ANALYSING UNEMPLOYMENT DETERMINANTS IN MALAYSIA USING THE VECM METHODOLOGY

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ABSTRACT

This research examines the factors influencing unemployment in Malaysia, considering both short-term and long-term perspectives through the utilization of the VECM (Vector Error Correction Model) methodology. After reviewing relevant literature, various macroeconomic indicators such as GDP growth, foreign direct investment, inflation, interest rate, and exchange rate were selected for analysis. Quarterly time series data spanning from (Q1) 2010 to (Q1) 2020 was employed for this study. Applying the VECM approach, the findings uncovered distinct relationships between these variables and unemployment. Specifically, a noteworthy positive correlation was observed between GDP and unemployment, indicating that as GDP increases, unemployment tends to rise as well. Conversely, in the short term, inflation displayed a significantly negative impact on unemployment, suggesting that higher inflation rates might be associated with lower unemployment rates temporarily. In the long run, the study identified a significantly positive relationship between GDP growth and unemployment. Intriguingly, foreign direct investment exhibited a notable increase in unemployment over the long term. Additionally, the causality test highlighted a one-way causal relationship from the identified determinants (GDP, inflation, foreign direct investment) to unemployment. Overall, this research underscores the complex interplay between key macroeconomic indicators and unemployment in Malaysia. The study's outcomes emphasize the significance of considering both short-term and long-term effects when analyzing the impact of economic variables on unemployment.

Keywords: unemployment, Malaysia, VECM, short run, long run

INTRODUCTION

Unemployment is one of the major macroeconomic fundamental among other fundamentals like inflation, economic growth, exchange rate and balance of payment. Unemployment defined as labour who are actively searching for employment but can't find one (Romer, 2012). Hence, the higher the percentage of unemployment, the higher the wastage of labour forces in the country Besides that, unemployment increases during the economic recession while reduces when the economy undergoes a growth. The unemployment rate is an indicator to measure unemployment. International Labour Organization (2019) calculates number of the labour force who are unemployed as a percentage of the total labour force.

In 2019-2020, the world suffered from the impact of Covid-19 pandemic. Most of the governments have taken aggressive actions, including the lockdown policy, or preferably

known as movement control order (MCO) to supress the adverse impact of the disease. During this period, citizens and foreigners were prohibited for boarding to or from other country. Besides that, the operation of economic activities was forced to stop to reduce the virus from spreading. Thus, the world had been undergoing an economic recession due to the disturbance in production (CNBC, 2020).

The extent and duration of the recession hinge on how effectively and cohesively the response to the Covid-19 outbreak is managed. Therefore, estimating the duration of this economic downturn solely based on the development of vaccines is insufficient. Malaysia encountered the outbreak starting from 24 January 2020, initially with three confirmed cases, and witnessed the onset of fatalities, beginning with two cases reported on 17 March 2020.

