

RESEARCH PAPER

# Determinants of Migrants Remittances in Malaysia: An Ardl Approach

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## ABSTRACT

*This article analyses what determines remittance inflows into Malaysia. Using the Autoregressive distributed lag (ARDL) approach, the study used time-series data for the period 1987-2018. The study validated the theory that remittance inflows ought to be encouraged through determinants such as real wages, inflation, financial development, exchange rate among others. Variables like exchange rate, inflation, gross domestic product growth, financial development and real wages significantly determine the remittance received into Malaysia. Precisely, inflation and real wages significantly impacted and positively encouraged remittance inflows into Malaysia from abroad. On the other hand, remittance inflows reacted negatively to gross domestic products growth, exchange rate and financial development. Furthermore, the significance of the determinants differs. Precisely, real wages happen to be additionally responsive in comparison to inflation and the reason is that its elasticity is greater. In addition, both inflation and real wages have a great impact in Malaysia. This study recommends that the determinants of migrants' remittances in the country should be given attention which will strongly aid in employing remittances for the reduction of poverty, rising investment at the national level and therefore, aid in boosting growth and enhancing sustainable development to Malaysia.*

**KEYWORDS:** ARDL; Determinants; Malaysia; Migration; Remittances.

**JEL:** F22; F24; F31; J15; J61; O15

## 1. Introduction

Remittances are one of the cherished source of income to households, improving the standard of living of families and communities [1]. Remittance is the order of the day and have recently drawn the attention of academicians, policy makers and the general public. Prior studies have discussed that remittances could maintain and sustain the economic firmness and assist to decrease unfavourable shock, particularly in the emerging nations through encouraging rate of economic growth [2], poverty level with the level of inequality ([3]; [4]; [5]; [6]). The prospective benefits linked to the remittances received are of importance to developing countries like Malaysia. Remittances to the home country can also increase

the home country credit worth [7] There are different studies that supported that remittance can uplift the level of education, health and gender equality ([4]; [8] and at the same time make effortlessness the liquidity constraints in situation where standard capital market is lacking ([9]; [7]), and they have long term development significances. Hence, any small fluctuations in the inflows of remittance can have considerable effect on the economy's stability. The migration from the developing to the developed countries has produced immense inflows of remittances to developing countries like Malaysia. The inflows of remittances to developing countries have increased considerably in the last decade globally of which Malaysia is not an exception and

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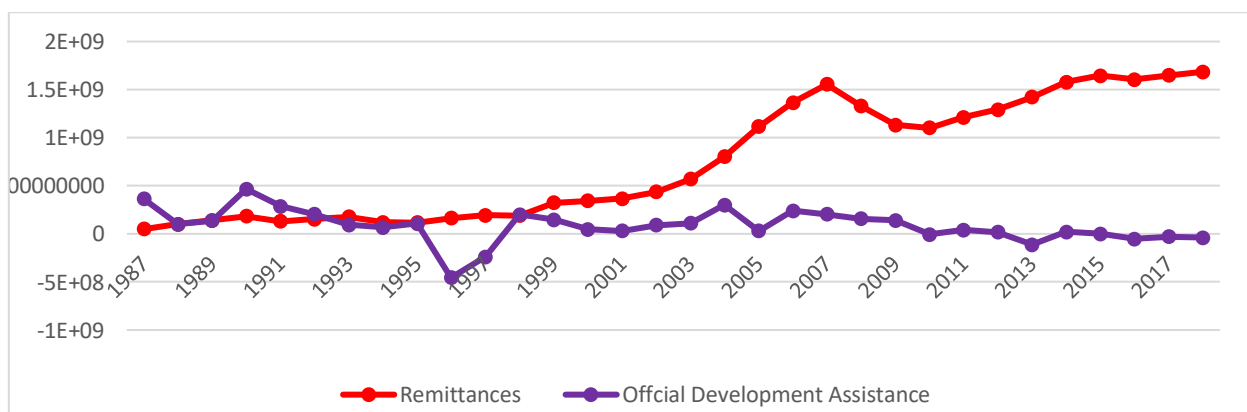
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remittances signifies one of the sources of Malaysia's foreign exchange.

