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An Analysis of Factors Affecting Malaysia's Youth Unemployment Rate

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Abstract

This study aims to identify if macroeconomics-related indicators consisting of gross domestic product (GDP), inflation, population and economic shocks are related in the Malaysia's youth unemployment. The youth unemployment rate and its determinants' data from an extended period of 1982 to 2020 were obtained from the Department of Statistics Malaysia (DOSM). By employing the autoregressive distributed lag (ARDL) analysis, findings show that Gross Domestic Product and Population significantly affect Youth Unemployment in the long-run. These findings indicate that the Malaysian government should develop youth-specific strategies to combat youth unemployment, with Technical and Vocational Education Training (TVET) quality and availability being one of the key initiatives. Emergency income support for youth starting in the job market ought to be provided as well, to assist them during economic shocks. Future research that includes foreign direct investment and gender variables together with youth unemployment data utilised in the current study is recommended.

Keywords: Youth Unemployment; Population, Gross Domestic Product, Economic Shocks

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1. Introduction

The youth unemployment (YUNEM) rate is defined as those who are unemployed between age 15 to 24 which makes up the percentage of the youth labour force (OECD, 2021). In Malaysia, the lower secondary completion rate has been decreasing significantly, from 94.1% in 2003 to 84.9% in 2019 (World Bank, 2023a). This shows that more youths are dropping out of school, and the dropout rates occurred in a somewhat bigger percentage among males (Mokshein et al., 2016).

According to the data provided by The World Bank in 2019, teenage females had a dropout rate of 10.42% while 13.65% teenage males dropped out of school (World Bank, 2023b). These youth dropouts (from 15 - 19 years old) obtain jobs as service and sales workers instead, which is the highest-ranked occupation for youths, comprising 201,700 youths (Department of Statistics Malaysia (DOSM), 2020). In addition, youths are affected more than the average adult worker when it comes to unemployment, especially after periods of recessions. In recent times, the COVID-19 pandemic had the most severe impact upon youths in the labour force, causing them to be the most vulnerable group (Welsh & Cheng, 2020).

The YUNEM rate has worsened for the past 10 years in Malaysia (Tan et al., 2021). For instance, the youth unemployment rate in 2017 was at 11.44%, which increased to 11.6% in 2018 and then continued to increase to 11.77% in 2019 (International Labour Organisation (ILO), 2021). The youth unemployment rate then hit a new high by the end of 2020, which was 13.2% (Department of Statistics Malaysia, 2021), which paints a picture on how severe this issue is. In fact, the former Minister of Higher Education, Datuk Seri Noraini Ahmad stated that the YUNEM rate, more specifically those aged 20-24 years old, is expected to increase to 25% due to the effects of COVID, whereby job opportunities of around 75,000 fresh graduates will be affected, six months upon their graduation (Dzulkifly, 2020). This is almost double the rate of 13.2%, which was the initial youth unemployment rate at the start of 2020. All in all, almost 6 million Malaysian youths aged 15 to 29 years old in the work force will be deeply affected due to COVID-19. These youth face the most risk when it comes to unemployment, as work openings will be limited due to the shrinking of the employment market.

Existing analysis of youth unemployment determinants, especially in Malaysia lacks extended length of annual data, and also did not investigate the impacts of the

various economic shocks experienced by Malaysia (such as the Asian and the Global Financial Crises) due to the limited annual data analysed previously. This study will fill in the gap of extant research on Malaysia's youth unemployment by including data from the 2020 COVID-19 year and also extend the number of years to include earlier years for a richer time series analysis. The Movement-Control Order (MCO), which was enacted in Malaysia as a result of the COVID-19 epidemic, had the biggest effect on independent employees, who primarily comprise young people who chose to launch their own enterprises. According to the Labour Force Survey Report Malaysia 2020, although the proportion of self-employed employees has increased in Malaysia, a pandemic like COVID-19 has a greater impact on young people (DOSM, 2021; Lee, 2020). The fact that the COVID-19 pandemic has touched numerous industries and caused mass layoffs of workers, particularly young people, strengthens this argument even further. This study will also employ economic shocks as an independent variable, as Malaysia has experienced a few shocks throughout the years, as mentioned previously. In addition to this variable, this study will employ three other independent variables (gross domestic product, inflation, and population) to extend from previous studies. This study aims to extend the long run time series analysis to investigate the role of economic shocks on Malaysia's youth unemployment rates.

