

The Effect of Remittance Outflow towards Economic Growth in Malaysia

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Abstract: This study aimed to discuss the short run and long run relationship between remittance outflow and economic growth in Malaysia from 1982 until 2014. Annual data was used where the dependent variable was economic growth and the independent variables were remittance outflow, export, exchange rate, FDI outflow and labor force. Johansen Co-integration was used to estimate the long run relationship meanwhile VECM was used to estimate the short run relationship between the variables. The findings revealed that there are long run relationship between remittance outflow, exchange rate, export, and FDI inflow and labor force to economic growth. Meanwhile, in short run, remittance outflow, export, and labor force influenced GDP. Remittance outflow was positively significant in the short and long run. This could be due to the use of foreign labor to produce goods and services in the country. The goods and services produced by the foreigners helped to boost the production process in the country. This encourages export of goods and services which eventually enhances the purchasing power of the nation. As export increases, GDP of the nation also increases resulting in a positively significant impact with the remittance outflow. Additionally, foreign direct investment inflow had insignificant impact in short run towards economic growth because of its low total factor productivity rate. As for the exchange rate, Malaysia was practicing a managed exchange rate system that was constantly exposed to shocks. It needs the interference of the government to have a positive impact towards economic growth.

Keywords: Remittance outflow, Economic growth, Co-integration, Malaysia, JEL, E13, F24, G15, O40.

INTRODUCTION

Remittance in Malaysia

Bank Negara Malaysia (BNM) defines remittance as a total of money that was being sent by individuals or household to another location within a country or overseas. According to Sander [5], remittances include sending to families who are overseas and also include foreign worker remittance as a source of income for the family as well for the nations. There are two types of remittance, which are international money remittance and domestic money remittance. International remittance was remittance by those who migrate into other countries, while domestic money remittance from those who leave the rural area in their hometown and work in the urban area of their hometown or rural-urban migration. Usually sender will remit of money by cash compared to item.

In Malaysia, remittance industry was controlled by BNM under the Exchange Control Act 1953 and the Payment Systems Act 2003. In 2009, BNM had conducted a review of framework of the law ad supervision to remitter services industry money and currency trading wholesale in Malaysia. This was to modernize the industrial landscape and maintain industry integrity. The study ends with legislation of Money Services Business Act 2011 which enables

licensing, control, and supervision on foreign exchange currency; remittance and currency trading wholesale [6].

The number of remittance provider such bank, non-banking and financial development institution have shot up to 77 at the end of 2014 compared to 37 at the end of 2005 [6]. Therefore, total outflow of remittance through official channel which was bank and money services business licensee have increased to RM32.1 billion in 2014 compared to RM6.1 billion in 2005. Competitive environment in industry of remittance had contributed to service quality to users from the aspect of lower cost, faster service, and more channel. In 1970, remittance outflow in Malaysia was RM1.3 million and rocketed to RM20 billion in 2013.

Malaysia was ranked at 11th in the world as largest remitter to overseas [7]. During 2010, a total of RM21.9 billion was being sent to migrant home countries. In Asia, Malaysia was ranked second place after Saudi Arabia that records RM83.72 billion [7]. According to The Establishment Post [8], migrant remittances in Malaysia doubled from the total of RM10 billion in 2009 to RM20 billion in 2012. Five countries that have the highest remit to origin country was Bangladesh (RM3 billion), Indonesia (RM2.95

billion), Nepal (RM1.9 billion), India (RM625 million), and Philippines (RM561 million).

Furthermore, remittance in Malaysia was high because of foreign workers flooding in various sectors. Increase in non-bank institutions which was legal influenced the development of remittance like Moneylenders. Money Services Business Act 2011 that limits the remittance service to Western Union and Merchant Trade only [8]. Based on PMR (2011), Money Gram limit remittance in Malaysia was totaled RM9000 to RM12000 only. This was to avoid unlawful money composition issue and to manage credit risk.

Based on the data from the Department of Information Technology Division and Record Malaysia, until June 2014, 2.1 million foreign workers were actively working in six primary sectors. Sectors that were dominated by foreign worker are manufacturing, construction, plantation, service, agriculture, and domestic helper. According to Emigration Department, in 2013, about 1.5 million of illegal immigrant (PATI) came to Malaysia. The countries that dominated these immigrants were Indonesia (41 percent), Philippines (34 percent), Bangladesh (7 percent), Nepal and Myanmar 5 percent respectively. This situation had been an issue that worried government and citizens because they shared the same privilege such as oil subsidy, necessities, education and health as the Malaysian citizens [9].

Economic Report 2014/2015 records the net flow of secondary income inflow and outflow. In January 2014, government has implemented the minimum wage that have improve total outflow remittance to 9.3 percent (RM27.4 billion) compared to -0.2 percent to RM25.1 billion in 2013. Secondary deficit income continues to increase in 2014 (RM18.3 billion) compared to 2013 (RM17.5 billion) due to high inflow of foreign workers and remittance outflow from Malaysian to abroad. It was supported by the development of domestic economy activity that continuously requires foreign workers.

Remittance was the second largest contributor for most developing countries after foreign direct investment (FDI). Official development assistant (ODA), confidential debt and equity taking place after remittance contribution [10]. Remittance for developing countries recorded to reach RM1887.6 billion in 2015, an increase of 0.9 percent compared to previous year. International remittance to all countries expected to increase by 0.4 percent to RM2513.94 billion [7]. This value depicts the vital of remittance to developing counties [11].