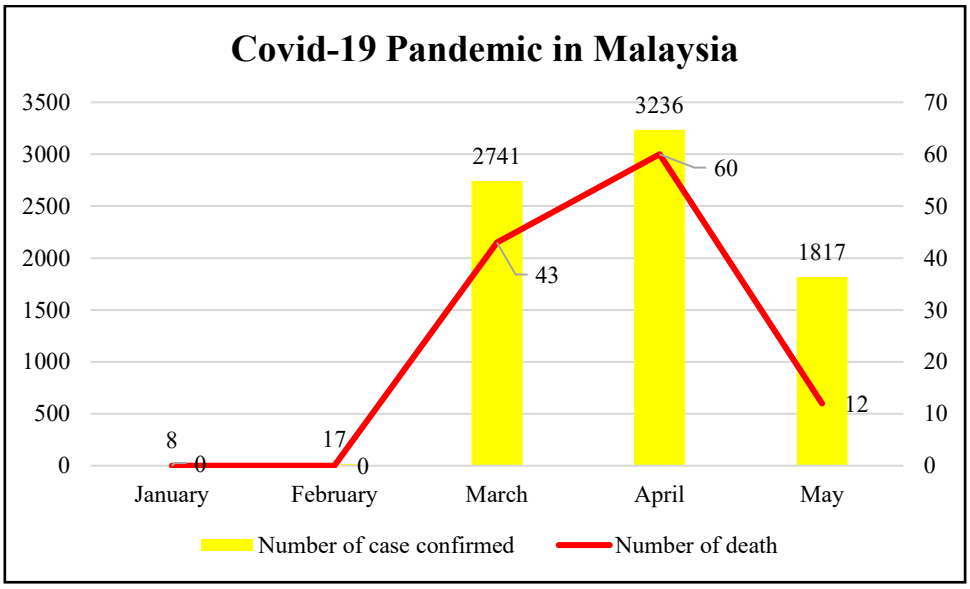

Figure 1 shows Covid-19 Pandemic in Malaysia
Sources: Ministry of Health, Malaysia

As a result of the political crisis spanning from 24 February 2020 to 29 February 2020 and the Sri Petaling Tabligh event occurring between 27 February 2020 to 1 March 2020, Malaysia experienced a second wave of COVID-19 outbreaks. The country saw a significant surge in confirmed cases during March 2020. Consequently, the Malaysian government implemented the Movement Control Order (MCO) from 18 March to 31 March 2020. However, despite this initial phase (MCO Phase I), there was no decline in confirmed cases, leading the government to announce MCO Phase II from 1 April 2020 to 14 April 2020. Subsequently, based on advice from the Ministry of Health, the MCO extended to Phase III, lasting from 15 April 2020 to 30 April 2020.

During this period, depicted in Figure 1, the number of confirmed cases reached a peak at 3236, with 60 reported deaths. The collective efforts spanning MCO Phases I to III, spanning around one-and-a-half months, eventually led to a decline in both confirmed cases and fatalities. Consequently, the government initiated a phased reopening of economic activities, implementing specific Standard Operating Procedures (SOPs). This transitioned into the Conditional Movement Control Order (CMCO) from 3 May 2020 to 9 June 2020, followed by the Recovery Movement Control Order (RMCO) from 10 June 2020 to 31 August 2020,

as announced by the government (NST, 2020a; NST, 2020b; NST, 2020c; NST, 2020d; NST, 2020e; NST, 2020f). Nonetheless, the repercussions of the MCO exerted a notable influence on the economy.

The GDP growth during the first quarter of 2020 was 0.7%. This growth has been estimated to achieve 0.5% in 2020 (Bank Negara Malaysia, 2020). Besides that, the firms were forced to be shut down during the MCO period. This situation makes them need to pay for the costs such as rental, utility and wages of the workers without the revenue during this period. Therefore, some small and medium enterprises (SMEs), choose to shut down to reduce their loss. Hence, the demand for labour is driven down. Despite this, the unemployment rate in Malaysia, which was always in full employment condition during these years, achieved a new record of 5% in April 2020.

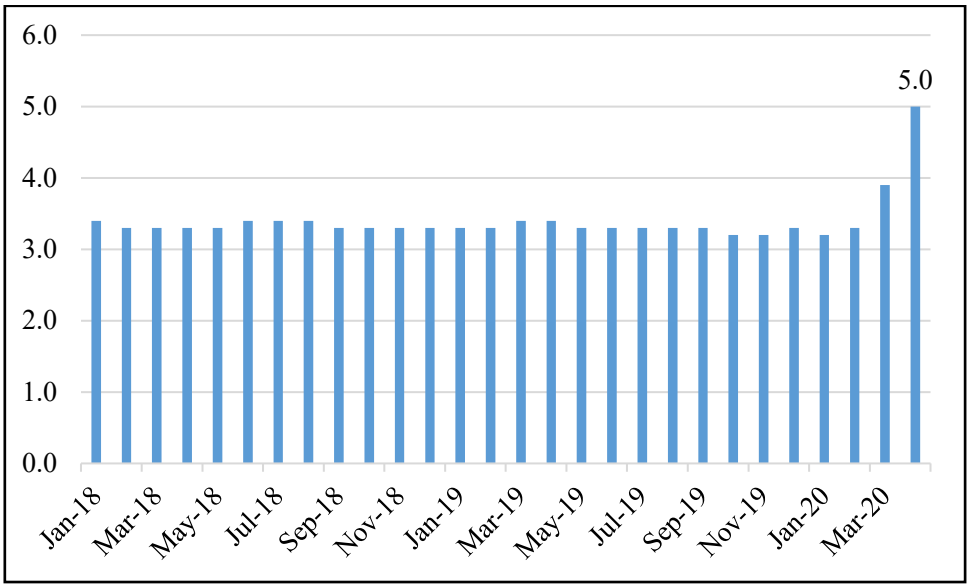

Figure 2 Shows Unemployment rate in Malaysia, January 2018-April 2020
Source: Bank Negara Malaysia, 2020

