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The Impact of Economic Growth, Education Level, and Inflation Rate on Income Inequality in Malaysia

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Abstract

Purpose: The goal of this study is to look at the determinants that contribute to income inequality in Malaysia.

Methodology: The time series spans the years 1990 - 2019, with 30 observations. The empirical findings of this study were obtained using three important econometrics tests through E-views software: Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test, the JJ Cointegration test, and the Vector Error Correction Model (VECM) test.

Expected Findings: The result reveals that economic growth, education level, and inflation rate have long-run and short-run relationships with income inequality in Malaysia.

Practical Implications: The government needs to implement and introduce new ways and solutions in increasing and enhancing the quality of the education system that could aid in reducing the country's income inequality.

Originality/Value: Findings of this study will assist the government and policymakers in determining the major drivers that are beneficial in reducing income inequality.

Keywords: Income Inequality, Economic Growth, Education Level, Inflation

Introduction

Income inequality is identical to the Gini coefficient, which is used to evaluate income disparity, with zero indicating perfect equality and one indicating perfect inequality. Income inequality in poorer nations impedes economic progress, whereas income inequality in wealthy nations stimulates it. Forbes (2000) stated that in wealthy countries, for example, the constructive link between income difference and economic growth may be streamlined; wealthier people save more than poor people. Income transfer from richer to poor people reduces the economy's saving rate and, as a result, may result in a drop in financial

development. Another explanation is that income redistribution may limit the ability for the rich to put in more effort in work, resulting in a slowing of economic growth.

Income disparity refers to inequalities in income levels among Malaysians and may be beneficial to economic growth when the amount of inequality is appropriate. However, if all individuals earn the same amount of money, organizations or individuals would be encouraged to increase their productivity. Following Malaysia's independence in 1957, almost half of the country's families were poor. During that time, 49% of families were classified as poor as Malaysia has a low-income, agricultural, and rural economy. Malaysian states have been classified into three groups since 1981, mostly based on per capita GDP. Federal Territory of Kuala Lumpur and Selangor are the two highest-income states in Malaysia. Johor, Melaka, Negeri Sembilan, Pahang, Perak, Pulau Pinang, Sabah, and Sarawak are among the states with a middle-income. Finally, Kedah, Perlis, Kelantan, and Terengganu are the low-income states (Aslam et al., 2003). Lean and Smyth (2014) discovered that Malaysia has had significant economic development during the last five decades after obtaining independence in 1957.

Income inequality has been one of Malaysia's most difficult concerns as a developing country. People who reside in urban areas of the countries often earn a high salary, whereas those who live in rural areas earn a lower income. According to the survey conducted by the Department of Statistics Malaysia (n.d.), the B40 group, which includes 2.91 million families, had an income threshold of RM4,849. The income criteria for the M40 group, which included 2.91 million families, ranged from RM4,850 to RM10,959. In addition, 1.46 million households in the T20 category had a yearly income of moreover RM10,960. In terms of the income distribution, the T20 accounted for 46.8% of total household income, up from 46.2% 2016. Furthermore, the M40 group accounted for 37.2% of total revenue, while the B40 only accounted for 16%, down from 16.4% in 2016. From this statistical data, it is possible to deduce that income gap exists in this household group. Even with multiple Economics Policies introduced by the government intended to promote growth, reduce poverty, and reorganize society, the disparities in development across regions, states, and rural-urban areas, remained significant (Ali & Ahmad, 2009).

Because of the unfavorable association between income inequality and economic growth in developing countries, financing is required for poor individuals. They may not have the opportunity to contribute, and to a large extent, poor individuals in the income gap can't participate in item mobility, which may motivate political and social instability and, as a result, economic growth drop. This study looked at the variables that affecting income inequality in Malaysia. To be more precise, the study focuses on three variables that influence income differences. The Malaysian government will benefit from this study as it will provide them with some ideas on how to lessen economic disparities in Malaysia. This study's findings can be used as a guideline or a reference by the government and policymakers to avoid disrupting Malaysia's economic growth rate. Furthermore, this study helps avoid policymakers from inefficiently spending fund on issues that may not be required in order to lessen income disparities. According to the estimations of this study, income inequalities may be reduced through economic growth, educational level, and inflation by adopting a particular method.

Literature Review

This section presents past research on the variables used in the study and how they relate to one another. The literature is listed in the subsections that follow.