Remittances start to play important role because of the globalization process. Labor mobility increase due to globalization process where world was seen as one market. Due to this process, money flow becomes active in money market. Remittance was sent by remitter that works far away from their home country. Remittance commonly sent for family and friend as living expenditure, education, health and sometime investment to origin country. According to Alkhatlan[12], the values of remittances exceed foreign aid in developed countries.

Remittance can overcome credit problem, income inequality, and job opportunities [13]. In micro level, remittance become supply for family members to get house, start business, improve education and health care. Foreign worker send money through official channel like financial institution. However, they often face language and cost problem [13]. Therefore, remittance was transferred through unofficial channel such as by post, by friend, or brings it home by them. So, most countries could not get actual value of remittance. In macro level, if remittances flow into one country, it can reduce deficit in balance of payment, increase recipient country exchange rate, increase income per capita, fund and investment [12]. Overall, most studies state that remittance can bring positive impact from micro and macro aspect which lead to economic growth.

However, there are conflicting studies. The outflow of remittances is large and continuously reduces the currency to the detriment of the production cost in the sending country. The increase in production costs reduce the competitiveness of exports [4]. Some economic analysts and experts argue that remittances can cause an outflow of skilled labor from the country. This indirectly affects the supply of labor. Existing labor supply only serves as a consumer, so changing the economic structure of the economy on consumption rather than production technique. Local workers will lose jobs because of strong competition with foreign workers.

Several studies conducted by researchers like Ang[14] argue that remittances can overcome the imperfections of the capital market and provide opportunities for foreign workers to accumulate assets. However, there is a problem of 'moral hazard' in which the outflow of money is not recorded until decrease money supply in the country. The decline in money supply could lead to a decline in demand for goods and services. Finally, create the income gap between migrant workers and local workers. Furthermore, currency inflation can occur up devaluing the national currency and increase production costs through higher interest rates .Therefore, the conclusion can be made

that remittances outflow can give a negative impact to the economy. Therefore, an empirical study needs to be conducted to analyze the impact of worker remittance outflow towards the economic growth in Malaysia.

The main objective of this study was to determine the relationship between remittances outflow with economic growth in Malaysia. These studies try to find the relationship of remittances to economic growth. Apart from that, this study has a few specific objectives that wish to be achieved. First, to identify short and long run relationship between remittance outflow and economic growth in Malaysia. Second, to analyze relationship of remittance outflow, exchange rate, export, FDI inflow and labor force towards economic growth. Lastly, to recommend policy options to increase economic growth related to remittance issue.

The focus of this study is in Malaysia and the data obtained from the World Bank, World Development Indicators (WDI) 1982 to 2014. The dependent variable in this study is that GDP per capita while the independent variables are remittances outflow, exports, foreign exchange rates, FDI inflow and labour force. The data used are secondary data. Therefore, the data used should be reviewed with the unit root test to identify whether the data used to have stationary problems. Long-term relationship between the variables will be determine by Johansen co-integration test and short-term relationships examined by Vector Error Correction Model (VECM).

This study contributes in the form of theory and practical. From theoretical aspect, the main purpose of this research was to close the research gap from the past study to prove the relationship between remittances outflow on economic growth in Malaysia. There a few researches that connect remittance together with economic growth in Malaysia favored with monetary variables like exchange rate. Recent study that carried by Koay and Choong[15] and Ee[16] only used inflow of remittance and does not include exchange rate into their study. So regarding to exchange rate variable, this study will get to see closer on financial institution growth in Malaysia. This was due to rapid development of financial institution in this country result to demand of money, loan, and increase in money investment. By that, exchange rate was significant to be reckoned as contributor to economic growth apart from remittance, FDI, and labour force. This relationship was very important for developing countries like Malaysia that currently experiencing development of financial system.

At the same time, most studies on remittance and growth made a panel data which involves various countries like Nyamongo *et al.* [17], Siddique *et al.*[18], Rao and Hassan [19], Fayissa and Nsiah[20],

Catrinescuet *al.*[21], Glytsos[22] and many more. Therefore, this study concentrates to one country time series annual data base. This was because every country has different macroeconomic influences. So, the best way to know remittance effect to economic growth was through one country's study.

From the practical aspect, remittance could provide knowledge whether remittance functions as loss of human capital as being study by Chamiet *al.*[23]. So, this study regard to total labour effect to economic growth through remittance that will help legislator to ensure remittance outflow can give positive effect to growth on Malaysia economy.

Recently, most of the studies are focused on panel data that involving various countries such as Rao and Hassan [19], Siddique *et al.*[18], and Nyamongo *et al.*[17].

Till now, little research like Alkhatlan[12], Baas [1]focused on remittances outflow with economic growth in host country. The study conducted by Koay and Choong[15] only use remittance inflow in Malaysia. So, this study will use monetary variables such as foreign exchange rates to economic growth. Therefore, taking into account the impact of foreign exchange rates in effect refer to economic growth, this study will be able to see up close the impact of the growth of financial institutions in Malaysia. This is due to exchange rate fluctuations experienced in recent years have much impact on economic growth. In addition, the rapid development of the country led to the demand, loans, investment funds rose more rapidly. As a result, the foreign exchange rate is to be considered as a significant contributor to economic growth in addition to remittances, exports, FDI and labor. This relationship is very important for developing countries like Malaysia, which is experiencing economic progress at the global level.

Recent years, most studies on remittances and growth are conducted using panel data involving various countries such as the Nicholas [22], Rao and Hassan [19], Siddique *et al.*[18], and Nyamongo *et al.*[17]. Therefore, this study focused on one country, namely Malaysia because each country has a different potential for economic development. This is because the impact of remittances in each country will vary according to the influence of macroeconomic variables are different. As such, the best way to find out the impact of remittances on economic growth is through research in one country alone.