2. Literature Review

The relationship between unemployment and various macroeconomy-related variables have been posited by several theories. For instance, Okun's Law posited that as unemployment decreases, the production or Gross Domestic Product of a country will increase. A 1% drop in unemployment will raise the potential GDP by an estimated 3% (Neely, 2010). This theory has been used in previous youth unemployment and unemployment studies such as by Baba & Abang Ali (2021), Michael & Arokiadasan (2020) and Mohd Noor et al. (2007).

A closely-related variable to unemployment is inflation, embodied by the Phillips Curve that posits that unemployment and inflation are inversely related. Hence, the higher the inflation rate, the smaller the unemployment levels in a nation (Greenlaw et al., 2017). This concept is vital, especially during the 20th century in regards to policy-making for the macroeconomy. However, this theory was proven to be wrong during the

stagflation period in the 1970s, whereby both inflation and unemployment levels were high (Tey et al., 2017.). This relates to Malaysia's current situation, whereby both inflation and unemployment levels are extremely high. According to the World Bank data for 2021, Malaysia's unemployment rate was at 4.6% (World Bank, 2023c) while its inflation was at 2.5% (World Bank, 2023d), both at which had been continuously increasing since 2018. Renowned researchers such as Solow and Samuelson (1960) were the first ones to support the Phillips curve theory. Lucas (1967) supported it as well, and stated that there could be a trade-off between inflation and unemployment. The Phillips curve theory has been used by youth unemployment and unemployment studies such as by Michael & Arokiadasan (2020) and Bayrak & Tatli (2018). The following sub-sections reviews these determinants in detail.

2.1 Youth Unemployment and Gross Domestic Product

Dimian (2011) conducted a study among both skilled and unskilled youth in Central and Eastern Europe Countries. It was observed through the regression results that YUNEM has a negative significant correlation with GDP but is positive when there is a lag in the unemployment rate. Next, a study was conducted by Michael and Arokiadasan (2020) that found that GDP and youth unemployment are significant and negatively related at a 5% significance level in the long-run, similar to Bayrak and Tatli (2016) using ARDL, on YUNEM in Turkey and Caporale & Gil-Alana. (2014) unemployment using fractional cointegration models.

Lastly, Tan et al. (2021) analysed the YUNEM rate in Malaysia. The methodology used was multiple linear regression. It was found that GDP and youth unemployment were negatively related, whereby the coefficient for this relationship is -0.178 and is significant. Hence, according to the above literature of YUNEM and GDP, it is hypothesized that there would be a negative correlation between these variables.

2.2 Youth Unemployment and Inflation

Within the 31-member nations of the Organisation for Economic Co-operation and Development (OECD), panel data analysis was carried out. The findings revealed that, at a significance level of.10, the inflation rate is adversely correlated with YUNEM (Bayrak & Tatli, 2018). According to estimates, the YUNEM rate decreases by 0.14%

for every 1% increase in inflation. This outcome is consistent with predictions made by economists and research done by experts in the field including Arslan and Zaman (2014) and Maqbool et al. (2013).

D'Ippolito (2011) studied YUNEM in both Denmark and Italy, using the Augmented Dickey Fuller (ADF) tests, Granger Causality and Regression Modelling. It was discovered that inflation did not create any change to the YUNEM rate for both Italy and Denmark, long-term. Another study by Caporale & Gil-Alana (2014) on the persistence of macroeconomy-related factors affecting youth unemployment in Europe was conducted. The methodology used was autoregressive modelling and fractional integration. The results showed that inflation does have a long-run effect on YUNEM. Tan et al. (2021) study assessed the YUNEM rate in Malaysia. Results showed that inflation has a weak and indirect relationship with YUNEM, using the multiple linear regression method. The author also highlighted that this finding proves the inflation and unemployment relationship of Malaysia is not in accordance with The Phillips Curve theory. Hence, there would be a predicted negative correlation between YUNEM and Inflation, according to majority of the studies carried out by researches as above.