Furthermore, the impact of the recession is serious, along with the plunge in global oil prices because of price war in between Saudi and Russia. This situation causes the decline of the commodity price and leads to the uncertainty of the global commodity price. Hence, the weak pressure on the price makes deflation occur, which the inflation rate estimated by Bank Negara Malaysia achieved as -1.5% in 2020 (Bank Negara Malaysia, 2020). Besides that, the political instability in Malaysia reduces the confidence of the foreign investor in Malaysia. This condition confuses the investors with the government policy's vision and mission. The pessimism of the future will reduce foreign investors' interest in foreign direct investment in Malaysia. The reduction of foreign direct investment will lead to a reduction in job opportunities which would eventually increase unemployment in Malaysia. Apart from that, the Overnight Policy Rate (OPR) has already increased from 3% to 2% by Bank Negara Malaysia during 2020 to resume the economy of Malaysia (The Star, 2020a; The Star, 2020b; The Edge Market, 2020). In Malaysia, the lending rate and saving rate set by commercial banks follow the trend of the OPR. When the OPR decreases, the lending and saving rates

will decrease. Therefore, the cost of borrowing decreases, and the firm increases the demand for labour. Eventually, unemployment will reduce. Hence, this study aims to identify what determines unemployment in Malaysia in the short-run and long-run relationship. Furthermore, this study also investigates the causality relationship between the selected determinants and unemployment.

LITERATURE REVIEW

According to Dalziel (1993), unemployment occurred because of the inadequate supply of goods, which the excess demand of goods than the supply of firms. This will lead to higher wages and lower profit conditions. Classical economists stated that the wage mechanism can overcome unemployment. When there is high unemployment, the reduction in wages can reduce cost and increase demand for labour by firms. Conversely, the wage increment can reduce employment when there is low unemployment. Employment always goes back to the natural rate, which is the equilibrium in the long run. However, Keynes believed wages are sticky, and the wage responded slowly to changes in the labour market (Brue & Grant, 2013). Besides that, the wages, in Keynesian's view, are flexible upward and rigid downward. Hence, the government's intervention is needed to overcome unemployment through the policy.

Thayaparan (2014) claimed that unemployment will decrease by 2.92 units when the GDP increases by 1 unit in Sri Lanka in the long run using the vector error correction model (VECM) to analyse the annual data from 1990 to 2012. Apart from that, AboElsoud, AlQudag and Elish (2019) suggested that GDP per capita had adverse relationship with unemployment in Australia using the VECM model. The result demonstrated that unemployment decreases by 0.01% when the GDP per capita increases by 1% in the long run. Besides that, this negative relationship was significant at a 1% confidence level. In Malaysia, Ngoo and Loi (2011) adopted the quarterly data from 2000 to 2007 to prove the appearance of Okun's law in Malaysia. They stated that Okun's law happened in Malaysia in the long run which result in decreasing unemployment rate by 1.825% when there was 1% in output growth.

Sisay (2019) used the annual data from 1984/85 to 2018/19, a total of 35 years, to identify the relationship between foreign direct investment with unemployment in Pakistan during long run. The result revealed an adverse impact of foreign direct investment on unemployment. Besides that, this negative relationship with foreign direct investment is also supported by research done by Sadikova, Faisal and Resatoglu (2017) in Russia. In Malaysia's case, Subramanian and Baharumshah (2011) claimed that foreign direct investment reveals a significant adverse long-run relationship with unemployment. The result stated that the unemployment decreases by 0.3502% when there is an increase in 1% of foreign direct investment.