In addition, this study did not take into account the effects of monetary growth because many previous studies conducted showed that the financial sector

advanced only able to promote the utility to channel remittances. However, the impact of remittances on economic growth is more probes in countries with less developed financial growth [15].

Through previous studies, the relationship between the dependent variable and the independent variables can be identified more clearly. In addition, it can serve as a guide to the study to improve the lack of previous studies and take the most appropriate method to study more effectively. Solow growth model selected for the variables to insert into the Cobb-Douglas production function.

Solow Model

A number of studies [24, 12, 25, 19] used the Solow growth model for the modeling of their study. Using the initial Cobb-Douglas production function used in the Solow framework, we obtain the output Y_t as:

$$Y_t = A_t K_t^\alpha L F_t^\beta$$

Where, A = technology, K = capital, LF = labor force, α = share of the profits, and β = labor share. Where K was defined as FDI; Then, Solow model was to estimate the development of technology such as:

$$A_t = A_0 e^{gT}$$

Where A_0 = given level of technology at $T = 0$ and technology grows exponentially with a set of factors, g and time T . For our purpose, we define g by REM , ER , and EX . Thus, the equation A_t will be as follows:

$$A_t = f(REM, ER, EX)$$

where,

REM = remittances outflow

ER = exchange rates RM against US Dollar

EX = exports

Therefore, technology is defined as we get:

$$A_t = A_0 REM_t^{\beta_1}, ER_t^{\beta_2}, EX_t^{\beta_3}$$

As for k = capital, the study takes FDI as a proxy that will enter into the equation. In the balance of payment (BoP) of Malaysia, there are short term capital account (STCA) and long term capital account (LTCA). STCA consists of saving and investment. Saving comprise of 42 percent of the GDP in Malaysia, meanwhile investment comprise of 46 percent of the GDP. This creates a saving-investment gap which resulting in a deficit at the STCA deficit with the FDI obtained from the LCTA. In the LTCA, FDI inflow more than FDI outflows. So, the equation of FDI will be as follows:

$$k_t^\alpha = f(FDI)$$

And hence

$$Y_t = A_t FDI_t^\alpha L F_t^\beta REM_t^{\beta_1}, ER_t^{\beta_2}, EX_t^{\beta_3}$$

And for purpose of regression estimation, we take the log of equation, we get:

$$\ln y = \beta_0 + \alpha \ln FDI + \beta \ln LF + \beta_1 \ln REM + \beta_2 \ln ER + \beta_3 \ln EX + \varepsilon$$

Where β_0 is constant, $\alpha > 0$, $\beta > 0$ is the capital (FDI inflow) and labor share respectively. $\beta_1, \beta_2, \beta_3$ are the long run elasticity coefficients of remittance outflow, exchange rate, and export respectively.

Empirical Analysis on the Relationship between Remittance and Economic Growth

Analyzing the connection of remittance to economic was certainly a complex matter because it has many aspects that need to be considered. Most of the researchers' study relationship between remittance and socio-economic indication include poverty, investment, multiplier effect, expenses, long term effect of economic growth, and inequality in recipient country. Nevertheless, remittance effect to long term economic growth was still disputable.

A paper from Alkhatlan[12] about the effect of remittance outflow on economic growth in Saudi Arabia in short and long run indicates negative and significance relationship. This is because the outflows of remittance reduces the amount of money available in the country and not make consumption and investment. So, it reduces the economic activities and give a negative impact to aggregate demand. While, export have positively significant relationship to economic growth because export revenue enhances purchasing power in the economy.

The relationship between remittance outflow and inflation in six The Gulf Cooperation Council (GCC) countries from 1972 to 2010. They found that remittance outflows give deflationary pressure on inflation in sending countries which means negative relationship. The results suggest that remittance outflow played an opposite role and this flow is important that would have subtle implication for monetary policy. Vargas-Silva [2] used impulse response function, Granger Causality test and co-integration test to identify the determinant of remittance in host or home in six countries. The result indicate that remittance react more in host country compared in home country. This is because migrant worker focuses more on economic condition at host country more than at home country when it relate to decision for remit. The decisions to remit more or less depend on workers if they tend to stay temporary or for a long period. Temporary workers are likely to remit for investment and consumption while permanent workers are likely to remit because of

altruistic purposes.

By using Generalized Method of Moments (GMM) statistical method, system Vector Auto Regression (VAR), and panel data method in five Asian countries from 1980 to 2009, Imai *et al.*[26] confirmed that remittance have the advantage to economic growth. Nevertheless, this study also found a new result where remittance instability and FDI are dangerous to economic growth. During positive contribution of remittance to economic performance, there was also a matter that may surprise economic. Therefore, policy maker should make policies to encourage remittance use in purpose of physical and human capital investment to encourage economic development.

Recent studies by Koay and Choong[15] on the relationship between remittances, development of financial sector to economic growth in Malaysia between 1975 to 2009 by using the ARDL test, unit root test, and Granger Causality test, result depicted remittance and financial development help to promote growth in short and long run in Malaysia economy. Financial intermediation can help remittance to send industrial production through credit to private sector which increases economic growth. A few policies have been proposed among them to financial institution recheck the charge and fee on remittance process and facilitated through banking on line and also Automatic Teller Machine (ATM).

Besides that, Uddin [27] also looked into short and long run relationship between remittance, financial development and economic growth in Bangladesh from 1976 to 2011. Johansen co integration test showed that in short run remittance was a surprise to income change. While in the long run, remittances were used as a financial resource where it functions as successor to domestic financial sector. This study proposed that government encourage remittance payment to official financial system and then focus on efficiency enhancement in financial system overall.

