the central hub of global high skilled migrants. Over the last few decades, the US is facing problems due to brain drain based on figure 2 where it shows that the number of immigrants has been increasing and it is expected the number will increase through 2020. Malaysians migration to other nations is not a new issue as brain drain has affected all nations.

![Figure 2: Source from Migration Policy](image)

1.1.3. Unemployment

Unemployment in OECD countries will cause a pull factor where the countries will gain Malaysian professionals who look for job opportunities and the availability of working will decrease. Unemployment is one of the major causes of migration. Malaysian migrate not only for income but also due to economic and social circumstances. Mostly developing regions of any economy display the
combination of lower wages and also high unemployment rate which is one of the strong reasons for the migration of skilled workers to developed regions. Below are the graphical figures of the unemployment rates for each five OECD countries that decreased causing a pulling factor for migrants.

Figure 3: Unemployment rate - Australia

Figure 4: Unemployment rate - Ireland

Figure 5: Unemployment rate - United States
Figure 6: Unemployment United Kingdom

Figure 7: Unemployment rate-New Zealand
1.1.4. Gross Domestic Products

The Gross Domestic Product, GDP is the most important statistic to an economy because it tells us an enormous amount about how the economy of the country is doing. Most OECD countries have a strong economy where when the GDP is rising, the income and consumer purchases increase as well. Consumption is said to be the largest part of the GDP calculation because this is where a household or individual would spend their money on (What is GDP and Why is It So Important to Economists and Investors?, n.d.). Investment is focused on investing in new equipment and materials by a company or a business. Government spending means whatever the government has spent on and purchased such as aircraft carriers and salaries of government servants. Exports are the goods being produced in the country and sold to other countries while imports are the goods being produced overseas and being sold to the native country. Below are the figures for GDP for each five OECD countries improving, except for the UK.

Figure 8: GDP per capita - Australia

Figure 3: GDP per capita - Ireland
Australia and Ireland have a similar upward trend as the top 16 and 10 places in the world for GDP. UK and NZ also have a similar upward trend of GDP, and the UK is the top 31 and 28 places in the world. Meanwhile, the United States has a steady upward trending throughout the years with the top 13 place.
1.1.5. Cost of Living

To understand the Consumer Price Index, CPI measures the average change in prices over time that consumers pay for a basket of goods and services, or as known as inflation. Investopedia stated that inflation attempts to quantify the aggregate price level in an economy and thus measure the purchasing power of a country's unit of currency. The CPI represents the monthly cost of a basket of goods and services of the country which could break into eight major groups:

![Figure 7](image)

Below are the figures of CPI for each six OECD countries that are updated monthly, except for Australia and New Zealand which publish quarterly CPI data based from the OECD Home website.

![Figure 13: Inflation rate - Australia](image)
Figure 8: Inflation rate - Ireland

Figure 9: Inflation rate - United States

Figure 10: Inflation rate - United Kingdom
Australia, the US and NZ seem to have a similar trend where the inflation was increasing and decreasing, but then US and Ireland inflation rates decreased to a negative value in 2010.

1.2. Problem Statement

Currently, firms in Malaysia are already facing difficulties in employing suitable candidates due to the hike in demand for talented workers that outweigh their supply in the long term. The demand for highly-skilled manpower will increase in the current and future job market since Malaysia is forging ahead with the Industrial Revolution (IR) 4.0. Changes in the system are needed such as exposing the primary students on app development in schools such as on how to develop a technology using codes and algorithms (Bernama, 2018). INTI Kuala Lumpur chief executive Anis Laila Yap Abdullah (2019) said “As organisations adopt technologies to enhance their processes, the competencies required by graduates and professionals are also shifting to emphasise complex problem solving, the ability to lead teams made up of humans and machines, and to have a solid foundation in ICT and data analytics to make informed business decisions quickly.”. Addressing students on the topic of careers and opportunities in IR4.0, students must be able to align themselves to the changes of the emerging workplace to remain relevant and competitive said the Deputy International Trade and Industry Minister Dr Ong Kian Ming (2019). Moreover, more people below 23 of age have emigrated and many of these talents do not return once they left (World Bank, 2011). The key factors that motivate Malaysians to move abroad are the differences in
earnings, career prospects, education and quality of life. Mostly, skilled workers or youngsters believe that other countries such as the United Kingdom, Singapore, and Hong Kong are better in terms of its career advancement, higher salaries being offered and better education system and how pessimistic they have been towards Malaysia’s future. Most past studies focus on the push factors of brain drain and, therefore, this study will address the pulling factors of macroeconomic fundamentals of host countries on brain drain from Malaysia.