Victor et al. (2018) expounded on the enduring correlation between inflation and unemployment in Hungary, establishing a long-term relationship. They utilized monthly data and VECM methodology to explore this association. Similarly, Touny (2013) employed VECM to investigate macroeconomic variables like inflation and unemployment in India, identifying a significant negative long-run relationship between the two. Contrarily, Faruoka

(2008) asserted the absence of a trade-off relationship in the long run in the Philippines. In Malaysia, Kogid et al. (2011) highlighted a negative unidirectional causal link between inflation and unemployment.

Regarding interest rates, Feldmann (2013) underscored a positive impact of real interest rates on unemployment over the long term, using data from 92 countries. Modeste and Mustafa (2002) supported this by claiming a positive relationship between interest rates and unemployment in the United States, indicating a 0.3% rise in unemployment for every 1% increase in interest rates. Furuoka and Munir (2014) and Kaur and Nur Asyiqin (2016) both found a long-term association between interest rates and unemployment in Malaysia.

Shifting to the exchange rate's impact on unemployment, Nyahokwe and Ncwadi (2013) analyzed quarterly data and established a positive relationship between real exchange rate volatility and unemployment in South Africa. However, in Nigeria, Osigwe and Ahamba (2016) revealed a contrasting positive effect of the exchange rate on unemployment, indicating a 0.06% decline in unemployment for every 1% increase in the exchange rate, significant at a 5% confidence level. In Malaysia, Nur Azwani, Salwani, Nabilah, and Nur Azliza (2017) confirmed a positive correlation between the exchange rate and unemployment.

METHODOLOGY

Research Framework

The research model was structured with unemployment as the dependent variable, whereas GDP growth, foreign direct investment, inflation, interest rate, and exchange rate served as the independent variables. The schematic representation of this research framework was depicted in Figure 3.

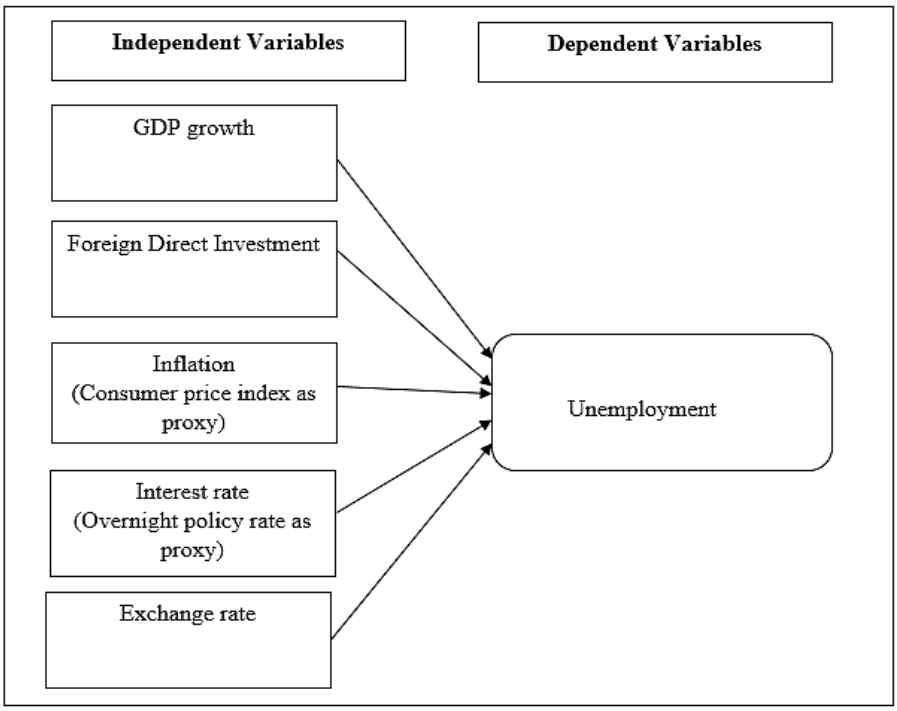

Figure 3 *shows that Research Framework*

Data Collection

The time series of quarterly data, first quarter (Q1) 2010 to the first quarter (Q1) 2020 was adopted from Bank Negara Malaysia and Ministry of Finance Malaysia. This period was selected because of the period of the Covid-19 outbreak happening in Malaysia, which was during the first quarter of 2020.