Remittance flow was a contributing factor that was important to economic development, but study from Shafiun[11] did not find any strong ties between those variables. He had committed his study in Bangladesh with set data from 1976 to 2007. The discovery showed some implication of important basis. Increase in FDI does not necessarily lead to increase to economic development. This was because; government did not just focus on effort to increase FDI. Therefore, government should ensure remittance used and channeled to investment, so that they able to generate economic growth in Bangladesh.

Next study was about remittance and economic

growth per capita in Small Island Developing State (SIDS). Econometric analysis has been done at 25 countries for 1971 to 2010. There was positive impact and significant relationship between inflow and outflow of remittance to economic growth. However, the result only for SIDS that located in Pacific and Sub-Sahara Africa and not in Latin America and Caribbean. This study purpose that, without remittance in these countries they would record average growth rate of - 0.74 percent within 1971 to 2010. This mean remittance was important and efforts need to be taken to achieve higher level.

Another study that found positive relationship was by Alkhathlan[12] that had used ARDL test and Error Correlation Model (ECM) technique to prove short and long run relationship between remittance and economic growth in Pakistan within 1976 to 2010. FDI has positively significant effect on the short and long run to economic growth.

In the same way, Karpestam[28] took macroeconomics variables like expenses, investment and import to study the direct and indirect effect of remittance inflow on developing countries from economic perspective. It estimated positive impact in the short run was high in high-income country. Nevertheless, positive impact in the long run was comparatively high in middle income countries compared to low-income countries. The other reason was due to the usage of their surplus income to invest overseas. Therefore, the best way to increase remittance in low-income countries was by improving competition at international level. This study suggests government should pay attention to emigration policy and encourage remittance through official channel as most sending country and recipient do.

Then again, Catrinescu *et al.*[21] claimed remittance inflow rejected negative relationship to economic growth after conducting a few statistical tests like Dynamic Panel Data estimation, GMM, and cross section estimation. There were several indications that were positive although it was slightly small. The study suggested the institution in the country play their role in running remittance to make sure they contribute to economic growth. Actually, remittance can be invested in larger volume and more efficient to bring high production. Some researchers doubt on capability of government to manage the remittance. Nevertheless, they found that institution can manage the remittance by giving positive effect to economic growth. This study also purposed the next researcher to use different suitable and regression model.

Jayarama *et al.*[25] carried out empirical research in Samoa in period of 28 years (1981-2008).

Results showed remittance had helped Samoa record larger economic growth. In particular, remittance and money flow in bank could lead to credit enhancement to private sector which in turn causes economic activity to be larger and increase in export. Lastly, it consequently led to GDP enhancement. Several policy need to be implemented where development of the financial sector need to be strengthened because it was the key of remittance channel. Apart from that, government decision maker and financial sector need to create policy or steps to support receiver's family that contribute to higher domestic savings, mobilization and larger source.

Addition, Karagöz[4] did the study in Turkey because it was one of the major receiver countries for 40 years ago. This study used statistic method such OLS estimation, unit root test, and Johansen Co integration test. Research results confirmed that remittance and economic growth effect in Turkey was negative. On the other hand, domestic investments imply positive relationship to economic growth, while FDI has no effect. There was no evidence that state Turkey has big capital source for economic development. Therefore, remittance structure in Turkey changes obviously. Western European third generation did not tend money back and develop entrepreneurial skills seriously. So, it makes it too hard for Turkey in getting high income like the past.

Thus it can be concluded that the effect of remittance towards economic growth can be positive, negative or no relation to economic growth.

METHODOLOGY

The method that was used to analyze data was Ordinary Least Square (OLS) method, t-test, Augmented Dickey-Fuller Unit Root, Philip-Perron's test, Johansen Co-integration and Vector Error Correction Model (VECM).

This study used OLS technique to formulate multiple regression models that contain a dependent variable (GDP per capita) and five independent variables (remittance outflow, exchange rate, export, FDI inflow and labour force).

As discussion on Chapter 2, Solow model was adapted into this study. The model was shaped to study relationship between remittance outflow and economic growth was formed based on literature by Shafiu[11], Jawaid and Raza[29], Karagöz[4], and Catrinescu et al[21].

So, the model will be as:

$$Y_t = A_t FDI_t^\alpha L_t^\beta REM_t^{\beta_1}, ER_t^{\beta_2}, EX_t^{\beta_3}$$

And for purpose of regression estimation, we take the log of equation, we get:

$$L \quad _ \quad GDP = \beta_0 + \alpha \ln FDI + \beta \ln LF + \beta_1 L_ER + \beta_2 L_EX + \beta_3 L_REM + \varepsilon$$

where,

L= log

GDP= gross domestic product per capita

FDI= foreign direct investment inflow

LF= labour force

EX= export

ER= exchange rate RM against USD

REM= remittance outflow

ε = error term

β_1 was positive marked. It means that if remittance outflow increase, economic growth will increase. On the other hand, if remittance outflow decline, economic growth would also decline. So, relationship between remittance outflow and economic growth was positive. Hence, positive marked as β_1 . Likewise, other variables.

Hypothesis

H_{a1}: There is a relationship between exchange rate and economic growth.

H_{a2}: There is a positive relationship between export and economic growth.

H_{a3}: There is a relationship between FDI and economic growth.

H_{a4}: There is a relationship between remittance outflow and economic growth.

H_{a5}: There is a positive relationship between labour force and economic growth.