1.3. Research Question
As discussed earlier in the research problem, there are a couple of factors that cause brain drain in Malaysia. Nonetheless, this study will address the following research:

1. How do macroeconomics fundamentals of host countries affect brain drain from Malaysia?

2. Is there any within-dimension effect of emigration rate among the countries under study?

1.4. Research Objective
The general objective of the study is to examine the effect of fundamental macroeconomic factors on brain drain in Malaysia. This study will analyse the macroeconomic aspects of brain drain. The objectives of this study are as follows:

1. To determine the pulling effect of macroeconomic fundamentals on brain drain in Malaysia.

2. To determine the within-dimension effect of emigration rate among the countries under study.
1.5. Scope of the Study
The study is conducted with one dependent variable, which is brain drain by the number of emigrants from Malaysia and with three independent variables are unemployment, economic activities and cost of living. The host countries for this study will be the five OECD countries, Australia, Ireland, the United States, the United Kingdom, and New Zealand. The study of OECD countries will be from 1980 to 2010.

1.6. Significance of the Study
This study has some importance to a few parties. Firstly, it is hoped that the Malaysian economy will improve with the services sector since the sector is the second main contributor to Malaysia’s GDP.

Secondly, TalentCorp could use the findings to decide on policymaking and policy implementation where it will benefit the students, fresh graduates, workers, and society. TalentCorp will be able to manage the pull of talent to mitigate brain drain by encouraging Malaysian professionals to bring home their experience, skill, knowledge to help create a better class workforce.

Finally, from this study too, economists and educators will gain a better understanding of brain drain. Plus, they are more trustworthy thus they have more power to influence the people on how to make the economy better again or brain gain, especially in decision making.
Chapter 2
Literature Review

2. Literature Review

For this chapter of the research paper, past studies are reviewed as to grasp the understanding of the relativity of the study. These past studies are selected based upon the variables, methods, limitations and findings which they had gathered for their study. The important variables that will be observed are the Brain Drain, Unemployment, Economic Activities and Cost of Living. The methods are studied from the past literature as to use an appropriate method in producing a justified result. Limitation of these works of literature is reviewed to justify the limitation of this research paper. The findings of previous literature to compare and learn if this paper would be supporting the different views gathered from past studies. This chapter will be the justification for this research as well as a reference as to not repeat existing research and filling in a research gap.

2.1. Brain Drain

Akbar E. Torbat (2002) from the Middle East studied on the brain drain from Iran to the United States. The dependent variable would be brain drain, while the independent variables were migration rate with tertiary education and universities’ admission policies. The method for this study was review of literature. Torbat found in his studies that political factors were the main cause of brain drain from Iran.

Heiko Korner (1998) studied on “The " Brain Drain " from Developing Countries - an Enduring Problem”. The variables he used were brain drain as the dependent and wages, career factors, policy factors, and limited technology as the independent variables. The method would be a review of the literature and the findings of his study were that all of the variables cause the highly skilled people to migrate to countries like the USA.

Hendel and Kagan (2010) studied on the “Professional Image and Intention to Emigrate Among Israeli Nurses and Nursing Students” by in Israel have migration as the dependent variable, and the independent variables were an image of profession, financial reasons, family reasons. The methods were descriptive statistics, Pearson Correlation analysis, T-test analysis, multiple regression analysis. The findings were nurses took their profession positively and the image of the profession and their intention to emigrate has no significant correlation between. The two major limitations of this study were the
sample size was drawn from a university and the psychological factors were not being investigated that might affect migration.

