The Effects of International Migration on Male Unemployment in Malaysia

Mohd Shahidan Shaari[1*], Abdul Rahim Ridzuan[2], Nor Hidayah Harun[3] and Faiz Masnan[1]

[1]Universiti Malaysia Perlis, Malaysia.
[2]Universiti Teknologi MARA, Melaka Campus, Malaysia.
[3]Universiti Teknologi MARA, Pulau Pinang Campus, Malaysia.

ABSTRACT

In Malaysia, male employment plays an important role in families as they are breadwinners. However, an increase in international migrants can cause them to be unemployed. Other than that, the number of male employment is higher than the number of female employment. In addition, the number of international migrants also exhibit an increasing trend. This situation has alarmed economists and policymakers. Therefore, this study aims to investigate the effects of international migration on male unemployment in Malaysia from 1982 to 2015. The Autoregressive Distributed Lags (ARDL) technique was employed and the results show that international migrants do not harm the labour force in Malaysia in the long run. This is because Malaysia needs foreign workers in some crucial sectors such as agriculture and construction. However, the results of the causality test reveal that migration can influence male unemployment in the short run. Therefore, it is imperative for policymakers to introduce policies to alleviate the problem of male unemployment, such as controlling the number of permits for foreign workers to work in the sectors that are dominated by local male workers.

Keywords: International Migration, Male Unemployment, ARDL.

1. INTRODUCTION

All countries in the world strive for full employment as it is one of the macroeconomic goals. It is also one of the indicators to measure the health of an economy (Herrmann, 2016). If a country plunges into recession, it implies that there is an inexorable rise in unemployment. Thus, this situation gains attention from policymakers to extricate the country from the recession. Inevitable poverty can stem from higher unemployment, thus culminating in numerous social woes such as higher crime rates and prostitution. The issue of high unemployment often poses unfavourable challenges to developing and even developed countries. Some economists remain in perplexity when ascertaining measures to combat high unemployment. In the absence of meticulous investigations, other economic problems such as inflation can transpire. As a result, they are caught between the devil and the blue sea.

A vast array of the previous literature has embarked on investigations regarding factors that can influence unemployment. Orji *et al.* (2015) explored the factor of inflation rates and pinpointed that higher inflation can contribute to higher unemployment and their finding does not lend credence to the Philips curve. Unemployment is not only hinged by inflation but also economic growth. Mohseni and Jouzaryan (2016) extended the study of Orji *et al.* (2015) by including the factor of economic growth and their results suggested that escalation of economic growth can reduce unemployment rates. As for the factor of FDI, Balcerzak and Żurek (2011) discovered that FDI can aggravate unemployment.

The factor of international migration is also of utmost importance. However, it is sparsely discussed in previous literature. The number of international migrants exhibits an increasing trend irrespective of economic conditions. Rios-Avila and Canavire-Bacarreza (2016) stated that the use of migrants in the process of production will replace the use of natives and thus unemployment ensues. Migrants are low paid, therefore, it can put pressures on local labour forces (Fromentin, 2013). In order to reduce the production cost, low-wage workers will always take precedence over high-paid workers. Despite the fact that several previous studies ascertained that increasing international migration can spur unemployment to growth, their findings are still untenable. According to Jensen (2018), an increase in the number of international migrants does not increase unemployment. This is rooted in higher labour market segmentation. International migrants occupy job positions that are unfavourable by local workers (Amelie, 2017). Some countries such as Malaysia are in dire need of foreign workers to generate output in some sectors such as agricultural and construction sectors. Therefore, the employment of international migrants will not affect local unemployment. It obviously implies that the arrival of international migrants is inevitably dependent on the growth of those sectors.

However, none of the previous studies encompasses male unemployment despite the fact that most male workers in Malaysia are breadwinners in their families. Therefore, this directs our attention to investigate the effects of international migration on male unemployment. According to the Department of Statistics, Malaysia (2017), in Malaysia, the number of male employment surpasses the number of female employment. Thus, it is imperative to shed some light on the issue of international migration and male unemployment. The findings of this study can help the Malaysian government formulate the right policies on the number of international migrations so that there is no surge in male unemployment.