Data

All data was collected in World Bank Indicator (WDI) expect for labor force from Department of Statistic Malaysia which covered period 1982 until 2014. All variables were transforming into log form before running regression analysis. This was to avoid heteroscedasticity problem.

Analytical Method

Analysis held by e-view that can explain all kind of analysis needed for this study.

Ordinary Least Square (OLS)

OLS was common method that used for estimate equation coefficient from set of data that have more than one independent variable such as equation from (Studenmund, 2006):

$$L \quad _ \quad GDP = \beta_0 + \alpha \ln FDI + \beta \ln LF + \beta_1 L_ER + \beta_2 L_EX + \beta_3 L_REM + \varepsilon$$

The purpose of OLS test was to choose $\hat{\beta}$ that can reduce error of total residual square root. OLS method can estimate $\beta_0, \beta_1, \dots, \beta_k$ co-efficient in multiple equation. The estimation of Y_i value will be count by use $b_0 + b_1 + \dots + b_k X_{ki}$, estimation and error in estimation Y_i was $Y_i - (b_0 + b_1 X_{1i} + b_k X_{ki}) = Y_i - b_0 - b_1 X_{1i} - b_k X_{ki}$. The error estimation of sum square root for all observation n was:

$$\sum_{i=1}^n (Y_i - b_0 - b_1 X_{1i} - \dots - b_k X_{ki})^2$$

Unit Root Test

Unit root test are used for two reasons. Firstly, to decide time series data through period of time study. Second, first study in all series data determine the level of unification.

Standard of normal regression procedure was not suitable for non-stationary data. First step for estimation procedure was determined if variable stationary or not stationary in first difference. ADF and PP allow linear time flow. Null hypothesis was serial with root unit. This test was regard to first difference level and if required second differentiation would be carried out to every variable by using ADF and PP model. ADF model used to test unit root in this area as follows:

$$\Delta X_t = \alpha + \beta X_{t-2} + \varepsilon_t$$

Where $\Delta X_t (X_t - X_{t-2})$, ε_t assumed as random known as white noise interference. If ε_t were true, ADF will involve lapse differentiation which it more suitable.

ADF test were based on OLS as follows:

$$\Delta X_t = \alpha + \beta X_{t-2} + \sum_{i=1}^T b_i \Delta X_{t-2} + \varepsilon_t$$

Where $\Delta X_t (X_t - X_{t-2})$ was second differentiation and T was number for lapse. More than one lapse was used with serial correlation and error ε_t . If T value was zero, the model was same with ADF test. First differentiation value (example $T > 1$) will be substitute to ensure ε_t was white noise.

Coefficient β was for the first lapse of variable, X_{t-2} . Null hypothesis for X_t was not stationary if $\beta = 0$. If null hypothesis not reject the first differentiation, the variable will be remain at second differentiation and cemented in second differentiation and written as I(2).

Time series data was not stationary, X_t , was consolidated in d level or I(d), if d was unchanged after differentiated as much as d times. Shafiun[11] used two differentiations for zero differentiation and first differentiation. For the first it does not stationary but at

second differentiation it becomes stationary. The non-stationary standard level of time series data can be determined by unit root test. Therefore, these test vital to avoid mistake of interpreting R^2 value, Dubrin Watson and t statistics.

PP test applied to ensure co-integration level. Equation was used for test are as follows:

$$\Delta Y_t = \alpha + \beta Y_{t-1} + \varepsilon_t$$

Coefficient β was for the first lapse Y_{t-1} variable level. Null hypothesis for Y_{t-1} was non-stationary if $\beta = 0$. If null hypothesis cannot be rejected from second differentiation, the variable can be stationary at the second differentiation and can be substitute at second stage that written as I(2). Asymptotic interference for PP t statistics are same as ADF t statistics and it reported based on by McKinnon at 1 percent (-3.4502), 5 percent (-2.8696), and 10 percent (-2.5711).

Time series data should be unified in first differentiation and Johansen co-integration test must be used.

Co-integration Test

To test long term relationship between variable, Johansen co-integration was the best. Hypothesis tested using maximum eigenvalue statistics and trace statistics where the result always contradictory. To test hypothesis in co-integration test, maximum eigenvalue statistical model is shown as:

$$\gamma_{\max} = -T \ln (1 - \gamma_{r+1})$$

where, γ_r was eigenvalue to the co-integration vector r and T was number of observation.

Statistical for the trace statistics as below:

$$\gamma_{\text{trace}} = -T \sum_{i=r+1}^k \ln (1 - \gamma_i)$$

Trace statistics was existence from the sum of value from maximum statistical from zero to co-integration vector r .

Based on the modal, hypothesis for the second null and alternative can show as:

H_0 = no co-integration series

H_1 = co-integration series

Null hypothesis H_0 accepted if trace statistics value or maximum statistics less than critical value. But null hypothesis rejected if value of trace statistics or maximum statistics more than critical value. Furthermore, when the value of dependent variable and independent not co-integrating, it shown residual value non-stationary and vice versa.

Study in empirical macroeconomics usually involves non-stationary and stationary variables. Recent study and literature was the way to analysis stationary variables. Specific regression model was shown below:

$$Y_t = \beta X_t + \varepsilon_t$$

There was assumption that ε_t was stationary and have white noise serial. Actually, the assumption was incorrect if Y_t and X_t was serial integration. Generally, if two series were integration at different arrangement, the linear combination will be integrated in two high arrays. If Y_t and X_t was I(1) and both stationary variables, thus we can expect $Y_t = X_t$ will become I(1) without taking, into account, and not I(0) (non-stationary). If every Y_t and X_t was float above the flow, at least there was few relationships between the flow. The different among them should in accordance with next flow where the model was not consistence.