Other than that, Dalen, Groenewold and Schoorl (2005) conducted a study on “Out of Africa: What Drives the Pressure to Emigrate?” from Ghana, Senegal, Morocco, and Egypt. The observed variable would be the intention of emigration and the independent variables were education, income position, work status, household connection, self-efficacy, region, financial factors, and job search. The authors’ data method was descriptive statistics and empirical puzzles, ordered probit analysis; and the study shows that the young men expect the financial gains with an optimistic view of finding a job in the country that they migrate to.

A study on “Key issues and causes of the Italian brain drain” by Sonia Morano Foadi (2006) in Italy. The dependent variable was brain drain, and the independent variable were policy factors, opportunities, academic system, and family factors. The method for the author’s study was a review of literature and the author found that Italy is not profiting at all as there are limited return policies. The law offers limited opportunities as well. Lack of funding and investment to the university system. Family factors also cause brain drain.

A study was conducted by Carr, Inkson and Thorn (2005) on “From Global Careers to Talent Flow: Reinterpreting 'Brain Drain'” in New Zealand. The dependent variable was talent flow, while the independent variables were economic factors, political factors, cultural factors, family influences, and career factors. The method was empirical analysis and factor analysis. The authors stated in the findings that it is normal to live in other countries but more will become dual or multiple citizens with global careers. Governments will think about capturing and institutionalizing the migrants’ skills during their visit. The business will consider interacting with new international workers and travellers who are not interested in slotting their career.
2.2. Causes of Brain Drain

A study conducted by Connell, Stilwell, Awases, and Braichet (2007) on “Sub-Saharan Africa: Beyond the health worker migration crisis?” in Africa. The dependent variable was migration, while the independent variables were wage, work condition, career factors, and limited technology. The method for their study was a review of the literature. Their findings stated that economic reasons are the primary cause that migrants move, and these migrants choose health careers because they offer migration diversity.

Poppe, Jirovsky, Blacklock, Laxmikanth, Moosa, Maeseneer, Kutalek, and Peersman (2014) studied on “Why sub-Saharan Africa health workers migrate to European countries that do not actively recruit”. The dependent variable was brain drain, while the independent variables were education, political, family factor, medical, economics, and facilitating factors. The methods used were by semistructured interviews. The findings stated that both Austria and Belgium were not the target countries for health workers, and educational purposes, political instability and family reunification.

Niimi and Ozden (2007) studied on “Migration, Remittances and the Brain Drain: Causes and Linkages” in Germany. The variables used were remittance, migration level, education level of migrants, the financial sector, and growth rate of GDP. The methods used were OLS and Hansen J-statistics. Their findings showed that both the stock of migrants abroad and their education levels are the main drivers of remittances.

Kazlauskiene and Rinkevicius (2006) did research on “Lithuanian “Brain Drain Causes: Push and Pull Factors” in Europe. The variable used was brain drain as the dependent variable and professional attraction, socio-economic condition, state academic system, economy condition, governmental policy, and family factor as the independent variables. The author used empirical research, and factor analysis as their method of data analysis. Their findings showed that most of the variables were the causes of the
migration of the highly-skilled people. However, ecological conditions and family reunification play a much lesser role in this phenomenon of brain drain.

Bang and Mitra (2011) conducted a study on “Gender bias and the female brain drain” in the US. The variables they used were brain drain gap as the dependent variable and GDP, population, unemployment rate, institutional quality and gender bias as the independent variables. The methods used were descriptive statistics, rotation method, and regression analysis. They found that cultural preconditions of gender equality in access to education and work were the most significant factor in determining the female brain drain from males.

A study on “Factors contributing to brain drain in Malaysia” was conducted by Fong and Hassan (2017). The variables were brain drain, salary, family influences, political factors, economic factors, and career. Primary data collected was using a rating scale questionnaire. The methods used for this study were descriptive statistics, Pearson Correlation analysis, regression analysis. To their findings, they mentioned that political instability is the most important reason Malaysian to leave, while family influences are the least important reason they migrate from the country.