Remittance are more stable over time and unchangeable source of foreign exchange compared to other financial inflows like the official development assistance (ODA) ([4]; [10]; [7]; [11]). In many countries, remittances is more than other financial inflows like ODA ([12]). Figure 1 below shows the remittance and ODA inflows into Malaysia from 1987 to 2018. In the year 2018, the remittances received by Malaysia was \$1.6 billion ([13]). This figures of remittance for 2018 is 34.5 times larger compared to the figures in 1987, and it is 4.6 times larger in terms of the figures for the ODA to Malaysia for the same year 1987. In addition, these types of inflows of capital to developing nations are believed to be underestimated because some transfers are done through unofficial channels ([14]). Furthermore, inflows of remittances to Malaysia have risen from 1987 to 2007 except for the year 2007 to 2009 where Malaysia faced drastic fall in her remittance as a result of the global financial crisis as can be seen in Figure 1 below. It later started picking up from 2010 till 2015, dropped slightly in 2016 and picked up from 2016 till 2018. Despite the persistent rise in remittance inflows and its potential importance as one of the means for the provision of foreign exchange for economic growth and development, surprisingly not much empirical studies are known on the factors that are responsible for the remittance inflows to the migrant's home country, precisely in Malaysia. Some empirical studies have made some effort to examine effect of exchange rate and some economic variables on remittance inflows to Asian and African countries. For instance, [14], [15], [16] and some studies discussed that variation in the levels of economic activities, exchange rate and interest rate are the principal determinants of remittance.

This study is motivated by the continuous increase in remittances to Malaysia. Understanding what motivates the volume of the remittances received allows policies to be implemented that do not reduce inflows of remittance. A developing country like Malaysia can therefore, take advantages of the financial benefits of the remittance inflows if the concerned variables are known and understood. With the rising importance of remittance to developing countries including Malaysia, it is vital to understand the model and the possible determinants via employing time series data. Migrants like any other participants in the currency market are being affected by the large exchange rate fluctuations. These fluctuations in the exchange rate affects the choice by the migrants abroad in terms of the volume of remittance. By concentrating specifically on Malaysia, it reaches a better-off investigation of the role of remittances in the country compared to those of regional or global coverage studies. This study also analyses the nexus between remittance and the numerous variables. Furthermore, this study investigates the main determinant of remittances by using time series data from 1987 to 2018 and ARDL model. This study estimated the short-run and the long-run nexus amongst remittance with the variables which inspires them. Generally, prior studies mostly have examined only the long run nexus. This study complements the commonly used dataset and employed Malaysian data. It is possible that the increase in remittance from 1987 upward might be partially due to unofficial medium of money transfer which are rendered unattractive because of the reduction of exchange rate. The remaining part of this study is as follow: Section 2 discusses our literature reviews, section 3 deals with our methodology, section 4 deals with results and its discussion while section 5 concludes our study.



**Fig. 1. Remittances and official development assistance inflow to malaysia from 1987 up to 2018.**

Source: Author's computation and data from (WDI, 2020).

## 2. Literature Review

Because of the importance of remittance to the beneficiary country, it is significant to investigate the factors that determines remittance by the migrants from their incomes they got from abroad which they remit from their destination to home countries. This study will deliberate on the empirical reviews of some of the determinants of migrants' remittances individually.

Taking into consideration the individual determinant, migrant is one of the determinants, migrant is measured by migrant stock. The source country's total number of migrant was found to be having positive significant effect on the volume of remittances ([16]; [17]; [18]). [16] in North Africa finds the impact of number of migrant workers on remittance as positive while in Turkey, it was not significant [19]. Another different determinant of remittances is inflation. Inflation plays key role on the volume of remittance as [19] confirmed the significant impact of inflation on remittances of Turkish. A study done by [20] showed the inflation rate of the recipient country is negatively related to remittances due to fact that migrants would remit later in order to evade the effect of inflation. Conversely, high level of inflation in home country leads to rise of remittances in order to compensate the fall in the home country's purchasing power. Although, the signs of the influence of inflation on remittance is both positive and negative, [21] finds the impact as indecisive.

Another key factor is the financial sector development which could be estimated by computing domestic credit that is given to private sector as a percentage of the gross domestic product (GDP). Higher financial sector development decreases the cost of transaction hence making it cheaper and easier for remittances to be sent via the official channels ([22]; [14]; [23]). Furthermore, exchange rate plays a key role in both the recipient and source country. The relationship found between these two variables (remittance and exchange rate) is ambiguous because if the country's currency of the migrant appreciates, then following altruism as in the case of Sri Lanka, migrants shall decrease their remittances since similar quantity for the goods in

the host nation could be purchased with a lesser amount of money of the host nation [24]. On the other hand, the appreciation of the currency of the migrant's nation compared to the nation's currency/money of the recipient could possibly rise the remittance value in country of the recipient, if the migrant does not exchange the remittance amount into their domestic currency [25]. It was validated by a study in Bangladesh and Philippines ([26]; [27]). Looking at the case of India, the bilateral rate of exchange does not significantly impact on remittances ([28]) .