Model

Unemployment rate as the dependent variable while the GDP growth, foreign direct investment, interest rate and exchange rate were the independent variables. The Overnight Policy Rate (OPR) was used as a proxy for interest rate, while the consumer price index (CPI) was used as a proxy for inflation. Meanwhile, the exchange rate used the RM/USD. Therefore, the regression model was converted to log:

$$UE_t = \beta_0 + \beta_1 GDP_t + \beta_2 Log\ (FDI)_t + \beta_3 Log\ (INF)_t + \beta_4 IR_t + \beta_5 Log\ (ER)_t + e_t$$

where,

UE represent unemployment, GDP stands for GDP growth, FDI stands for foreign direct investment, INF was inflation, IR stands for interest rate, ER represents exchange rate and e refers to error term.

METHODOLOGY

Unit Root Test

The existence of the spurious regressions should be checked to ensure that the data is stable in the long run. Hence, the model will become not stationary if unit root problem exists. The Augmented Dickey-Fuller Test (ADF) was used. Based on the rule of thumb, the null hypothesis stated that the model in level form exists with a unit root problem and will fail to be rejected when the P-value was less than 0.05 or the t-estimated was larger than the t-critical. Therefore, the first difference should be applied to the model to solve the unit root problem.

Cointegration Test

The stochastic trends can represent the error when the time series data is non-stationary. The P-value was less than 0.05, indicating that the model was cointegrated. Therefore, several steps must be followed to run the unrestricted cointegration rank test:

1. The order of integration of the variables in the model.
2. To determine the lag length of the model.
3. Identifying the rank of π or the number of cointegrating vectors.
4. To determine weak exogeneity and linear restrictions in the cointegrating vectors.

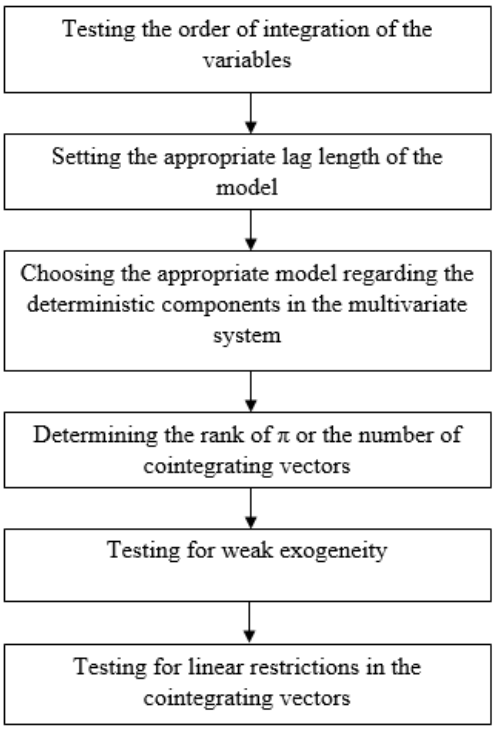

Figure 4 shows The Order of Johansen Test **(**Johansen, 1995)

Vector Error Correction Model (VECM)

VECM demonstrates the short-run and long-run relationship regarding the model. VECM also solves the spurious regression problem. The equation of the VECM model was shown as follows:

$$\Delta UE_t = T_1 \sum_{i=1}^{k-1} u_{1i}\Delta UE_{t-i} + \sum_{i=1}^{k-1} v_{1i}\Delta GDP_{t-i} + \sum_{i=1}^{k-1} W_{1i}\Delta FDI_{t-i} + \sum_{i=1}^{k-1} X_{1i}\Delta INF_{t-i} + \sum_{i=1}^{k-1} Y_{1i}\Delta IR_{t-I} + \sum_{i=1}^{k-1} Z_{1i}\Delta EX_{t-I} + m_1 ECT_{t-i} + e_t \quad (2)$$