“Brain Drain of Doctors; Causes and Consequences in Pakistan” was studied by Tahir, Kauser, Tahir (2011). Doctors’ motivation to migrate is the dependent variable while financial factors, political factors, medical education system, health conditions, quality of healthcare services, health policy, the practice of dispensers, hakims, quacks, spiritual healers are the independent factors. The data analysis is done by Binomial Test. As a result, financial gain, political instability, professional infrastructure of health department, medical education system, poor health conditions, quality of healthcare services, health policy, practice of dispensers, hakims, quacks, spiritual healers are the reasons why doctors in Pakistan emigrate.
Nadia Sajjad conducted a study on “Causes and Solutions to Intellectual Brain Drain” in Pakistan. The variables she used were brain drain, education factors, political factors, family influences, career, standard of living and economic factors. For her study, she investigated the data using descriptive statistics only. On her findings, she concluded that job dissatisfaction, poor economic return, political instability, insecurity of life, family consideration, lack of opportunities and improper planning of manpower have caused brain drain in Pakistan.

Mussie Tessema (2009) studied on “Causes, Challenges and Prospects of Brain Drain: The Case of Eritrea” in East Africa. The variables used were brain drain as the dependent variable, economic factors, governance, peace and stability were the independent variables. The methods used for this study were descriptive statistics, Cronbach’s Alphas, and regression analysis. Tessema stated in her findings that brain drain caused in Pakistan were due to the economic factors, lack of good governance and peace and stability.

A study was conducted on “Nurses’ Views on Their Professions in Turkey and Influencing Factors by Sabanciogullari and Dogan (2017). The dependent variable was brain drain, while the dependent variables were the influencing factors. The methods used for this study were descriptive and cross-sectional. Sabanciogullari and Dogan said that Turkish nurses had high levels of positive views on their profession and commitment but low levels of intentions to achieve their professional responsibilities.

### 2.3. Pulling Factors of Brain Drain

A study was conducted on the Brain Drain of Health Professionals from Sub-Saharan Africa to Canada by Packer, Klassen, Kazanjian, Apland, Adalikwu, Crush, McIntosh, Schrecker, Walker, and Zakus (2006). The dependent variable was brain drain, while the independent variables were career factors, family factors, and economic factors. The method for this study was review of literature, and the authors found that the reasons for them to migrate is because of the desire for increased income, greater access to enhanced technology, security and stability.
Other than that, Ehlers (2007) conducted a study on “Factors That May Influence South African Nurses’ Decisions to Emigrate” also used only descriptive statistics for her data analysis method. Her dependent variables were the nurses’ decisions to migrate, while the independent variables were working conditions, career, personal growth, safety and security. Her findings are that professionals were able to afford the standards of living that they desired. Therefore, safety and self-actualization were their main reasons to migrate. The limitations of the study were the responses on the questionnaire was at a low rate.

Baruch, Budhwar and Khatri (2007) studied on “Brain drain: inclination to stay abroad after studies”. The variables they used were intentions to migrate, students’ adjustment to the host countries, education support, family influences, career and economic factor. For their study, they investigate the data using the descriptive statistics, Cronbach’s alpha reliability, and regression analysis. On their findings, a couple of main reasons affected their intention to stay were the ethnic differences and labour markets by students’ perceptions, their adjustment in the host country, and their family. The authors study only investigated focusing on business management students only, so this was the limitation of their study.

Mntshali, Lee, Tsai and Lai (2017) studied on “The Factor Influencing International Students’ Choice of Working in Taiwan after Graduation. The dependent variable is the students’ intention, while the independent variables are personal factors, university experiences, labor market, and choice of working in Taiwan. They used descriptive and logistic regression analysis and found that Taiwan’s labor market was the main factor that influenced the respondents, while university experiences had less influence. The limitation of this study was the sample included Taiwan ICDF and Ministry of Education sponsored students, so the policy the students have to follow is the main contributor to influence them.
Parkins (2011) studied on “Push and Pull Factors of Migration” in Jamaica. Dependent variable is brain drain. Safety, occupation, economic factors, and social opportunities were the independent variables. The method was a comparative snapshot study assessing the migration decision-making process of talents. Parkins found that the host country is in an advantageous position as these skills contribute to that country’s development and growth. So in return, the country offers secure economic and social opportunities that were not available in Jamaica.
Chapter 3
Methodology

3. Methodology

This chapter of the research paper is to draw an outline on the method that will be executed for data analysis on the data collected.