2. LITERATURE REVIEW

This section focuses on empirical studies about the impact of non-native workers on unemployment. It has been robustly discussed and debated among previous studies. Some studies, for example, Fromentin (2013) and Jensen (2018) found that international immigration can benefit local labour force. On the other hand, Lozej (2018) and Husain *et al.* (2014) argued that international immigration will have deleterious impacts on the local labour force. The empirical studies differ according to regions, methods and proxy indicators.

Oh *et al.* (2011) examined the influence of international migration on unemployment rates in urban America. The study explored the impact of local human capital (education) and urban labour markets (employment distributions by the class of workers) on urban unemployment by using a sample of the 301 Primary Metropolitan Statistical Areas /Metropolitan Statistical Areas (PMSAs/MSAs) in 1990 and 2000. The empirical findings postulated that more focus on international migrants in urban areas including recent immigrant cohorts tend to increase the urban unemployment rate. Hussain *et al.* (2014) extended the study by Oh *et al.* (2011) by encompassing rural areas but focusing on Malaysia. The study also included household income and used different methods namely Johansen co-integration and VECM. Data ranging from 1980 to 2011 were analysed and the results supported that migration in Malaysia does not only affect unemployment in urban areas but also rural areas.

Fromentin (2013) also used the same method (Johansen co-integration and VECM). However, the finding is not consistent with the above studies due to different indicators. The study focused on net migration (the difference between immigrants and emigrants) rather than migration. Annual data from 1970 to 2008 were analysed and the findings reveal that net migration has negative influences on unemployment rates. This is because foreign workers migrate to France and then create jobs. This can benefit the native labour force in France. Jensen (2018) supported the findings that international migration does not have any repercussion for the local labour force.

The study also used the Johansen co-integration and Granger causality. 146 years of data for the period 1870-2015 were analysed and the findings postulated long-run equilibrium relationships among GDP, unemployment, and immigration inflows in which there is a bidirectional relationship between GDP and immigration, and a unidirectional causality running from immigration to unemployment. The results also revealed that immigration does increase GDP and reduces unemployment.

Islam (2007) did not deny the importance of international migration for the local labour force. This is because the study found that an increase in international migration can have desirable effects on native workers in Canada. The findings were obtained from an analysis using the Johansen co-integration and VECM on data from 1961 to 2001.

Unlike Latif (2015) who precisely examined the impact of permanent international immigration on the unemployment rate in Canada for both short-run and long run. The study employed panel econometric techniques such as FMOLS, DOLS, and panel VECM. The results suggested that immigration has a significant positive impact on unemployment rates in the short run. However, in the long run, immigration has negative and insignificant impacts on unemployment rates. Further analysis was done by Jean and Jiménez (2011) to assess the consequences of immigration for native unemployment in OECD countries. The study used data on native unemployment from eighteen OECD countries over the period 1984–2003 combined with skill-levels. The results reveal that there is no significant long-run impact but only temporary impact on native unemployment, depending upon their policy frameworks.

A study done by Alden & Hammarstedt (2014) concluded that education and subsidized employment are vital for immigrants to be employed. As a developing country, Malaysia still needs more workers in all economic sectors particularly in the construction sector to stimulate economic growth. Larger output needs to be produced with a small number of workers, wages are expected to be higher. Therefore, firms will try to cut their cost of production by hiring more foreign workers because local workers are not interested to work for lower wages. Thus, Abdul-Rahman *et al.* (2012) studied the negative impact induced by foreign workers in the construction sector. They summarized that the over-dependence on foreign workers is considered to have a serious negative impact on local workers.