2.3 Youth Unemployment and Population

Kalim (2003) conducted research to identify the factors of YUNEM in Pakistan using ARDL. She mentioned that an increase in population is suppressing employment opportunities among the youth, and this was proven to be true in her study. Furthermore, Imtiaz et al. (2020) from Pakistan, studied the factors of YUNEM using regression and discovered overpopulation is positively correlated with YUNEM. Another study was developed on the determinants of youth unemployment in Kenya, whereby population was one of the independent variables used (Nyamitago et al., 2020). ARDL was applied as the methodology to analyse short and long-term links. According to the findings, a 1% hike in population raises the youth unemployment rate in Kenya with an additional 1.1%. The above studies prove that YUNEM and population and youth unemployment are positively related, which is the expected relationship in this research.

2.4 Youth Unemployment and Economic Shocks

First, studies were conducted to examine how institutions affected the relationship between the unemployment rate and the economic and financial crises in the European Union (Ionut, 2019). Using Panel Estimated Generalized Least Squares, he evaluated the impact of the crises on unemployment from 2003 to 2017, with the dummy being set to 1 during financial shocks and 0 during normal economic conditions. The findings demonstrated that the member states constructing extractive institutions as opposed to inclusive institutions are most definitely more susceptible to the effects of financial shocks upon the unemployment rate. Another study was undertaken in the United States to see how an economic and health shock impacts the racial, gender, and ethnic divide in the country's labour market during the pandemic (Milovanska-Farrington, 2021). A dummy variable named ‘post’ was added, with dummy equalling 1 if the respondent completed the survey after March 2020, when the pandemic began, and dummy equalling 0 if they did so before. Overall findings indicated that COVID-19 had a major impact on the US labour market, including youths.

Choudhry et al. (2012) carried out research to analyse the effect of financial crises upon the YUNEM rate among 75 countries. The methodology used was panel data analysis and its duration was from 1980 to 2005. The financial crises were measured whereby crisis = 1 if a country experienced any financial crisis and crisis = 0 if it did not. In summary, the results showed that financial crises are positively related with youth unemployment rates, and that its results were significant. In short, all of the studies above have shown that when economic shocks occur, the YUNEM rate would also increase. The following section details the time series analysis methodology that will be employed to investigate the longer time period of 1982 to 2020 within which the combination of GDP, inflation, population and economic shocks independent variables will impact on YUNEM.

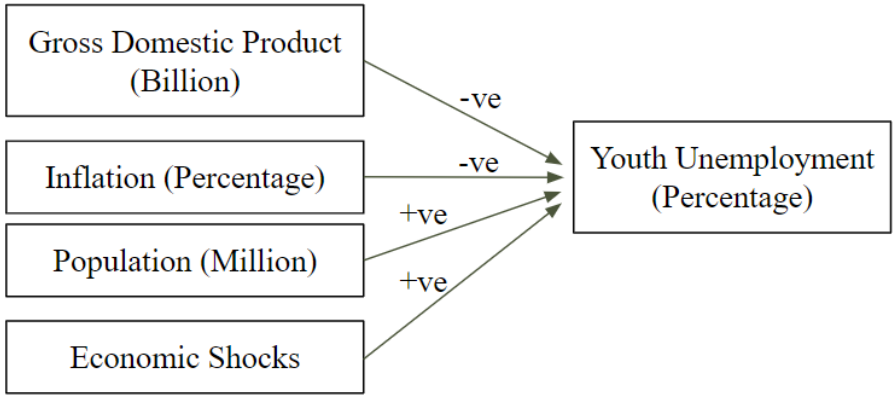
3. Results and Discussion

This research is conducted to study the variables affecting Malaysia’s YUNEM rates. It uses time series data and quantitative methods. **Figure 1** below displays the model framework. The variables that will be studied in are Gross Domestic Product (measured

in RM billion), Inflation (%), Population (million), and the dummy variable of economic shocks. Youth Unemployment (%) is the dependent variable.

The expected signs for this study's variables; Gross Domestic Product, Inflation, Population and Economic Shocks are portrayed in **Figure 1** and are based on previous literature review, as seen in **Section 2**.