3.1. Theoretical Framework

![Theoretical Framework Diagram]

The concept of the theoretical framework is to build essential ideas for the study wanted to be done. With the theoretical framework, the stream of the study can be outlined. Based on past literature which had been reviewed, the following theoretical framework is formed for this study. As shown in Figure, the dependent variable will be Brain Drain while the independent variable will be Unemployment, Economic Activities and Cost of Living.

3.2. Econometric Properties

In this subchapter, the methods and their details will be discussed. To achieve the research objective of this study, Panel Data Analysis will be the analytical process used to analyze the panel data. The method from Panel Data Analysis which are Panel Correlation, Panel Least Square, Panel Unit Root and Panel Cointegration.
3.2.1. **Panel Least Square**

To study the relationship of the variables, Panel Least Square will be used in order to obtain the coefficient of the independent variables after regression of Equation 1. This is also to observe whether the variables have any significant relationship or otherwise. $R^2$ will produce from the regression, this is observed to indicate if the dependent variables are explained by the independent variable. The test will have the following hypothesis.

- $H_0 =$ There is a significant relationship between variables
- $H_1 =$ There is no significant relationship between variables

As to reject or not to reject the null hypothesis, the probability of the independent variables will be examined. The significant level will be 10%, 5% and 1%. The probability of the independent variable lower than the significant level will be significant and null hypothesis is rejected and there would be a significant relationship between variables, or otherwise.

3.2.2. **Panel Unit Root**

Levin, Lin and Chu and Phillips-Perron tests will be conducted as panel unit root test to avoid spurious regression and to assure that all variables are stationary. The hypothesis of this panel unit root test will be as follows:

- $H_0 =$ There is a unit root
- $H_1 =$ There is no unit root

To reject the null hypothesis, the probability of the variables is significant at level 10%, 5% and 1%. Do not reject the null hypothesis or otherwise.

3.2.3. **Panel Cointegration**

After the variables are to be confirmed that they are stationary and no unit root. The test will proceed with panel cointegration. Pedroni (1999) developed the panel cointegration. Pedroni’s panel cointegration employs seven tests for within-dimension and between-dimension relationship. The Panel v, Panel rho, Panel PP and Panel ADF statistics in Pedroni’s analysis tests for a within-dimension...
relationship, while the Group rho, Group PP and Group ADF test for between-dimension relationship.

\[ H_0 = \text{There is cointegration} \]

\[ H_1 = \text{There is no cointegration} \]

The hypothesis to reach whether there is cointegration, compared to the significant level of 10%, 5% and 1%.

### 3.3. Model Estimation

To analyze the data, a general form of the equation should be required. After reviewing past pieces of literature and relating it to the theoretical framework, the general form of equation should be as follows:

\[ \bar{BD}_{it} = \beta_0 + \beta_1 UN_{it} + \beta_2 EA_{it} + \beta_3 CL_{it} + \epsilon_{it} \]

*Equation 1: General Equation*

As shown in Equation 1, the general equation follows panel data. The dependent variable will be Brain Drain which is represented with BD. The independent variables of Unemployment, Economic Activities and Cost of Living will be represented by the UN, EA and CL, respectively. The \( \beta \) represents the coefficient from the variables after data analysis. The \( \epsilon \) will be the error term. The \( i \) is to represent the observation which is \((i=1,2, \ldots N)\) while the \( t \) is to represent the period of the observation.

### 3.4. Data Source

This research paper will mainly use secondary data which is available online from a trusted source. The data are recorded on yearly basis for the variables of Brain Drain, Unemployment, Economic Activities and Cost of Living are all available online at IAB Brain Drain Data, factfish World Statistics and Data Research, IMF Data which were recorded and reported.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Unit to Measure</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain Drain</td>
<td>Percentage (%)</td>
<td>Malaysian migration by gender and emigration rates (5 interval years)</td>
<td>IAB</td>
</tr>
<tr>
<td>Unemployment</td>
<td>Percentage (%)</td>
<td>Unemployment of 6 OECD</td>
<td>IMF</td>
</tr>
<tr>
<td>Economic Activities</td>
<td>Million ($)</td>
<td>GDP of 6 OECD</td>
<td>IMF</td>
</tr>
<tr>
<td>Cost of Living</td>
<td>Percentage (%)</td>
<td>CPI of 6 OECD</td>
<td>IMF</td>
</tr>
</tbody>
</table>

*Table 1: Data Source*
Chapter 4

Data Analysis

4. Data Analysis

4.1. Introduction

In chapter 4, the results will be reported and discussed based on the methods to analyze the data and complete the research objective. The results that will be discussed in this chapter are the Panel Unit Root, and Panel Cointegration.