3. METHODOLOGY

This study employs the Autoregressive Distributed Lags (ARDL) approach to investigate the effects of international migration on male unemployment in Malaysia from 1982 to 2015. The variables used in this study are the number of male unemployment (MU) and international migration (M) in Malaysia. Real GDP, Foreign Direct Investment (FDI), and consumer price index (CPI) are also used in this study as controlled variables. Firstly, the unit root test based on Augmented Dickey-Fuller (ADF) is conducted to see the stationarity of the data for all of the variables. The Bound test is conducted to see whether there is a long-run relationship. Next, long-run and short-run relationships are estimated using the ARDL approach to examine the effects of international migration on male unemployment in the long run and short run. The model specification for this study is as follows:

$$\text{LnMU}_t = \alpha_1 + \alpha_2 \text{LnM}_t + \alpha_3 \alpha \text{LnGDP}_t + \alpha_4 \alpha \text{LnFDI}_t + \alpha_5 \alpha \text{LnCPI}_t + \varepsilon_1 \dots (1.0)$$

Where,

$\ln\text{MU}_t$ = the ln of male unemployment in year t
$\ln M_t$ = the ln of international migration in year t
$\ln GDP_t$ = the ln of real gross domestic product in year t

$\ln FDI_t$ = the ln of foreign direct investment in year $_t$
$\ln CPI_t$ = the ln of consumer price index in year $_t$
ε_t = random value of error

3.1 Stationary Test

Before the model is estimated using the ARDL approach, a unit root test was conducted to examine the stationarity of time series data. There are several options that can be used to see the stationarity. However, this study employs ADF as it is the most famous approach used by previous studies. The hypothesis for the root unit test is as follows:

$H_0 = a = 0$, has a unit root (data is not stationary)
$H_1 = a \neq 0$, has no unit root (data is stationary)

To test the presence of unit root in time series data, the model for ADF is as follows:

$$\Delta y_t = \alpha y_{t-1} + \sum_{i=1}^{n} \psi_i \, \Delta y_{t-i} + \varepsilon_t \ldots (2.0)$$

Where Δ is the first differentiation operator, ε_t is the error term, and y_t is the variables. If the ADF test proves that at level I (0) and first difference I (I), the time series data is not significant, suggesting that we fail to reject the null hypothesis and thus the data has a unit root. On the other hand, if the ADF test shows that the time series data is significant, implying that the data has no unit root. We can compare the t-statistic value with the critical value of McKinnon. If the t-statistic value is lower than the critical value of McKinnon, then H_0 is accepted where there is a unit root and the data is not stationary. If the t-statistic value is higher than the critical value of McKinnon, then H_0 is rejected, suggesting that there is no unit root and the data is stationary.

3.2 Auto-Regressive Distributed Lags (ARDL)

Pesaran and Shin (1998) introduced the ARDL method. This method is unique as it does not need a large sample size but provides reliable and consistent results while other co-integration methods such as Jahansen need a large sample size to provide reliable results (Pesaran *et al.*, 2001). Using this approach, a co-integration test is first conducted to estimate whether there is a long-run relationship between the variables, namely, male unemployment (MU), international migration (M), GDP, FDI and CPI. According to Engle and Granger (1987), to conduct the co-integration test, it is important to consider that all of the related variables in this study must have the same degree of integration. However, it does not apply to the ARDL approach as it does not necessarily consider the same degree of integration. It can be mixed (Pesaran & Shin, 1999). All the variables in this study are converted into logarithm to estimate elasticity coefficients. The ARDL test used in this study is based on the following Equation 3.0.

$$\Delta \text{LnMU}_t = \alpha_1 + \sum_{i-1}^{a} \delta_i \Delta \text{LnMU}_{t-i} + \sum_{i-0}^{b} \delta_i \Delta \text{LnM}_{t-i} + \sum_{i-0}^{c} \delta_i \Delta \text{LnGDP}_{t-i} + \sum_{i-0}^{d} \delta_i \Delta \text{LnFDI}_{t-i}$$
$$+ \sum_{i-0}^{e} \delta_i \Delta \text{LnCPI}_{t-i} + \theta_0 \text{LnMU}_{t-1} + \theta_1 \text{LnM}_{t-1} + \theta_2 \text{LnDGP}_{t-1} + \theta_3 \text{LnFDI}_{t-1}$$
$$+ \theta_4 \text{LnCPI}_{t-1} + e_t \ldots (3.0)$$

Where δ is short-term coefficients, θ is long-term coefficients and e_t is a residual term within a period of study. Pesaran *et al.* (2001) stated that to determine the boundary phase of the ARDL

modelling estimate, the F-statistical test is used and the value will be compared with the critical values. The boundary test for co-integration is performed by testing the following hypotheses:

$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$; there is no co-integrating relationship between variables
$H_1 = \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$; there is a co-integrating relationship between variables

If there is a co-integrating relationship between the variables, the F-statistic value exceeds the critical value of the upper bound. If the F-statistic value is less than the lower bound critical value, that means there is no co-integrating relationship between the variables (Narayan, 2005). However, if the F-statistic value lies between the upper bound and the lower bound critical values, according to Pesaran *et al.* (2001), we cannot make any conclusive inference unless we know the regressor. Suppose that there is an existence of a long-run relationship among the variables, thus, the elasticity for the long run will be estimated using the ARDL model based on Equation 4.0 as follows:

$$\Delta LnMU_t = \alpha_2 + \theta_0 LnMU_{t-1} + \theta_1 LnM_{t-1} + \theta_2 LnGDP_{t-1} + \theta_3 LnFDI_{t-1} + \theta_4 LnCPI_{t-1} + e_t \dots (4.0)$$

Where θ indicates long-run elasticities of each variable, we choose the optimal lag length based on Akaike information criterion (AIC). Suppose that there is a long-run relationship, then we proceed to estimate the short-run relationship and the model is derived in Equation 5.0 as follows:

$$\Delta LnMU_t = \alpha_3 + \sum_{i-1}^{a} \theta_i \Delta LnMU_{t-i} + \sum_{i-0}^{b} \theta_i \Delta LnM_{t-i} + \sum_{i-0}^{c} \theta_i \Delta LnGDP_{t-i} + \sum_{i-0}^{d} \theta_i \Delta LnFDI_{t-i}$$
$$+ \sum_{i-0}^{e} \theta_i \Delta LnCPI_{t-i} + \psi ECT_{t-i} + e_t \dots (5.0)$$

Where ECT_{t-i} is an error correction term that measures the adjustment speed back to the equilibrium. A negative ECT value indicates that the model will go towards equilibrium with the speed of adjustment. The ECT value must be significantly negative and cannot be more than 1. If it is larger than 1, it suggests that there is no convergence towards equilibrium. The diagnostic tests such as normality test, serial correlation test, Ramsey Reset test (functional form), and Breusch Pagan test (Heteroscedasticity), are subsequently conducted. The results of the diagnostic tests must not be significant to imply the goodness of the model. Given that the long-run elasticities are unable to show us the causality between the determinants in each model, we also performed the Toda-Yamamoto granger non-causality test that can provide more information for policy recommendations. The Toda Yamamoto Granger non-causality tests correspond to the Vector Autoregressive (VAR) model (Toda & Yamamoto, 1995). The formulation of the model is written in Equation 6.0:

$$LnMU_i = \alpha_0 + (\sum_{i=1}^{k} \alpha_{1i} LnMU_{t-1} + \sum_{i=k+1}^{d\,max} \alpha_{2i} LnM_{t-1}) + (\sum_{i=1}^{k} \beta_{1i} LnM_{t-1} + \sum_{i=k+1}^{d\,max} \beta_{2i} LnM_{t-1})$$
$$+ (\sum_{i=1}^{k} \gamma_{1i} LnGDP_{t-1} + \sum_{i=k=1}^{d\,max} \gamma_{2i} LnGDP_{t-1}) + (\sum_{i=1}^{k} \delta_{2i} LnFDI_{t-1}$$
$$+ \sum_{i=k+1}^{d\,max} \delta_{2i} LnFDI_{t-1}) + (\sum_{i=1}^{k} \varphi_{2i} LnCPI_{t-1} + \sum_{i=k+1}^{d\,max} \varphi_{2i} LnCPI_{t-1}) + \varepsilon_t \dots (6.0)$$

This method is valid regardless of whether a series is I (0), I (1) or I (2), non-cointegrated or cointegrated of any arbitrary order. The optimum lag 4 is detected using the VAR lag order

selection based on AIC. One extra lag (dmax = 1) is added to the optimal lag of the VAR model for conducting the Granger non-causality test based on the Toda and Yamamoto approach.