Figure 1: Model Framework



3.1 Data sources and Modelling Methodology

Table 1 below shows the data sources and previous works for this study's variables. Youth unemployment data is obtained from Malaysia's Department of Statistics, while the World Bank database was accessed for Malaysia's Gross Domestic Product, Inflation, and Population data. The economic shocks dummy variable was determined using information obtained from Malaysia Central Bank; Bank Negara Malaysia. The data for 1982 until 2020 (39 years) were obtained. Most notably, the data for YUNEM was obtained through special arrangement from Department of Statistics Malaysia (DOSM). This extends the number of years analysed from nineteen years (Michael & Arokiadasan, 2020) and thirty-one years (Baba & Abang Ali, 2021).

The Gross Domestic Product and Population data were transformed into natural log values *LGDP* and *LPOP*. The Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) unit root tests were run to check for stationarity.

Table 1: Data Source

Variables	Source	Previous Studies
Youth Unemployment (%) (*YUNEM*)	Department of Statistics Malaysia	-
Gross Domestic Product (RM billion) *(GDP)*	The World Bank	Tan et al. (2021) Baba & Abang Ali (2021) Michael & Arokiadasan (2020) Mohd Azmin et al. (2017)
Inflation (%) *(INF)*	The World Bank	Baba & Abang Ali (2021) Michael & Arokiadasan (2020) Tan et al. (2021)
Population (million) *(POP)*	The World Bank	Baba & Abang Ali (2021) Mohd Azmin et al. (2017)
Economic Shocks *(ES)*	Bank Negara Malaysia	Ionut (2019) Milovanska-Farrington (2021) Choudhry et al. (2021)

To apply either method, lag length selection is performed through FPE (final prediction error) and AIC (Akaike Information Criterion) tests as these are the most appropriate to be used for samples below 60 observations. Utilising these criteria reduces the possibility of under estimating and increases the possibility of recovering true lag length (Liew, 2004).

This study proceeds with the ARDL Long Run Form and Bounds Test, as well as the ARDL Error Correction Model. These methods are appropriate for this study's smaller sample size in order to generate more accurate and efficient results, no matter the regressors are non-stationary at level, first difference or both (Pesaran et al., 2001). These methodologies will determine if there is long run cointegration and hence analyse the relationships in the resulting model. This is also supported by Shreshta & Bhatta (2018) which stated that an ARDL model requires an appropriate amount of lags to include the data generation process into a framework of general to particular modelling for the short and long-run. Lastly, a few diagnostic tests will be selected in order to identify whether this model has employed the correct regressors (DeBenedictis & Giles, 1998). The tests that will be performed are Breusch-Godfrey Serial Correlation test, Heteroskedasticity test and CUSUM of Squares test of model stability were carried out in past studies (Michael & Arokiadasan, 2020; Maqbool et al., 2013; (Nyamitago et al., 2020).

3.2 Model Estimation

This study's independent variables are chosen based on the existing works of literature available. This study follows Michael & Arokiadasan (2020) by using time series data. The research model is as follows:

$$YUNEM_t = f(LGDP, INF, LPOP, ES) \quad (1)$$

where,

YUNEM = Youth Unemployment (%)

LGDP = Natural log of Gross Domestic Product (RM billion)

INF = Inflation (%)

LPOP = Natural log of Population (million)

ES = Economic Shocks (1 = year with economic shock, 0 = year without economic shock)

t = 1982 - 2020 (39 years)

3.3 Descriptive Statistics

The results in **Table 2** show that out of all the independent variables in original form, inflation has the highest standard deviation, which is at 1.5525%. This indicates that the inflation data is more widely spread out. On the other hand, the population has the lowest standard deviation, at 0.2477%. *INF* and *YUNEM* are left-skewed as their coefficients are positive, LGDP) and *LPOP* are right-skewed as their coefficients are negative. All the variables portray a slightly heavy-tailed distribution as its coefficients are positive. All of the variables' Jarque-Bera statistics have p-values higher than 0.05. As a result, the data's normal distribution is not ruled out as the null hypothesis. This indicates that the data for all variables in this model is normally distributed. Based on the *Sum Sq. Dev.* statistics in the same table, the data with the highest variability from ascending to descending value in this study would be *LPOP*, *LGDP*, *INF* and then *YUNEM*. The greater the value of the sum of squared deviations, the more variable the data will be (Field, 2018).