4.2. Descriptive Statistic

<table>
<thead>
<tr>
<th></th>
<th>Emigrate</th>
<th>Unemployment</th>
<th>CPI</th>
<th>Real GDP (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>22448.03</td>
<td>5.807303</td>
<td>67.86545</td>
<td>2,100,000</td>
</tr>
<tr>
<td>Median</td>
<td>19078.00</td>
<td>6.105200</td>
<td>69.88282</td>
<td>3,670,000</td>
</tr>
<tr>
<td>Maximum</td>
<td>72906.00</td>
<td>17.92260</td>
<td>100.0000</td>
<td>15,000,000</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.000000</td>
<td>0.000000</td>
<td>23.46624</td>
<td>21,300</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>22429.80</td>
<td>4.393453</td>
<td>22.91608</td>
<td>3,780,000</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.660775</td>
<td>0.624092</td>
<td>-0.292440</td>
<td>2.238880</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.189301</td>
<td>3.492910</td>
<td>2.070718</td>
<td>7.050121</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>3.505434</td>
<td>2.626348</td>
<td>1.758239</td>
<td>53.16182</td>
</tr>
<tr>
<td>Probability</td>
<td>0.173302</td>
<td>0.268965</td>
<td>0.415148</td>
<td>0.000000</td>
</tr>
<tr>
<td>Sum</td>
<td>785681.0</td>
<td>203.2556</td>
<td>2375.291</td>
<td>7.37E+13</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>1.71E+10</td>
<td>656.2825</td>
<td>17854.98</td>
<td>4.87E+26</td>
</tr>
<tr>
<td>Observations</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

Table 2: Descriptive Statistics for the data

Table 1 describes all the variables from each data set that are being used in this research. The number of observations for all variables is 35. Park (2006) said normality test is used to see whether certain data is normally distributed. Skewness and Kurtosis statistics are involved and need to be studied to confirm the data is normally distributed. The highest skewness is -0.292440, which is CPI that appears to be negatively skewed, or left-skewed. The lowest value is 2.238880, which is Real GDP with the data rightward skewed. In terms of Kurtosis, the highest value is 7.050121 which is Real GDP and the lowest is 2.070718 which is CPI. In these results, I find that the mean of those who
emigrated to the five OECD countries is 22,448 people, while the median is 19,078 people. The emigrate data appears to be skewed to the right, which explains why the mean is larger than the median. Those who emigrated had the highest standard deviation, 22,429 among all variables, followed by CPI, unemployment and real GDP. The unemployment variable has a larger median, 6.1% as compared to the mean of 5.8%. The histogram is also rightward skewed. Based on the boxplot, there are some outliers identified. Similar to unemployment, CPI has the second largest value of mean, 67% and median 69%. The boxplot for CPI seems to look like there are no outliers. The mean real GDP is 2,100 billion, smaller than the median, 3,670 billion. The boxplot for real GDP looks completely different than the other variables.

4.3. Panel Unit Root

The Levin, Lin and Chu, Im, Pesaran and Chin, Augmented Dickey-Fuller and Phillips-Perron tests were run for the unit root test. The results are being obtained below:

Levin, Lin and Chu

<table>
<thead>
<tr>
<th></th>
<th>Level</th>
<th>First Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept (statistic)</td>
<td>Trend &amp; Intercept</td>
</tr>
<tr>
<td>Emigrate</td>
<td>0.8224</td>
<td>0.0042</td>
</tr>
<tr>
<td>Unemployment</td>
<td>0.0510</td>
<td>0.0003</td>
</tr>
<tr>
<td>CPI</td>
<td>0.0102</td>
<td>0.0000</td>
</tr>
<tr>
<td>Real GDP</td>
<td>0.9990</td>
<td>0.0006</td>
</tr>
</tbody>
</table>