4. FINDINGS

Preliminary data analyses such as the unit root test for each variable give important information on data stationarity. Using the ADF unit root test, the analysis was run at level and first difference, as presented in Table 1. The results based on intercept and intercept with a trend at level show that almost all variables are not stationary, except for lnMU, and lnFDI which are significant at 5%. On the other hand, the results of unit roots at first difference show that all of the variables are significant at 1% or 5%, respectively and thus they are stationary. The results of this test point out the existence of mix stationarity of the variables, thus fulfilling the condition of using the ARDL estimation for the regression analysis.

Table 1 ADF unit root test

Variables	Intercept		Intercept and Trend	
	Level	**First Difference**	**Level**	**First Difference**
lnMU	-3.1123**	-4.3802*	-2.9051	-4.2842*
lnM	-2.5725	-5.8329*	-2.6864	-5.7719*
lnRGDP	-1.0333	-4.6338*	-1.2008	-4.6554*
lnFDI	-3.4839**	-6.3372*	-3.7283**	-6.2202*
lnCPI	-0.5715	-4.3031*	-1.3115	-4.2323**

Note: * and ** significant at 1% and 5% significant level respectively

In order to confirm the presence of a long-run relationship between the variables, the model has been tested by using the ARDL co-integration test, and the results reveal the F-statistic value, as tabulated in Table 2. The null hypothesis cannot be rejected if the F-statistic falls below the bound levels, but if the F-statistic exceeds the upper bound level; the null hypothesis is rejected, thus signifying the existence of a co-integrating relationship. The results show that the null hypothesis of no co-integration is rejected at 1% significant level given that the F-statistic value, 5.085, is greater than the upper bound critical value, I (1), as given in Table 1. This implies a tendency for the variables to move towards the long-run equilibrium for the proposed model.

Table 2 Bound test

F-statistic		
5.0845*		
Critical Value		
Significance Level	**Lower Bound**	**Upper Bound**
1%	3.74	5.06
5%	2.86	4.01
10%	2.45	3.52

Note: * significant at 1% significant level respectively

The main analysis of this study focuses on the results of long-run and short-run elasticity which can be viewed in Panel A and Panel B as depicted in Table 3. Based on the results, lnFDI, lnCPI and lnRGDP establish significant relationships with lnMU in Malaysia in the long run and short run. As for lnFDI, it has been confirmed that higher FDI decreases male unemployment in this country. Based on the long-run coefficient value, a 1% increase in FDI reduces male unemployment by 0.10%. On the other hand, a smaller coefficient value is detected in the short run, suggesting that a 1% increase in FDI only decreases male unemployment by 0.03%. Next, CPI positively

influences male unemployment in the long run. Statistically, a 1% increase in CPI increases male unemployment by 11.55%. Similar to the long-run elasticity, the short-run results show a less magnitude, implying that a 1% increase in CPI causes male unemployment to rise by 3.64%. Next, an improvement in economic growth exhibits a negative relationship in both long run and short run. Statistically, a 1% increase in GDP decreases by 1.65% in the short run, and the impact is greater in the long run as it decreases by 5.23%. Another variable (international migration) does not significantly influence male unemployment.

Table 3 also shows the estimated lagged ECT, CointEg(-1) in the ARDL regression for the nation which appears to be negative and statistically significant with the value of -0.315. ECT reflects the speed of adjustment for the model and the negative value means that the variables in the model will converge in the long run. For instance, more than 31% of adjustments are completed within less than a year for Malaysia.

Table 3 Estimated long run coefficients using the ARDL approach

Variable	Coefficient	T-Statistic	Probability
Panel A: Long run elasticities (1,0,0,0,0)			
lnM	0.1659	0.8541	0.4006
lnFDI	-0.1088***	-1.7161***	0.0976***
lnCPI	11.5515*	3.3785*	0.0022*
lnRGDP	-5.2348*	-3.1949*	0.0035*
C	103.4341*	3.6793*	0.0010*
R^2 = 0.8779	DW = 2.0717		
Panel B: Short run elasticities (1,0,0,0,0)			
D(lnM)	0.0523	0.9129	0.3694
D(lnFDI)	-0.0343***	-1.8100***	0.0814***
D(lnCPI)	3.6449*	5.2191*	0.0000*
D(lnRGDP)	-1.6518*	-4.8578*	0.0000*
CointEq(-1)	-0.3155*	-4.6810*	0.0001*

Notes: *, and *** indicate significant at 1%, and 10% significant level respectively.