Table 2: Descriptive Statistics

	LGDP	LPOP	INF	YUNEM
Std. Dev.	1.0297	0.2477	1.5525	2.3279
Skewness	-0.1738	-0.3166	0.0395	1.1927
Kurtosis	1.7156	1.8411	2.6945	4.9924
Jarque-Bera	2.8771	2.8337	0.1618	15.6970
Sum Sq. Dev.	40.2901	2.3308	91.5851	205.9190
Observations	39	39	39	39

3.4 Unit Root Tests

Tables 3 and 4 show that the ADF and PP tests indicate that *LGDP* and *YUNEM* have unit roots at first difference using both trend as well as trend and intercept. Variable *INF* has unit root at level and first difference based on the ADF and PP test statistics. *LPOP* is stationary only at first difference using both trend and intercept, based on the PP test statistics.

Table 3: Augmented Dickey-Fuller (ADF) Unit Root Test

	Level		First Difference	
	Intercept	**Trend & Intercept**	**Intercept**	**Trend & Intercept**
LGDP	-1.4155	-0.6341	-5.0625***	-5.1970***
INF	-4.1602***	-4.3376***	-5.3628***	-5.2880***
LPOP	-0.3234	-2.4254	-2.293	0.7911
YUNEM	-2.1295	-2.3008	-4.5930***	-4.5102***

*Note: The values in the table refers to the test statistics obtained for each variable at level and first difference. The asterisk *** indicates 1% levels of significance.*

Table 4: Phillips-Perron (PP) Test

	Level		First Difference	
	Intercept	**Trend & Intercept**	**Intercept**	**Trend & Intercept**
LGDP	-1.3896	-0.6341	-5.0608***	-5.1994***
INF	-4.2327***	-4.373***	-9.3850***	-9.2524**
LPOP	-8.1613***	1.5736	-0.0000	-3.8832***
YUNEM	-2.4718	-2.6202	-4.5615***	-4.4789***

*Note: The values in the table refers to the test statistics obtained for each variable at level and first difference. The asterisks (**, ***) indicates significance levels at 5% and 1% levels respectively.*

Since the variables are stationary at different levels of differences, Johansen Cointegration Test cannot be utilised moving forward (Shreshta & Bhatta, 2018). After determining that the number of lags is four, the ARDL Cointegration is carried out. The Equation (2) of the ARDL model is as follows:

$$\Delta YUNEM_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta YUNEM_{t-1} + \sum_{i=1}^{q} \alpha_{2i} \Delta LGDP_{t-1} + \sum_{i=1}^{q} \alpha_{3i} \Delta INF_{t-1} + \sum_{i=1}^{q} \alpha_{4i} \Delta LPOP_{t-1} + \sum_{i=1}^{q} \alpha_{5i} \Delta ES_{t-1} + \alpha_6 YUNEM_{t-1} + \alpha_7 LGDP_{t-1} + \alpha_8 INF_{t-1} + \alpha_9 LPOP_{t-1} + \alpha_{10} ES_{t-1} + \varepsilon_t \quad (2)$$

whereby Δ represents first difference operator and α_i indicates the coefficient of variables.

3.5 ARDL Long Run Form and Bounds Test

This test is carried out in order to detect cointegration and long-run relationships between the variables in this study. The hypothesis of this test is as below:

$H_0: \ \alpha_{LGDP} = \alpha_{INF} = \alpha_{LPOP} = \alpha_{ES} = 0$ (There is no cointegration among the variables).

$H_1: \ \alpha_{LGDP} \neq \alpha_{INF} \neq \alpha_{LPOP} \neq \alpha_{ES} \neq 0$ (There is cointegration among the variables).