At the same time, if two series was same I(1), there was where $\varepsilon_t = Y_t - X_t$ was I(0). Id two series was same I(1), the partial difference among them will stabilize around fixed mean. The mean was serial that flowing within approximately equivalent rate. Two series that fulfill the condition was said as co-integration and vector $(1-\beta)$. In such case, long term relationship between Y_t dan X_t , was behavior where two variables flow increasingly. In short term, relationship between Y_t and X_t long term deviation.

In this case, distinguish data will be up against productive because long term relationship between Y_t and X_t was not clear. Differentiation can cause loss of information in data. Study of co-integration with estimation method can maintain information for both co-variations.

Every model has variable, $Y_t = (Y_{1t}, \dots, Y_{12t})$ where have one long run equilibrium relationship respectively,

$$Y_t' \gamma - X_t' \beta = 0$$

Regression encompasses constant variable and exogenous where it become I(1) and time trend. Vector for parameter (γ) was co-integration vector. In short term, system will digress from balance and the relationship could be formulated as follows:

$$Y_t' \gamma - X_t' \beta = \varepsilon_t$$

Where, error balances, ε_t must become stationary serial. In actual situation, M variables in system would be one co-integration vector. In a system that have M variable, it only can be (M-1) independent co-integration vector. Total independent linear co-integration vector exists in equilibrium system that called co-integration degree. Co-integration degree arrange from 1 to M(-1). If co-integration degree in the

system exceeds 1, it was not calculating as co-integration vector. If variables I(0) was co-integrating, so it have linear combination among them which was I(0). If two variables have linear trend,

$$Y_{1t} = \alpha + \beta + \mu_t$$

$$Y_{2t} = \gamma + \delta + v_t$$

where μ_t and v_t was white noise, linear combination for Y_{1t} and Y_{2t} will offer one new variable, Z_t that can be generate by stationary.

$$Z_t = (\alpha + \theta\gamma) + (\beta + \theta\delta) + \mu_t + \theta v$$

This can be generated if Y_{1t} and Y_{2t} share the same trend.

Stock and Watson [30] determines a set of M co-integration variables that can be written as stationary component which increase with linear component for smaller set of trend and M-r general random walks.

Johansen co-integration and Stock method and Watson are same. To conduct Johansen test, a VAR model need to summarize.

$$Y_t = I_1 Y_{t-1} + I_2 Y_{t-2} + \dots + \Gamma_p Y_{t-p} + \varepsilon_t$$

From model above, p must be determined by further. Z_t will represent vector to all variables.

$$Z_t = (Y_{t-1}, Y_{t-2}, \dots, Y_{t-p+1})$$

T was two matrixes T X M for two residual ordinary least squares, D (residual in regression for changes in Y_t on Z_t) and E (residual from regression Y_{t-p} on Z_t) formed. Correlation between column D and E. d_l^* represent linear combination for column D and e_l^* for column E, so two linear combinations will maximize correlation among them. Finally, null hypothesis or co integration vectors will be test with statistical test.

Johansen co-integration suggest two possibility testing procedure to test null that have no co-integration. First test was total co-integration vector, equal to r (Trace test). Second test for hypothesis was total co-integration vector which was same as r (Max Eigen value test). This statistic could be formulated as follows:

$$Trace = T^N \sum \ln(1 - \lambda_i)$$

$$i = r+1$$

$$Max L = T \ln(1 - \lambda r + i)$$

Where r was total co-integration vectors, and $\lambda_1 \dots \lambda_N$ was p^2 canonical correlation between Y_{t-p} and ΔY_t serial.

Vector Error Correction Model (VECM)

Vector Error Correction was model used to test the existing of short run relationship between dependent variable and independent variables.

$$H_0 = 0$$

$$H_1 \neq 0$$

$$\Delta y_t = \alpha_0 + \alpha_1 \hat{e}_{t-1} + v_t^y (\epsilon_{t-1})$$

Null hypothesis above explains independent variable which had no short run relationship with dependent variable. On the other hand, alternative hypothesis explains independent variable that has short run relationship with dependent variable.

If VECM shown 4 was the value of t-statistic, so it has significant result to support co-integration in the variables. The model assumes as stable if the coefficient term on error correction was negative.

Error correction model (ECM) that can applicable into structure variable term in this study could be written as:

RESULT
Unit Root Test

Table 1: Unit Root Test Result

VARIABLES (log form)	ADF			PP		
	LEVEL	1 ST DIFFERENCE	2 ND DIFFERENCE	LEVEL	1 ST DIFFERENCE	2 ND DIFFERENCE
L_GDP	0.494648	4.669641***	7.089987	0.504579	4.66941***	16.70570
L_ER	1.578201	4.797022***	8.225295	1.631001	4.769095***	18.96249
L_EX	3.195551	3.970577***	5.535162	3.065851	3.953441***	18.57182
L_FDI	3.465982	6.066560***	4.897073	3.415977	16.90639***	46.82648
L_REM	1.776966	5.938320***	10.04796	1.991187	6.102797***	32.18773
L_LF	0.370309	6.079450***	9.574574	0.372013	6.218126***	8.199570

*MacKinnon (1996) one-sided p-values with test critical values of 1% (3.670170), 5% (2.963972), and 10% (2.621007).
***Data become stationary and all autocorrelation problems fixed at the 5% of critical value.

The ADF and PP test were used to examine time series properties of the variables and co-integrated in same order. From Table 1, all the variables were non stationary at level and first difference, but when

converted all the variables into second difference, it become stationary at 5 percent level. This shows that there was a combination of one or more series of long run relationships [29].