Table 3: Levin, Lin and Chu

Phillips-Perron

<table>
<thead>
<tr>
<th></th>
<th>Level</th>
<th>First Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept</td>
<td>Trend &amp; Intercept</td>
</tr>
<tr>
<td>Men_Women</td>
<td>0.5181</td>
<td>0.3879</td>
</tr>
<tr>
<td>Unemployment</td>
<td>0.2443</td>
<td>0.0608*</td>
</tr>
<tr>
<td>CPI</td>
<td>0.0188**</td>
<td>0.0021**</td>
</tr>
<tr>
<td>Real GDP</td>
<td>1.0000</td>
<td>0.1208</td>
</tr>
</tbody>
</table>

Table 4: Phillips-Perron
The unit root test was conducted for the purpose of indicating if the variables are stationary at the first difference before proceeding to the next steps of analyzing. The identification factor of the stationary is presented with the asterisk since it is determined by the significant level from the probability value. Level of significant 10%, 5% and 1% correspond with the (*), (**) and (***) respectively. Table 2 shows that all variables, emigrate, unemployment, CPI and real GDP are stationary for first differences at 1% level of significance. Meanwhile all variables for ADF and Im, Pesaran and Shin are not stationary at first differences. Based on table 5, emigrate is stationary at first differences with intercept, and trend and intercept of 10% and 5% significant levels, respectively. Unemployment and real GDP are stationary at first differences at 5% significant level for both with intercept, and trend and intercept. However, CPI is only stationary at first difference with intercept at 10% level of significant.

4.4. Panel Cointegration

Pedroni Cointegration was used for the panel cointegration test. The results are shown as below:

<table>
<thead>
<tr>
<th>Panel Statistics (within-dimension)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel</td>
</tr>
<tr>
<td>v</td>
</tr>
<tr>
<td>rho</td>
</tr>
<tr>
<td>PP</td>
</tr>
<tr>
<td>ADF</td>
</tr>
</tbody>
</table>

*Table 5: Panel Statistics*

<table>
<thead>
<tr>
<th>Group Statistics (between-dimension)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>rho</td>
</tr>
<tr>
<td>PP</td>
</tr>
<tr>
<td>ADF</td>
</tr>
</tbody>
</table>

*Table 6: Group Statistics*

Table 6 and 7 show the seven statistics that were produced from the Pedroni Cointegration test. From table 6, Panel v and rho are cointegrated, while Panel PP and ADF are cointegrated at significant levels of 1% and 10%, respectively. Group rho is not cointegrated but Group PP and ADF are cointegrated both significant at 1% level of significant. The Panel Statistics table determines that there is a within-dimension
relationship, which means that the emigration rate for Malaysia to Australia, New Zealand, Ireland, the United States and the United Kingdom has long run cointegration relationship. Meanwhile the Group Statistics table determines the between-dimension relationship, meaning that the emigration rate is affected by unemployment, GDP and cost of living in the long run from Australia, New Zealand, Ireland, the United States and the United Kingdom. Based on both of the tables above, four out of seven statistics are significant, which means that it could be concluded that there is a long run relationship since the model has cointegration.

4.5. Discussion
The result produced from the data analysis is simply to answer the objectives of this research. The research objectives are achieved because it shows that there is a long run cointegration relationship and there is a within-dimension effect on Malaysian emigration rate from Australia, New Zealand, Ireland, the United States and the United Kingdom. The variables that are stationary at first differences are emigrate, unemployment, CPI and real GDP, except that CPI is not stationary at first differences with trend and intercept. To run the Pedroni Cointegration test, it is expected that all variables must be stationary to prevent odd outputs with errors. A cointegrating relationship can also be seen as a long term relationship.
5. Conclusion

5.1. Summary

While I am conducting this study, we all can agree that Malaysia has been facing the increasing rate of migration, because most of our best skilled and talented professions are migrating to other OECD countries and contributing their expertise. Based on reviewing the literature, migrants from developing countries are more likely to move out of their homeland to seek and explore more opportunities offered by OECD countries, hence, has caused the productivity level in Malaysia decreasing. Not only that, the brain drain of Malaysians is also causing the prevention of economic development due to diminishing talented workers. Other than that, a study from Fong and Hassan (2017) mentions that political instability is the main reason why Malaysians choose to leave the country.