Table 6 shows that the F-statistic of this Bounds Test is 12.4981, which is higher than all of the bounds statistics (3.52, 4.01 and 5.06) at first difference. Hence, the null hypothesis is not accepted. This proves there is cointegration in the model. This result is in accordance with Michael & Arokiadasan (2020) and Baba & Abang Ali (2020) studies which reported cointegration in the model as well.

Table 6: Bounds Test

		Bounds Test Critical Values	
F-statistic	**Significance**	**I(0)**	**I(1)**
12.4981	10%	2.45	3.52
	5%	2.86	4.01
	1%	3.74	5.06

Table 7 shows that *LGDP* has a coefficient of -38.4803 and is significant at 1% level. Therefore, it has a long-run causal effect on *YUNE*. This means that a 1% increase in gross domestic product results in a 38.48% decrease in youth unemployment. Similarly, *LPOP* also has a long-run causal relationship with *YUNE* as its p-value is 0.0003, which is less than 0.01. This indicates that a 1% increase in population leads to a 130.35% increase in *YUNE*. However, *INF* and *ES*, with coefficients of 0.3567 and 1.5567 respectively, do not have a long-run causal relationship with *YUNE* as they are not significant.

Table 7: ARDL Long Run Results

Variable	**Coefficient**	**Standard Error**	**T-Statistic**	***p*-value**
LGDP	-38.4803	8.0605	-4.7739	0.0001***
INF	0.3567	0.2622	1.3605	0.1849
LPOP	130.3464	31.4951	4.1386	0.0003***
ES	1.5567	1.0957	1.4207	0.1668

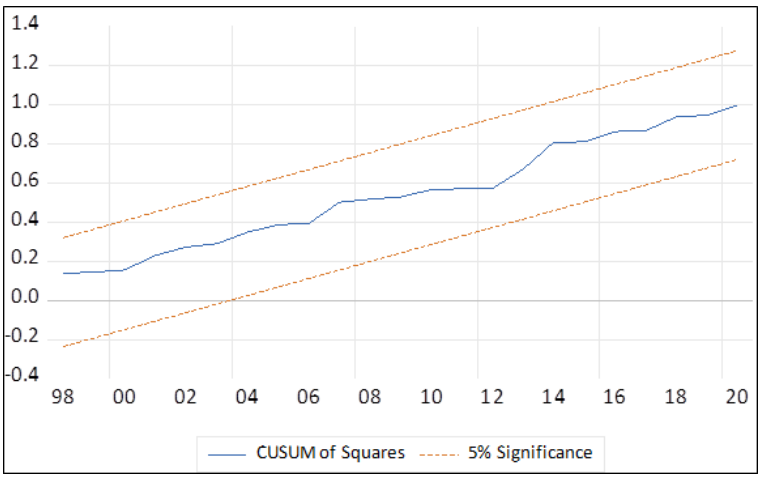
*Note: The asterisk *** indicates 1% level of significance.*

Diagnostic tests are carried out to ascertain the robustness and validity of the estimation model. The chi-square values of the Breusch-Godfrey Serial Correlation LM

test and the Breusch-Pagan-Godfrey heteroskedasticity test obtained were 1.2925 and 0.9282, respectively. Both statistics were could not reject the null hypothesis of no serial correlation and homoskedasticity, supporting Michael & Arokiadasan (2020) and Michael & Arokiadasan (2020) findings.

The CUSUM test is run to test the stability of our model in this study. The CUSUM of Squares line shown in **Figure 2** lies comfortably between the boundary lines at 5% significance. Therefore, this proves that the model is stable.

Figure 2: CUSUM of Squares Test



4. Discussion

This study's time series analysis of Gross Domestic Product, Population and Economic Shocks found a long-term negative ssociation between the log of the gross domestic product and youth unemployment. This outcome is consistent with research by Bayrak & Tatli (2016) and Michael & Arokiadasan (2020), which found a long-term inverse link between economic growth and the rate of youth unemployment.

There is no evidence of association between inflation and youth unemployment. This is consistent with D'Ippolito's (2011) finding that the youth unemployment rate in Denmark does not alter as a result of inflation. D'Ippolito (2011) suggested that this might be due to small sample size, demographics and political factors. Furthermore, Caporale & Gil-Alana (2014) found no evidence of a short-term link between inflation and youth unemployment.