Johansen Co-Integration Test

Table 2: Johansen Co-Integration Result

Hypothesized No. of CE(s)	Trace Statistic	Critical Value 0.05	Probability	Max-Eigen Value	Critical Value 0.05	Probability
None*	99.01210	97.75366	0.0293	40.09610	40.07757	0.0498
At most 1	58.91600	69.81889	0.02702	20.50714	33.87687	0.7206
At most 2	38.40886	47.85613	0.2845	16.95520	27.58434	0.5838
At most 3	21.45366	29.79707	0.3300	12.20012	21.13162	0.5280
At most 4	9.253539	15.49471	0.3425	9.162598	14.26460	0.2729
At most 5	0.090941	3.841466	0.7630	0.090941	3.841466	0.7630

Trace and Max-eigenvalue test indicates 1 and 1 co-integrations respectively at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Table 2 showed Johansen co integration test for the model which trace statistic and maximum eigenvalue test were used. For both the test, there were 1 co-integration equation between the variables.

term relationship that integrated the variables in the long run.

For the trace test, there was one co integrated equation at 5 percent level of significance. Refer to Table 2, trace statistic value (99.01210) more than critical value (97.75366) at 5 percent level of significant. So, we reject null hypothesis and accept alternative hypothesis. It showed that there was long

In maximum eigen value test, the result reject null hypothesis at 5 percent significance level because of the maximum eigen value (40.09610) was more than 5 percent level (40.07757) and that was statistically significant. So, in the long run, there were co-integrations between the variables.

Thus, for both test, it confirms that there are long run relationship between dependent and

independent variables. Because of trace statistic and maximum eigenvalue were co integrated between the variable, therefore we can run restricted VAR which was known as VECM.

Vector Error Correction Model (VECM) Result

Based on Max-Eigen statistic in Johansen co-integration test, there were long run relationship

$$D(L_GDP) = C(1)*(L_GDP(-1) + 0.324449653535*L_ER(-1) - 0.454220810152*L_EX(-1) - 0.000295307218962*L_FDI(-1) + 0.0428542780703*L_REM(-1) - 0.341839917337*L_LF(-1) + 6.50962236913) + C(2)*D(L_GDP(-1)) + C(3)*D(L_GDP(-2)) + C(4)*D(L_ER(-1)) + C(5)*D(L_ER(-2)) + C(6)*D(L_EX(-1)) + C(7)*D(L_EX(-2)) + C(8)*D(L_FDI(-1)) + C(9)*D(L_FDI(-2)) + C(10)*D(L_REM(-1)) + C(11)*D(L_REM(-2)) + C(12)*D(L_LF(-1)) + C(13)*D(L_LF(-2)) + C(14)$$

between the variables. So, VECM test was run to indicate short run relationship.

According to VECM, all the variables were converted into first difference automatically. Hence, the model that the system created was:

From model above, we can run Wald test to know the existent of short run relationship among the

variables. So, the table below will show the null hypothesis for Wald test:

Table 3: Wald Test Null Hypothesis

Dependent Variable	Independent Variables	Null Hypothesis
D(L_GDP)	D(L_ER)	c(4)=c(5)=0
	D(L_EX)	c(6)=c(7)=0
	D(L_FDI)	c(8)=c(9)=0
	D(L_REM)	c(10)=c(11)=0
	D(L_LF)	c(12)=c(13)=0

If p value was less than 5 percent, then we reject null hypothesis. That means there was short run

relationship between dependent and independent variables.

Table 4: Result for Wald Test

Variables	Hypothesis	Value of Chi-square	p value	Short Run Relationship
D(L_ER)	c(4)=c(5)=0	3.171284	0.2048	No
D(L_EX)	c(6)=c(7)=0	6.064953	0.0482	Yes
D(L_FDI)	c(8)=c(9)=0	2.700820	0.2591	No
D(L_REM)	c(10)=c(11)=0	12.92063	0.0016	Yes
D(L_LF)	c(12)=c(13)=0	12.78843	0.0017	Yes

Based on Wald test result, export, remittance outflow, and labor force have short run relationship to GDP per capita. Nevertheless, exchange rate and FDI inflow does not influence GDP per capita in the short run (Refer to Table 4).

Diagnostic Test R² and F Statistic

Table 5: Result of R² and F Statistic

R-squared	0.744701	Mean dependent var	0.033011
Adjusted R-squared	0.537270	S.D. dependent var	0.038621
S.E. of regression	0.026272	Akaike info criterion	-4.135911
Sum squared resid	0.011043	Schwarz criterion	-3.482019
Log likelihood	76.03867	Hannan-Quinn criter.	-3.926725
F-statistic	3.590118	Durbin-Watson stat	2.229302
Prob(F-statistic)	0.008839		

Based on Table 5, the value of R^2 was 74.47 percent changes in the economic growth was explained by export, remittance outflow, labour force, exchange rate and FDI which was more than 60 percent. That means 24.53 percent was explaining from others factor

in the model. Meanwhile F statistic of 3.59 means the data used fits the model because its significance ($p=0.008839$) was less than 5 percent.

Serial Correlation LM Test

Table 6: Result of Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.361086	Prob. F(2,14)	0.7032
Obs*R-squared	1.471601	Prob. Chi-Square(2)	0.4791

The p value is 47.91 percent which was more than 5 percent significance level. So, accept H_0 . This means that the model does not have serial correlation problem (Refer to Table 6).