Another variable in this study is the GDP. The economic condition of the recipient country is one of the important determinants of remittance inflow. Some studies found that recipient country's output that is, GDP has negative relationship with remittance inflows. This relationship was validated by a study done on 36 sub-Saharan African countries from 1990 up to 2005 ([23]). In a different study with regards to Bangladesh, the GDP of Bangladesh had significant and positive relationship on remittance inflows. Because of increase in employment and the potential earning in the countries of recipient, migrants are willing to remit more remittances ([26]. In a study about India, it was found that GDP was an insignificant determinant of remittances ([28]).

## 3. Methodology

To investigate the determinants of remittances, this study used time series data from 1987 up to 2018 for Malaysia. The choice of the time period was due to availability of data for all the variables involved in the study. This study employed ARDL bound testing approach. Our model followed [15], [3] and [14] with modifications. The model is given as follows:

$$REM = f(MIG, RW, INF, FD, EXR, GDP) \quad - \quad (1)$$

Equation (1) above shows that remittance is the function of migrant and controls variables like real-wage, the inflation in the country, financial sector development, the prevailing exchange rates and gross domestic product growth.

The Equation (1) model above is specified in econometric form which gives:

$$REM_t = \theta_0 + \theta_1 MIG_t + \theta_2 RW_t + \theta_3 INF_t + \theta_4 FD_t + \theta_5 EXR_t + \theta_6 GDP_t + \varepsilon_t \quad - \quad (2)$$

From Equation (2) model above, taking logarithm of both sides gives:

$$lREM_t = \theta_0 + \theta_1 lMIG_t + \theta_2 lRW_t + \theta_3 lINF_t + \theta_4 lFD_t + \theta_5 lEXR_t + \theta_6 lGDP_t + \varepsilon_t \quad - \quad (3)$$

Where; *REM* signifies the remittance, *MIG* is migrant; *RW* is real wages, *INF* is the inflation, *FD* signifies financial sector development, *EXR* signifies exchange rate and *GDP* is the gross domestic product growth.  $\theta_0 - \theta_4$  and the  $\varepsilon_t$  which are the explanatory variables coefficients and the Gaussian error term respectively.

(a) Dependent variable.

The dependent variable and main concern that is considered in this study is *Remittances (REM)*. It refers to official remittances of workers and employee's compensation received by migrants' home country. Remittance have been used widely in both theoretical and empirical studies ([15]; [14]; [17]). Given the fact that, remittances of workers are partly transferred for motives of investment ([29]), their flows to the migrant-sending countries are expected to be influenced by economic conditions ([30]). Factors like migrant real wages, exchange rates, differential rates of interest, level of financial development, migrant and inflation are expected to influence flow of remittances of workers to the migrant-sending countries.

(b) Independent Variables.

*Migrant (MIG)* which is measured by migrant stock, is the main variable in this study. It has been widely used in empirical literatures ([16]; [18]; [12]). Migrant stock measurement is total and is being measured annually. Migrant stock refers to the number of people, living in an area or country other than that in which they were born.

*Real wages (RW)* has been widely used in empirical study [14]. It is the available wage in the country. The real wages determine not just the economic activities level in the country of the migrant, the income with the savings of the migrants but at the same times determine the amount to be remitted ([31]; [29]). The higher the earned income, the higher the possible amount will be remitted. The higher the income, the higher the possibility of sending more remittances ([32]).

*Inflation (INF)*: One of the measures of economy's uncertainties in the home nations of the migrants is inflation ([20]). Increase in inflation or price-level undermined the credibility of policies in the migrant sending-country ([33]). Therefore, a higher inflation level in the home country of migrant may results in the lower worker remittances inflow for investment, because it depicts the uncertainty and increased risk ([34]). Given the fact that many empirical studies ([15]; [32]) have stresses that inflows of remittance of workers decline as domestic inflation rises, this variable is added into the empirical model.