In producing a reliable estimation, several diagnostic tests, such as normality test, serial correlation test, Ramsey Reset test (functional form), and Breusch Pagan test (Heteroscedasticity) were carried out and the findings are presented in Table 4. All tests were conducted to ascertain that the econometric model, as suggested in this study, is free from any econometric issue that may yield biased results. Given the p-value of each test greater than 10% significant level, the model does not suffer from any econometric issue.

Table 4 Diagnostic tests

Test Statistic	F-statistic
Jarque-Bera	0.1287 (0.9377)
Breusch-Godfrey Serial Correlation	0.1690 (0.6444)
Heteroskedasticity Test	1.0521 (0.4082)
Ramsey RESET stability	0.1924 (0.6646)

Note. The numbers in brackets ( ) are p-values.

In addition to the four diagnostic tests introduced above, the stability of the model is assured via Cumulative Sum of Recursive Residual (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) (see Figure 1). The condition of stability is only achieved when both CUSUM and CUSUMSQ lines (blue) fall within the 5% significant level, represented by two dotted red lines. The model in this study is indeed stable as it satisfies the conditions described above. With the confirmation of diagnostics and stability tests, it is concluded that the econometric model introduced in this study can produce the best outcomes from its main analysis, as displayed in previous Table 3.
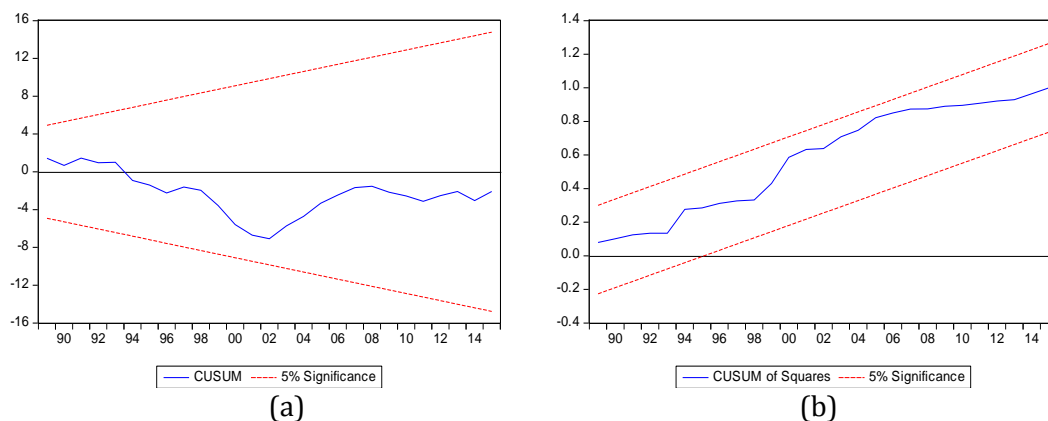

Figure 1. (a) Cumulative sum of recursive residual (CUSUM) and (b) Cumulative sum of squares of recursive residuals (CUSUMSQ).

The Toda and Yamamoto (1995) granger non-causality test through vector autoregressive (VAR) model was conducted to investigate the direction of causality between determinants of male unemployment. To make sure that the model was dynamically stable, the inverse roots of AR polynomial was performed. Based on Figure 2, it can be confirmed that the model is dynamically stable given that the inverted roots (dotted blue) are all strictly inside the circle.
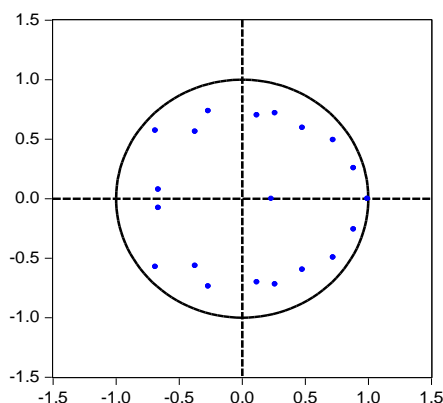

Figure 2. Inverse roots of AR characteristic polynomial.