5.2. Recommendation

From the data analysis, it indicates that Malaysian people are leaving the country because of better macroeconomics fundamentals from the five OECD countries. The unemployment rate of 5.8% from OECD countries has motivated Malaysian to seek jobs overseas for many reasons. Since these OECD countries promote better salary packages, it encourages Malaysians to work there and earn more especially when the CPI of total OECD countries is 67.8%. Since the salary offered is low, even when the cost of living is high, this is a push factor that Malaysian has the need for a higher salary to survive. The real GDP of the OECD countries is 2,100,000 billion, higher to be compared to Malaysia. These are the pull factors that why Malaysians brain drain to developed countries.
5.3. Discussion

This issue has a domino effect on Malaysia, firstly by weakening the economy due to the increasing rate of migration since there are fewer numbers of employees. Therefore, the amount of tax will decrease, so the Government earns less of it from the diminishing rate of the employee. In addition, Malaysia is lagging behind other countries because of the limited number of talents towards contributing innovative and creative ideas in terms of industrial development. Since Malaysia currently has an issue on minimum wage policy, many are still unsatisfied especially with high inflation and cost of living. Therefore, Malaysia's current Government ought to revise the salary structure both in the public and private sector. Another way of encouraging these people to stay is by giving promotional opportunities because it will motivate them to work harder and contribute to the Malaysian economy.

Lack of promotional opportunities is one of the push factors that Malaysians are leaving the country. Malaysian organizations that are incapable of offering promotional opportunities is the highlight from reading sources. This happens due to the lack of industrial development. Therefore, this has caused the workers to be frustrated and unsatisfied with their jobs. Because OECD countries could offer more promotional opportunities, this is the pull factor that Malaysians want to brain drain. It is highly appreciated when Malaysian organizations could properly assess their employees’ performance for their contributions to the organization. This will eventually motivate professionals to stay.

It can be seen that most Malaysian workers are unhappy with the low salary wages offered by Malaysian organizations, especially fresh graduates who are talented and skilled. This professional will compare the offers of salary packages from both Malaysia and other OECD countries, causing a push factor for the Malaysians to move out and migrate. Therefore, Malaysian organizations should take initiatives on retaining their employees by increasing the salary because they will feel the fair treatment when the salary package is competent with overseas’.
Other than macroeconomics fundamentals, the increasing crime rate in Malaysia also has encouraged people to migrate to other safer countries, a push factor. This has caused the Malaysian to feel less secure in safety and low quality of life, so they will have less interest to stay here and decide to stay overseas with a better and secure system. Therefore, an improvement of the Malaysian security system will make these people feel safe in Malaysia and provide a better quality of life. Other than that, Malaysia is well-known for its numerous races and culture, so minimizing ethnic and religious conflict will encourage Malaysian to be more open-minded.

5.4. Limitation
This research only provides the data from 1980 to 2010, which is not updated and incomplete since it is already 2020. Future research should search up other OECD countries that Malaysian migrates. Future research may consider getting a better data collection from 2010 onwards for more accurate and relevant results of Malaysian brain drain.

5.5. Conclusion
Nevertheless, in conclusion, Malaysian brain drain is still happening and increasing even from people around us. They feel that they belong to other OECD countries where their talents will be appreciated more and their hard work is being paid off. Other than that, these professionals gain many advantages working overseas, especially when the economy of developed countries are better than developing, such as inflation rate, CPI, and the GDP. These people will look at the macroeconomics fundamentals and normally would compare to their homelands’, and will choose to brain drain if the other country has more benefits for themselves. These macroeconomic fundamentals are crucial for one's life when they live in a country, because most people from developing countries crave for a better quality of life, higher wages, getting employed, and so many more. Malaysian brain drain has obviously caused the productivity level to decrease, so the current Malaysian Government has to look through these issues and come to a solution(s). No governance rules will change and adapt overnight, it will take time and we also need to give time for the good changes. Once one issue to another has an improvement, it will make the Malaysian economy improve by stages.
REFERENCE


[2]