*Financial development (FD)* has been used in empirical literature ([14]). The measure of this variable is annually. It is being measured through the domestic credits to the private sectors, that is, it is financial resource that is offered to private sectors like, purchase for non-equity services, loans, trade credit and some receivable accounts which establishes repayment claims. Financial sector development ought to ease money transfer procedure through increasing numbers of the competing formal channels of remitting, which reduces cost of remitting and also influences the migrant workers to send their savings to their origin countries from their countries of host ([35]; [14]).

*Exchange Rate (EXR)* has been used in empirical literature and this variable is measured as the price of one currency compared to another. It is determined through the country's authorities, which is expressed by units of local currency for the main destination countries of the migrant. The depreciation of domestic rate of exchange (defined as an index increase) is supposed to attract more inflows of remittance via a sale effect as domestics assets, services and goods becomes significantly affordable and cheaper to migrants that are earning foreign currencies ([14]; [36]). Besides, exchange rate appreciation does negate the incentive to remit by migrants ([37]; [14]). Furthermore, exchange rate is also amount of local currency unit which is divided by the foreign currency unit. It means a rise in rate of exchange means decline in the value of local currency ([38]).

*Gross Domestic Product (GDP)* had been used in empirical literature ([3]; [39]). The GDP of is one of the most important determinants of remittances. With the increase in the GDP growth, the migrants could have more and different employment prospect in conditions of improved economic conditions and therefore remit more.

All the data employed for this study were sourced from World development indicators.

#### 4. Results and Discussion

Table 1 below depicts descriptive statistics for Malaysia's remittances and its explanatory variables from 1987 up to 2018. In 2018 the remittance of Malaysia was \$1.6 billion (WDI), the mean of remittance is \$758 million with the minimum value of \$48.8 million. All our variables are normally distributed because our probability value as revealed via 'Jacque-Bera' were greater than normal statistical level of significance. Which suggest this study's null hypothesis in the series are distributed normally and that cannot be rejected. This result was further validated by kurtosis and skewness values. All our variables are

positive except for financial development and gross domestic product growth. Variables such as remittance, migrant, real wages, inflation and exchange rate are platykurtic while financial

development and gross domestic product growth are leptokurtic since their results are greater than 3.

**Tab. 1. The descriptive statistics for the variables of interest**

	REM	MIG	RW	INF	FD	EXR	GDP
Mean	7.58E+08	1499265.	4460.281	2.651471	113.3368	105.4692	6.045591
Median	5.03E+08	1277223.	3508.059	2.640158	112.8415	99.25948	5.897611
Maximum	1.69E+09	2514243.	8430.823	5.440782	154.8921	139.0491	10.00270
Minimum	48816528	695920.0	1417.485	0.290008	69.41267	85.14250	-7.359415
Std. Dev.	6.14E+08	685796.8	2394.130	1.296655	19.23024	14.24513	3.587558
Skewness	0.266369	0.387410	0.464435	0.304459	-0.056765	0.603460	-1.854468
Kurtosis	1.365467	1.595117	1.668314	2.549108	3.359490	2.170952	7.628465
Jarque-Bera	3.940677	3.432057	3.514916	0.765446	0.189497	2.858637	46.90519
Probability	0.139410	0.179779	0.172483	0.682002	0.909602	0.239472	0.000000
Sum	2.42E+10	47976487	142729.0	84.84706	3626.779	3375.013	193.4589
Sum Sq. Dev.	1.17E+19	1.46E+13	1.78E+08	52.12075	11463.87	6290.632	398.9878
Observations	32	32	32	32	32	32	32

*Note:* REM is the remittance, MIG is the migrant, RW is real wages, INF is the inflation, FD is the financial development, EXR is the exchange rate and GDP is the gross domestic product growth.

*Source:* Author's computation employing E-view 11.

This paper employed ARDL in [40]. The ARDL method was employed due to 3 reasons which are: First, it has the capability of estimating long- and short-run nexus amongst the variables which does not possess same integration order insofar as those variables of interest are stationery at level i.e.  $I(0)$ , first difference i.e.  $I(1)$  or both. However, none of

the variable should be  $I(2)$ . Second, ARDL could eliminate issues connected to autocorrelation and third, it could be employed in sample size that are small. To proceed, Augmented Dickey-Fuller (ADF); and the Phillips-Perron (PP) unit root test was employed. The test of ADF ([41]; and PP ([42] are shown in Table 2 below:

**Tab. 2. Results of test of unit root.**

Variable	ADF		PP	
	Constant	Constant & Trend	Constant	Constant & Trend
<i>Level <math>I(0)</math></i>				
REM	-0.310299	-3.362622	-0.245624	-2.028935
MIG	-0.089347	-2.908781	0.139838	-2.881053
RW	-0.234417	-1.703483	-0.298011	-1.838794
INF	-5.079646***	-5.507076***	-5.142995***	-5.523705***
FD	-2.114377	-4.722682***	-1.888917	-1.797721
EXR	-2.231524	-2.959532	-2.266344	-3.017642
GDP	-4.577636***	-5.292076***	-4.618282***	-5.288607***
<i>First Difference <math>I(1)</math></i>				
REM	-3.527096***	-3.498443*	-2.434684	-2.369779
MIG	-2.112605	-1.463940	-6.034290***	-6.627972***
RW	-4.590027***	-4.529228***	-4.590027***	-4.529228***
INF	-6.923752***	-6.855094***	-10.22632***	-10.13026***
FD	-4.897597***	-4.872827***	-4.875762***	-4.879263***
EXR	-5.128401***	-5.042521***	-8.815639***	-9.515217***
GDP	-7.643600***	-7.505045***	-18.16758***	-19.20863***

*Note:* \*\*\*, \*\* and \* are significance at the level of 1%, 5% & 10% respectively. REM is the remittance, MIG is the migrant, RW is real wages, INF is the inflation, FD is the financial development, EXR is the exchange rate and GDP is the gross domestic product growth. *Source:* Author's computation employing E-view 11.

Taking into consideration our Table 2, at level or  $I(0)$ , the variables that are stationary are – INF both for ADF and PP at 1% level of significance, FD for ADF for its constant & trend at 1% level of significance and GDP for ADF and PP at 1% level of significance. However, at the first difference or

$I(1)$ , RW, INF, FD, EXR and GDP are stationary employing the techniques of ADF and PP while REM is stationary using ADF and MIG is stationary using PP. With this result available, the usage of ARDL model for estimating in addition establishing the long run relationship amongst

remittance, migrant, inflation, real wages, financial sector development, GDP growth and exchange rate in Malaysia is vindicated.

### 5. Ardl Bound Test

This paper carried out automatic lag selection. The E-view chose lag 2, its outcomes displays the

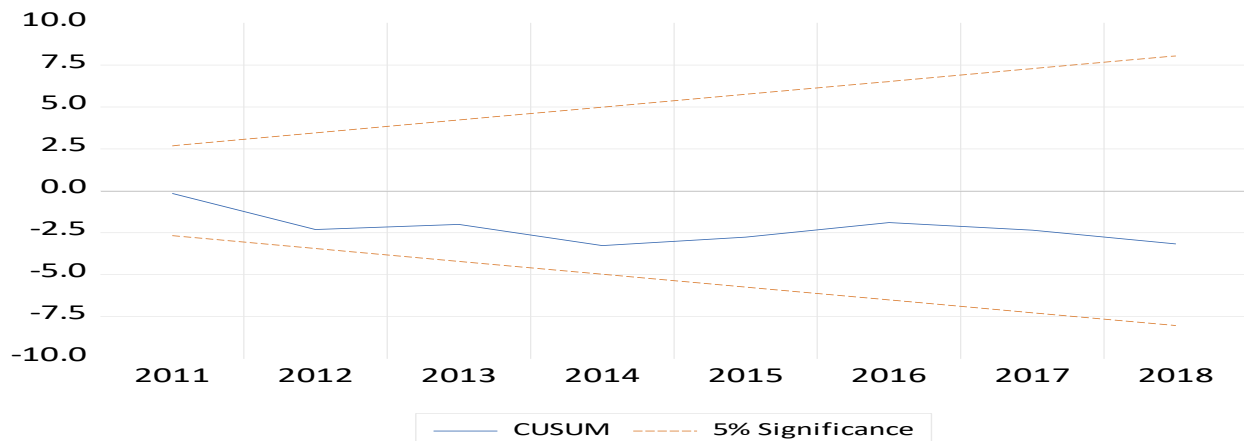
optimal lag as ARDL(2, 2, 2, 2, 1, 1, 1). For us to test and know if ARDL(2, 2, 2, 2, 1, 1, 1) model have passed the diagnostic checks, the study conduct LM, CUSM square and CUSM tests. The outcome of LM test is shown by Table 3 below:

**Tab. 3. The breusch-godfrey serial-correlation LM test.**

F-statistics.	0.317972	Prob., F(2,6)	0.7392
Obs.*R-squared.	2.491664	Prob. Chi-squared(2).	0.2877

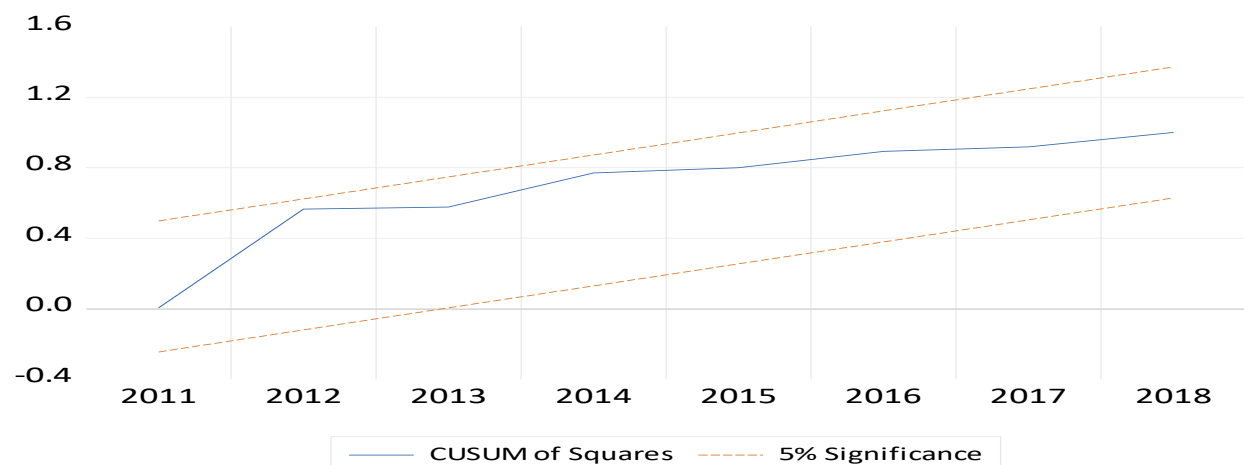
From our Table 3 above, the Prob. Value stands at 0.2877, since the 'p-value' happens to be greater than 0.05, the value implies this study does not have serial-correlation issue in the ARDL.

Furthermore, we conduct the stability or CUSUM test and it's shown in figure 2 below. CUSUM test of Figure 2 below showed that the line that is blue in colour falls in-between the bounds.



**Fig. 2. CUSUM test. Source: author's computation employing E-view 11.**

Now we test the CUSUM square to observe if the model or residual is stable. It is displayed by the use of Figure 3 below:



**Fig. 3. The CUSUM square test. Computed employing E-view 11.**

The 'CUSUM square' showed the model or residual is stable due to the fact that the blue-line falls in-between the bounds. Since we have passed all the diagnostic checks above (the above 3 tests),

we have identified our optimal lag for the ARDL bound test, in Table 4 below, we now test our bound test to see if there is long run relationship.

**Tab. 4. F-Bounds test to test existence of long-run cointegration nexus.**

Test Statistics.	Value(s).	Significance.	I(0)	I(1).
Asymptotic: n=1000				
F-statistic.	4.584856	10%	1.99	2.94
K	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99
Finite Sample: n=35				
Actual Sample Size	26	10%	2.254	3.388
		5%	2.685	3.96
Finite Sample: n=30				
		10%	2.334	3.515*
		5%	2.794	4.148**

Note: \*\* and \* are significance at the level of 5% & 10% respectively.

Source: Author's computation employing E-view\_11.

In Table 4 above, it displays that the F-test = 4.584856 which is greater than the finite sample (n=30) critical values, the values/figures are 4.148 and 3.515. They are significant at both 5% and 10 % respectively. That means there is a long-run

cointegration nexus amongst remittance and its determinants which are migrant, real-wages, financial development, inflation, GDP growth and exchange rate.