Heteroscedasticity Test

Table 7: Result of Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.065951	Prob. F(18,11)	0.4714
Obs*R-squared	19.06819	Prob. Chi-Square(18)	0.3876
Scaled explained SS	4.020202	Prob. Chi-Square(18)	0.9998

The p value for observe R^2 was 38.76 percent which mean we cannot reject null hypothesis because p value f 0.3876 was more than 5 percent significance

level. Hence, this model does not have heteroscedasticity problem (Refer to Table 7).

Normality Test

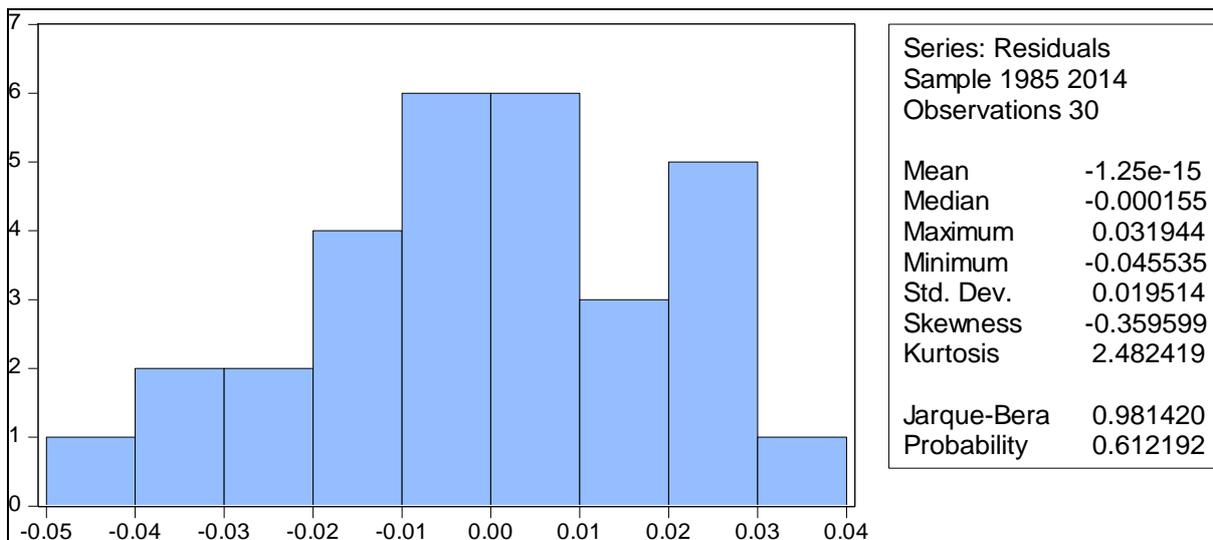


Fig-1: Result of Normality Test

Based on Jarque-Bera, p value was 61.22 percent. The null hypothesis cannot be rejected which means the residual was normally distributed.

Therefore, this model had pass all the diagnostic test and that means it very stable based on the acceptance from the diagnostic test.

DISCUSSION AND CONCLUSION

Based on Shafiun[11], Jawaid and Raza[29], Karagöz[4], and Catrinescu *et al*[21] past studies, the unit root test, Johansen co-integration test, and VECM test were employed. The main objective was to determine short and long run relationship between the remittance outflow and economic growth in Malaysia. This study used annual data from 1982 to 2014. Data was collected from World Bank World Development Indicator (WDI) and Department of Statistic Malaysia.

The result showed that there was a long run relationship between remittance outflow, exchange rate, export, FDI inflow and labor force to economic growth. Meanwhile, export, remittance outflow and labour force were significant and influence economic growth in short run. Unfortunately, exchange rate and FDI inflow were not significant to economic growth in short run. As expected from the past literature, in long run export can bring positive effect into the economic growth of a country because foreign-owned production was more productive than domestically owned production [31]. For some reasons, remittance outflow was positively significant in the short and long run. This could be due to the use of foreign labour to produce goods and services in the country. The goods and services produced by the foreigners helped to boost the production process in the country. This encourages export of goods and services which eventually enhances the purchasing power of the nation. As export increases, GDP of the nation also increases resulting in a positively significant impact with the remittance outflow. This result is supported by Baas [1], Vargas-Silva [2], where increase in remittance outflow result in higher exports and an increase in GDP.

Moreover, Vargas-Silva [2] also claimed that the positively significant impact is also due to the duration of the foreign workers residing in the country. The decisions to remit more or less depend on workers if they tend to stay temporary or for a long period. Temporary workers are likely to remit for investment and consumption while permanent workers are likely to remit because of altruistic purposes. Most of the foreign workers reside in Malaysia for a long period and they are considered as permanent workers. The result is completely different from Alkathlan[12], which they found negative relationship of remittance outflow with economic growth. Malaysia has different sender economic condition compared with Saudi Arabia, Mexico and United State which usually have very high on remittance outflow every year.

Additionally, FDI inflow had insignificant impact in short run towards economic growth because of its low total factor productivity rate. As for the exchange rate, Malaysia was practicing a managed exchange rate system that was constantly exposed to shocks. It needs the interference of the government to have a positive impact towards economic growth. The findings were supported by the study of Gapen *et al.*[3] and Karagöz[4].

This study suggests that government should ensure labor laws to create a confidence among migrant worker to invest more in Malaysia. When migrant workers invest more money in this country, it can

reduce the remittance outflow to their home country. Other than that, to encourage export into this country, the investor protection must be truly implemented through the implementation of law to ensure investor feeling safe and stimulate economic growth [31]. In the future research, hope this paper can be the guideline to improve the quality of their study concern to data, sample size, variables, and methodology.

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