$$\Delta GDP_t = T_2 \sum_{i=1}^{k-1} u_{2i}\Delta UE_{t-i} + \sum_{i=1}^{k-1} v_{2i}\Delta GDP_{t-i} + \sum_{i=1}^{k-1} W_{2i}\Delta FDI_{t-i} + \sum_{i=1}^{k-1} X_{2i}\Delta INF_{t-i} + \sum_{i=1}^{k-1} Y_{2i}\Delta IR_{t-i} + \sum_{i=1}^{k-1} Z_{2i}\Delta EX_{t-i} + m_2 ECT_{t-i} + e_t \quad (3)$$

$$\Delta FDI_t = T_3 \sum_{i=1}^{k-1} u_{3i}\Delta UE_{t-i} + \sum_{i=1}^{k-1} v_{3i}\Delta GDP_{t-i} + \sum_{i=1}^{k-1} W_{3i}\Delta FDI_{t-i} + \sum_{i=1}^{k-1} X_{3i}\Delta INF_{t-i} + \sum_{i=1}^{k-1} Y_{3i}\Delta IR_{t-i} + \sum_{i=1}^{k-1} Z_{3i}\Delta EX_{t-i} + m_3 ECT_{t-i} + e_t \quad (4)$$

$$\Delta INF_t = T_4 \sum_{i=1}^{k-1} u_{4i}\Delta UE_{t-i} + \sum_{i=1}^{k-1} v_{4i}\Delta GDP_{t-i} + \sum_{i=1}^{k-1} W_{4i}\Delta FDI_{t-i} + \sum_{i=1}^{k-1} X_{4i}\Delta INF_{t-i} + \sum_{i=1}^{k-1} Y_{4i}\Delta IR_{t-i} + \sum_{i=1}^{k-1} Z_{4i}\Delta EX_{t-i} + m_4 ECT_{t-i} + e_t \quad (5)$$

$$\Delta IR_t = T_5 \sum_{i=1}^{k-1} u_{5i}\Delta UE_{t-i} + \sum_{i=1}^{k-1} v_{5i}\Delta GDP_{t-i} + \sum_{i=1}^{k-1} W_{5i}\Delta FDI_{t-i} + \sum_{i=1}^{k-1} X_{5i}\Delta INF_{t-i} + \sum_{i=1}^{k-1} Y_{5i}\Delta IR_{t-i} + \sum_{i=1}^{k-1} Z_{5i}\Delta EX_{t-i} + m_5 ECT_{t-i} + e_t \quad (6)$$

$$\Delta EX_t = T_6 \sum_{i=1}^{k-1} u_{6i}\Delta UE_{t-i} + \sum_{i=1}^{k-1} v_{6i}\Delta GDP_{t-i} + \sum_{i=1}^{k-1} W_{6i}\Delta FDI_{t-i} + \sum_{i=1}^{k-1} X_{6i}\Delta INF_{t-i} + \sum_{i=1}^{k-1} Y_{6i}\Delta IR_{t-i} + \sum_{i=1}^{k-1} Z_{6i}\Delta EX_{t-i} + m_6 ECT_{t-i} + e_t \quad \ldots\ldots(7)$$

Equations 2 to 7 exemplify the application of the VECM within this study's model. In this context, the Error Correction Term (ECT) represents the mechanism for correcting errors, while 'et' signifies the error term that illuminates deviations from the long-run equilibrium portion (Engle & Granger, 1987). Consequently, the null hypothesis posits that the independent variables lack a significant long-term relationship with unemployment. The rejection of this null hypothesis occurs when the T-statistic exceeds the T-critical value.

Granger Causality Test

The Granger causality test is conducted to ascertain both the existence and direction of potential causality between two variables simultaneously (Granger, 1969). For instance, when testing causality between two variables, X and Y, the null hypothesis—asserting that variable X does not Granger-cause variable Y—is rejected if the P-value surpasses 0.05. If the null hypothesis is rejected, the causality test results in three potential outcomes:

i. Variable X affects variable Y.
ii. Variable Y affects variable X.
iii. Variables X and Y affect each other.

Statements (i) and (ii) show a unidirectional from one variable to another. Meanwhile, statement (iii) reveals a bidirectional among the variables.