Last but not least, the ARDL Long Run Form and Bounds Test revealed that Economic Shocks had a positive connection with YUNEM in the long run, with a coefficient of 1.557. This anticipated favourable association is consistent with earlier studies like Choudhry et al. and Milovanska-Farrington (2021). This study included economic shocks as an independent variable due to the previous literature found and due to the fact that this variable has not been included in previous unemployment-related studies in Malaysia. The researcher believes that it is an important variable to be included and explored as the Malaysian economy has undergone multiple crises such as the Asian Financial Crisis in 1997, global slowdown in 2001 after the 9/11 attacks, Global Financial Crisis in 2008 and most recently, the COVID-19 global pandemic in 2020 (Raad, 2020).

5. Research Implication and Recommendation

Based on the outcomes of this study, the Malaysian government should develop youth-specific strategies. Out of 37 OECD countries, 22 of them have developed youth strategies across many sectors, especially since the pandemic. For instance, the Estonian government came up with a stronger Youth Guarantee plan whereby the sole focus will be on the vulnerable youth and to ease the transition of youth from schooling to working (OECD, 2021). Hence, Malaysia should seek inspiration from OECD countries and develop similar youth strategies as it was found that a rise in population creates an increase in the YUNEM rate of Malaysia.

An increase in inflation leads to an increase in living costs and therefore, increases the dropout rates of youth. Therefore, to lower these dropout rates, it is recommended for Malaysia to put more focus on TVET. TVET is an education pathway which gives a chance to students interested in science and technology to further pursue a career in the industry (Mohd Sauffie, 2015). TVET does not only help in decreasing school dropout rates, but is also able to produce high-skilled individuals that will contribute to the national economic growth. Hence, the gross domestic product (GDP) of Malaysia can simultaneously rise by placing more emphasis on TVET education (Mohd Sabri, 2012). To improve on the current TVET system, Malaysia can take Germany as an example. Germany has the best dual education system, whereby most of its youth gain employee-related skills in school, via the apprenticeship system (Pastore, 2018). Germany also

ensures that the students get a wage ranging between €400 to €800 a month through this programme (German Educare, 2023). Hence, students get the best of both worlds by staying in school to gain education, while earning a monthly wage. This is a great step for Malaysia to take, as the monthly wage offered will enable youth to ease the financial burden of their families during an inflation and at the same time, they will not be forced to drop out. In short, Malaysia can certainly improve on its TVET education system by implementing Germany's model.

Lastly, emergency income support should be provided, to cushion the impacts of the ongoing economic shock (COVID-19) towards the youth. This is because it was found that an increase in economic shocks would increase youth unemployment rate in Malaysia. Income support can be given in terms of transfer payments and increased social benefits. Malaysia should follow the footsteps of OECD countries, which have implemented this policy. For instance, France provides monthly allowances for previous university students who were scholars and under the age of 30, who are seeking employment. This monthly allowance is also extended to youth under the age of 26, who have registered with employment services, pre-pandemic. In short, Malaysia should follow the example of France by providing continuous allowance for youths until they get a job, instead of providing one-off payments.

6. Conclusion and Future Research

In summary, this study's time series analysis of Gross Domestic Product, Population and Economic Shocks through ARDL Bounds Test and Error Correction Regression found significant relationships between Gross Domestic Product, Population and Economic Shocks with YUNEM rate in the long run.

However, this research could not access granular youth unemployment statistics by gender, strata, or by state. Future research could consider including data for gender and states of Malaysia in a panel data analysis (Hsiao et al., 1995).

Although the dataset that was obtained in this study is ten years longer than the one available from The World Bank (from 1982 onwards as opposed to the World Bank's 1991-onwards data), it is still a relatively short period of thirty-nine years. Both datasets contain missing data, which further reduces the sample size of the data. According to Hair et al. (2010), there can be substantial consequences if the data is of a small sample

size (less than 50 cases). The missing data from this research's youth unemployment statistics is treated using the mean substitution technique as recommended by Hair et al. (2010) because the missing data in this study is less than 10%. This treatment of missing data could be inaccurate if the missing data is abnormally high or low for that year.

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