**Tab. 5. Long run coefficients results.**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMIG	-0.763151	0.522547	-1.460443	0.1823
LRW	2.107984	0.418509	5.036889	0.0010
LINF	0.743947	0.183884	4.045744	0.0037
LFD	-1.650598	0.480013	-3.438653	0.0088
LEXR	-3.529106	0.629600	-5.605313	0.0005
LGDP	-1.129464	0.196748	-5.740662	0.0004
C	38.22599	7.489050	5.104250	0.0009

Note: LMIG is the logarithm of migrant, LRW is the logarithm of real wages, LINF is the logarithm of inflation, LFD is the logarithm of financial development, LEXR is the logarithm of exchange rate, LGDP is the logarithm of GDP growth and C is the constant. Source: Author's computation employing E-view 11.

Looking at Table 5 above, real-wages, financial development, inflation, GDP growth and exchange rate are the significant determinants of remittance. The coefficient of real wages is positive and significant. This is in harmony via employing PMG by [14]. If real wages increase by 1%, remittance will increase by 2.107%. The coefficient of inflation is positive and significant. It is in harmony with [12] and invalidates [3] who got negative but significant result. If our inflation increases by 1%, then remittances tend to increase by 0.743%. The coefficient of financial development is significant and negative. This invalidates [14]. If financial development

increases by 1%, the remittances tend to decrease by 1.650%. The coefficient of exchange rate showed it is significant and negative, which is in harmony with [12] and invalidates [14]. If our exchange rate increases by 1%, then remittances tend to decrease by 3.529%. The coefficient of gross domestic product is significant and negative, this invalidates [3] and [39]. If our gross domestic product increase by 1%, then remittance tend to decrease by 1.129%. Real-wages happens to be more-quicker to respond in comparison to inflation since the elasticity is greater. The coefficient of migrant shows it is negative and not significant.

**Tab. 6. Results of short-run coefficients.**

Variables	Coefficients	Standard Error	t-statistic.	Probability.
C	-32.15425	6.631777	-4.848512	0.0003
ECT(-1)	-0.841991	0.172812	4.872304	0.0002
D(LREM(-1))	-0.912409	0.262357	-3.477741	0.0037
D(LREM(2))	-0.141802	0.162401	-0.873159	0.3973
D(LMIG)	0.141729	0.265517	0.533786	0.6019



D(LRW)	-4.190600	0.925226	-4.529270	0.0005
D(LINF)	-0.158959	0.072776	-2.184244	0.0465
D(LFD)	0.159481	0.342822	0.465199	0.6489
D(LEXR)	8.192822	1.764680	4.642667	0.0004
D(LGDP)	0.646737	0.130785	4.945045	0.0002

Note: C signifies constant, the ECT signifies error correction term, LREM signifies logarithm for remittance, LMIG is the logarithm of migrant, LRW is the logarithm of real wages, LINF is the logarithm of inflation, LFD is the logarithm of financial development, LEXR is the logarithm of exchange rate and LGDP is the logarithm of GDP growth.

The result of short-run coefficient is given by Table 6 above. One of the most interesting aspect of the outcomes was that, the result is negative and the coefficient of ECT coefficient lies in-between one and zero which is in harmony with the theory of ARDL. It also implies there are convergence evidence to the long-run equilibrium. The ECT of -0.8420 which signifies the speed of adjustment of the model back to the equilibrium position is 84.20%. In addition, the convergence adjustment back to the long-run equilibrium will take one year and two months (that is,  $\frac{1}{84.20} \times \frac{100}{1} = 1.2$  year).

## 6. Conclusion

This paper using ARDL approach examines migrants' remittance determinants on inflows of remittance into Malaysia with the use of time series data from the year 1987 up to 2018 like other studies [43]. The findings of this study is in harmony with the theory that assert that remittance inflows ought to be induced via determinants such as real-wages, financial development, inflation, exchange rate, interest rate among others. The study established the variables of interests together play vital aspect in inducing the remittance inflows to Malaysia. Variables like real-wages, financial sector development, inflation, GDP growth and exchange rate have significant impact on remittance inflows. Precisely, inflation and real wages have impact that is significant and they favourably encourage remittance inflows into Malaysia from abroad. On the other hand, remittance responded negatively to GDP growth, financial sector development and exchange rate. Furthermore, significance of the migrants' remittance determinants differs. Precisely, real-wages happens to be greatly responsive in comparison to inflation due to the fact that its elasticity is greater. Both the inflation and real-wages are established to possess good statistical impact in Malaysia. This study recommends that the determinants of migrants' remittances in the country should be given concentration which will strongly aid in employing remittances for the reduction of poverty, rising investments at the domestic level, and therefore aid in improving

growth, and enhancing development that is sustainable to Malaysia.

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