RESULTS

Descriptive Data Analysis

The skewness of unemployment (-0.2106), inflation (-0.1435), and interest rates (-1.7612) is negative, whereas GDP growth (0.7421), foreign direct investment (0.6190), and exchange rates (0.0260) exhibit positive skewness. The kurtosis for unemployment (2.6238), foreign direct investment (2.6430), inflation (1.6647) and exchange rate (1.2552) are less than 3, representing that these variables are platykuryic relative to the normal distribution. Meanwhile, GDP growth (8.2266) and interest rate (7.4767) are leptokurtic relative to normal distribution because their kurtosis is greater than 3.

Unit Root Test Result

All variables except GDP growth (-3.1851) and interest rate (-4.6409) were non-stationary in the level form. This condition means that the unit root problem exists in these variables. Meanwhile, all the variables were stationary at first difference (unemployment, -5.3178; GDP growth, -5.2898; foreign direct investment, -6.7891; inflation, -6.0768; exchange rate, -5.3201). Hence, it is still highly probable that the model may cointegrate, which was examined by the cointegration test.

Cointegration Test

This study implements the cointegration test through the Johansen cointegration test. As the variables are stationary at first difference form, I(1), it will proceed with setting the suitable lag length of the model. Through the VAR model estimation, the value of the Akaike information criterion (-13.0308) was smaller than the value of the Schwarz criterion (-8.118). Hence, the adequate lag length was lag one.

After the suitable leg length was chosen, the unrestricted cointegration rank tests, comprising both trace and maximum eigenvalue tests, indicated that the model exhibits cointegration. This finding was supported by the presence of at least one cointegrating equation at a significance level of 0.05, indicating the existence of a long-term relationship within the model.

Vector Error Correction Model.

The VECM (Vector Error Correction Model) approach was employed in this study to illustrate the association between the independent variables—comprising GDP growth, foreign direct investment, inflation, interest rate, and exchange rate—and the dependent variable, unemployment, both in the short run and the long run. As a result, Table 8 presents the outcomes of the VECM in the short run, while Table 9 illustrates the results of the VECM in the long run.

In the short-term findings, it was observed that GDP growth exhibits a noteworthy negative association with unemployment over the long run. Specifically, a 1% increase in GDP growth tends to correspond with an average decrease of 0.5202% in unemployment. On the other hand, there is an average increase of 0.045% in unemployment when foreign direct investment rises by 1%. This demonstrated negative relationship is deemed significant, as indicated by the T-statistic (-5.4046) being lower than the critical T-value (-2.021) at a 5% confidence level.

Moreover, inflation, interest rate, and exchange rate also display negative impacts on unemployment in the long run. However, these negative relationships lack statistical significance. Consequently, the extended-run model equation derived from the Vector Error Correction Model (VECM) was presented below:

$$UE_{t-1} = 12.9210 + 0.5202GDP_{t-1} - 4.4962Log(FDI)_{t-1} + 5.2315Log(INF)_{t-1} + 0.1224IR_{t-1} + 1.9783Log(ER)_{t-1} \quad \text{.....(8)}$$

It was evident that GDP growth exerts a positive impact on unemployment, leading to an average increase of 0.0121% in unemployment for every 1% rise in GDP growth. This positive correlation holds significance, considering the T-statistic (2.3760) being lower than the critical T-value (-2.021). However, during the short run, foreign direct investment and exchange rate demonstrate an insignificant positive relationship with unemployment. Specifically, a 1% increase in foreign direct investment results in an average increase of 0.0002% in unemployment. In contrast, a 1% rise in the exchange rate does not significantly impact unemployment.

Moreover, both inflation and interest rates exhibit a negative relationship with unemployment in the short run. The negative correlation with inflation is statistically significant, showing an average decrease of 0.0272% in unemployment for every 1% increase in inflation. On the other hand, the negative relationship between interest rates and unemployment lacks

statistical significance. Additionally, an increase of 1% in interest rates leads to an average reduction of 0.0097% in unemployment.

Diagnostic Test Result

The diagnostic tests, including the normality test, autocorrelation test and heteroscedasticity test, were carried out. The normality test was done by the Jarque-Bera test. Meanwhile, the autocorrelation test was supported by the correlation LM test, while the heteroskedasticity test was implemented through the White test.