The results of the Toda-Yamamoto granger non-causality test is shown in Table 5.

Table 5 Toda Yamamoto Granger non-causality test

Dependent Variable	Direction of Causality				
	LnMU	**LnM**	**LnFDI**	**LnCPI**	**LnRGDP**
LnMU	-	0.5229	5.0594	4.2901	16.4716***
LnM	10.4898**	-	7.8251*	1.7189	31.7930***
LnFDI	3.2999	5.3353	-	12.9530**	6.2940
LnCPI	5.2834	2.2880	10.0061**	-	6.2794
LnRGDP	6.1646	3.1059	9.0050*	18.5720**	-

Note: 1. ***, **, * indicate significant at 10%, 5% and 1% significant level, respectively. The optimum lag detected was 4 based on AIC and K + dmax = 5

The granger non-causality test reveals that there are six unidirectional causalities found running between (i) LnM to LnRGDP, (ii) LnM to LnMU, (iii) LnM to LnFDI, (iv) LnMU to LnRGDP, (v) LnRGDP to LnCPI, and (vi) LnRGDP to LnFDI. The level of migration cand be a prerequisite for higher economic growth and foreign direct investment inflows, at the same time, it can lead towards higher male unemployment rates. The rapid growth of the economy can also cause higher inflation and attract more foreign investor to invest in the country. The only bidirectional causality detected is between LnFDI and LnCPI for this model. The illustration of Granger causality can be seen in Figure 3.
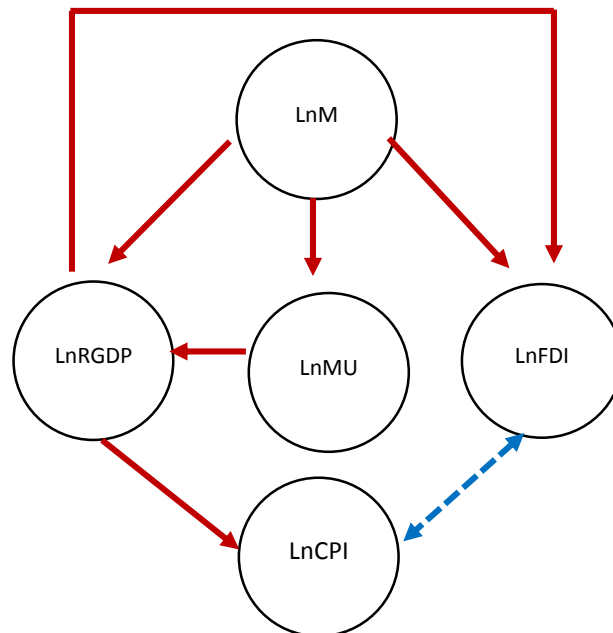

Figure 3. Toda-Yamamoto Granger non-causality test. Note: The red line refers to unidirectional causality while the blue dotted line (feedback hypothesis) refers to bi-directional causality.

5. CONCLUSION

This paper aims to examine the effect of international migration on male unemployment in Malaysia using the ARDL approach for the period 1982- 2015. The results suggest that there is a significant relationship between foreign direct investment, inflation, GDP and male unemployment. Nevertheless, there is no effect of international migration on the male unemployment rate. The long-run and short-run estimation tests reveal that higher foreign direct investment and an increase in GDP can reduce male unemployment rates. On the other hand,

higher inflation rates lead to higher male unemployment rates which this result does not support the Philips curve.

In accordance with the obtained findings, it is possible to suggest that international migration has no detrimental effect on male unemployment in Malaysia. This situation has shown that Malaysia needs to attract more FDI for better job opportunities to accelerate GDP. Thus, the Malaysian Government still need workers in several crucial sectors such as construction and agriculture. Only a small percentage of the native workforce involves those sectors compared to the percentage involvement of foreign workers (Abdul-Rahman *et al.*, 2012). A clear understanding of the effects of this suggestion is the starting point of sound economic policies, both in labour law and immigration policy in Malaysia. It is interesting for further this study to measure the effect of international migration on male labour condition by using different types of migrants arrival into Malaysia.

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