The P-value of Jarque-Bera (0.9678) exceeds 0.05, indicating that the null hypothesis, which states that the model is not normally distributed, is rejected. The result of the autocorrelation test showed the P-value (0.3740) cannot reject the null hypothesis and proved the model was clear from the autocorrelation problem. The result of heteroskedasticity test revealed that the P-value (0.6312) was more than 0.05, the null hypothesis was not rejected based on the rule of thumb. Therefore, there was no existence of heteroskedasticity problem in the model.

Granger Causality Test

Table 1 illustrates that the result of pairwise Granger causality tests with lags on 1. When the P-value is less than 0.05, the null hypothesis that a variable does not Granger cause another variable will be rejected.

Table 1 shows the Granger Causality Tests Result

Null hypothesis	Obs	F-statistic	Prob.
GDP ------- UE	40	11.4244	0.0017
UE --------- GDP		0.0106	0.9184
LogFDI -------- UE	40	11.3656	0.0018
UE --------- LogFDI		2.0865	0.1570
LogINF ---------- UE	40	10.4206	0.0026
UE --------- LogINF		0.9309	0.3409
IR ---------- UE	40	11.8527	0.0014
UE ---------- IR		0.5600	0.4590
LogER ---------- UE	40	16.7448	0.0002
UE ---------- LogER		5.3165	0.0268

As the P-value exceeds 0.05, the null hypothesis was rejected, which indicated causality from the selected independent variables, which include GDP growth, foreign direct investment, inflation, interest rate and exchange rate to the dependent variable. Hence, the result proves this model has a unidirectional causality relationship.

CONCLUSION

In essence, this study endeavours to pinpoint the factors influencing unemployment in Malaysia. Additionally, it delves into scrutinizing the connection between these factors and unemployment across both short and long-term periods. The study employed quarterly time series data spanning from the first quarter of 2010 to the first quarter of 2020, utilizing the Vector Error Correction Model (VECM) as the analytical approach.

The findings underscore a significant positive short-term association between GDP growth and unemployment. Furthermore, inflation exhibits a negative impact on unemployment in the short term. In the long run, GDP growth displays an influential reverse correlation with unemployment. Conversely, a noteworthy positive link exists between foreign direct investment and unemployment over the long term, and this positive relationship holds

significance. The causality test reveals a one-way causal connection from the selected determinants to unemployment, indicating no causality relationship from unemployment to these determinants.

Given the current challenge of heightened unemployment in Malaysia due to the Covid-19 pandemic, effective government interventions become imperative. One potential strategy involves implementing expansionary fiscal policies aimed at augmenting government expenditure and reducing income and corporate taxes. These measures can stimulate GDP growth, ultimately curbing unemployment in the long run. Additionally, the central bank could consider deploying expansionary monetary policies, which entail increasing the money supply and reducing interest rates. Maintaining interest rates below 2%, particularly the Overnight Policy Rate (OPR), could facilitate increased borrowing for small and medium enterprises (SMEs), vital for sustaining business operations during this period. The findings emphasize that higher interest rates contribute to increased long-term unemployment, thus highlighting the importance of keeping interest rates low to mitigate unemployment.

Moreover, while external economics plays a pivotal role in Malaysia's national income generation, it can adversely affect long-term unemployment. As a policy maker, the government could implement protective measures to shield domestic enterprises from closure due to foreign competition. Policies such as tariffs could be instrumental in offsetting the impact of foreign direct investment on unemployment in Malaysia by preventing domestic firm closures, thereby maintaining labor demand.

The recommendation for future research is Covid-19 can be used as a dummy variable to become one of the independent variables in the model. Hence, this model can estimate the impact of the Covid-19 pandemic towards unemployment in Malaysia. Besides that, other variables can be used to identify their impact on unemployment in Malaysia. For example, government debt, government expenditure, corporate tax, population, and political stability are dummy variables and others. Monthly data and the annual times series data can also be adopted to study the impact of the determinants of unemployment. Moreover, other approaches, such as the Autoregressive Distributed Lag (ARDL) and the Fully Modified Ordinary Least Square (FMOLS), can be applied to catch up the long-run relationship from the independent variables to unemployment.

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