Economic Growth

Fields (1989) stated that redistribution from wealthy to poor limit accumulation of the capital and impede progress in certain models if the rich save a higher proportion of their income than the poor but Alesina and Rodrik (1994) argued that increasing inequality will harm the economy. This is due to the fact that high levels of inequality lead to a further dispute over distributional issues and prompt the government to impose more taxes in order to decrease it. These taxes, therefore, reduce the rate of return on private assets, so limiting capital accumulation and delaying growth. Inequality may have a beneficial or negative influence on economic progress, and vice versa, depending on the circumstances of advancement (Yang & Greaney, 2017). Furthermore, a country's great inequality may provide a strong drive for the government to redistribute money across various socioeconomic strata. This is due to the government's ability to affect the income distribution of the general population through tax and transfer systems, and hence expand the influence on economic growth through inequality.

Consequently, redistribution of income by a high-income tax does not necessarily reduce income disparity. In a near-steady state, increasing income taxes can reduce income disparity, but it cannot be lowered in the early stages of economic growth. Income inequality has a negative influence on economic growth in the initial phases of development stage, but it has a positive impact on economic growth progresses toward stability.

Education Level

According to Abdullah (2012), the level of education can narrow the wealth inequality, making it a useful tool for reducing income inequality on average. The study by Wells (2006) showed that the links between education and economic autonomy ought to be examined using further reliable approaches that incorporate secondary enrolment rates, as well as methods that incorporate enrolments at various levels and other educational determinants. Gregorio and Lee (2002) discovered the Kuznets' Inverted-U linkage between income level and income inequality, as well as government social expenditures making a beneficial contribution to more equitable income distribution.

The polynomial inverse lag (PIL) framework was introduced by Wan et al (2006) to allow the effects of inequality on investment, education, and eventually growth to be assessed at specifically designated time lags, with the results predicted to be less affected by the difficulties of heterogeneity, endogeneity, and measurement errors that are prevalent in cross-country growth regressions. Also, Coady and Dizioli (2018) suggested that the association between income disparity and educational attainment is shown to be favourable, but it is minor and not always statistically significant.

Inflation

As per the study by Li & Zou (2002), uniform monetary inflation enhances income disparity since the poor are most likely the ones who are affected by it, whilst the rich benefit more and their income share grows at the same time. Despite the fact that the impact of inflation on income shares on the poor and middle class is minimal, there is still a negative association between these two variables. As a result, monetary inflation has a beneficial influence on income and wealth redistribution (Cantillon effect), resulting in income inequality.

Additionally, Chen et al (2014) employed a happiness study technique to discover how inflation affects people's happiness levels. Inflation produces welfare loss, according to this research, although the loss is not quite as large if inflation is foreseen. Moreover, when welfare expenditures are taken into consideration, different income groups differ dramatically. This study has policy significance since it may assist policymakers in making better cost-benefit decisions.

Methodology

The data for the variables are obtained in the period of 30 years which starts from the year 1990 until 2019. Malaysia's Gross Domestic Product (GDP) and inflation rate were chosen to determine the effect of economic growth on income inequality in Malaysia. Both data for GDP and the inflation rate shown as the percentage of the consumer price index (CPI) of Malaysia were obtained from World Bank Data. Also, the educational level data are the labor force by educational attainment (secondary level) in Malaysia as well as the Gini coefficient data is obtained from the Department of Statistics Malaysia. The reason for the selected education level is that the minimum wage in Malaysia is applied throughout all the working sectors in Malaysia, regardless of the education level and almost every place required an individual to possess at least Sijil Pelajaran Malaysia (SPM) level of education qualification.

Table 1
Definition of Variables

Types of Variable(s)	Variable(s)	Abbreviation(s)	Definitions	Source(s)
Dependent variable	Income Inequality	INC	Assessed by the GINI index, used to calculate income inequality with zero indicating perfect equality and one indicating perfect inequality	Department of Statistics Malaysia
Independent variable(s)	Economic Growth	GDP	Represents an economy's total production as the monetary value of all goods and services produced during a specified timeframe, often annually	World Bank Data
	Education Level	EDU	Method of human capital investment and generation, with a person's competence and talent being considered essential components in boosting efficiency and productivity of physical capital	Department of Statistics Malaysia

	Inflation	INF	The gradual rise in the cost of goods and services	World Bank Data

Estimation Model

The following model can be used for the purposes of estimation and testing of the determinants of income inequality:

$$NC = \alpha + \beta_1 GDP + \beta_2 EDU + \beta_3 INF + \varepsilon_t$$

Where α is a constant term, INC represents the income disparity, GDP is economic growth, EDU represents education level, INF represents inflation rate and ε_t represents stochastic error term. Based on the estimation model, the relationship between the dependent and independent variables are illustrated as below.

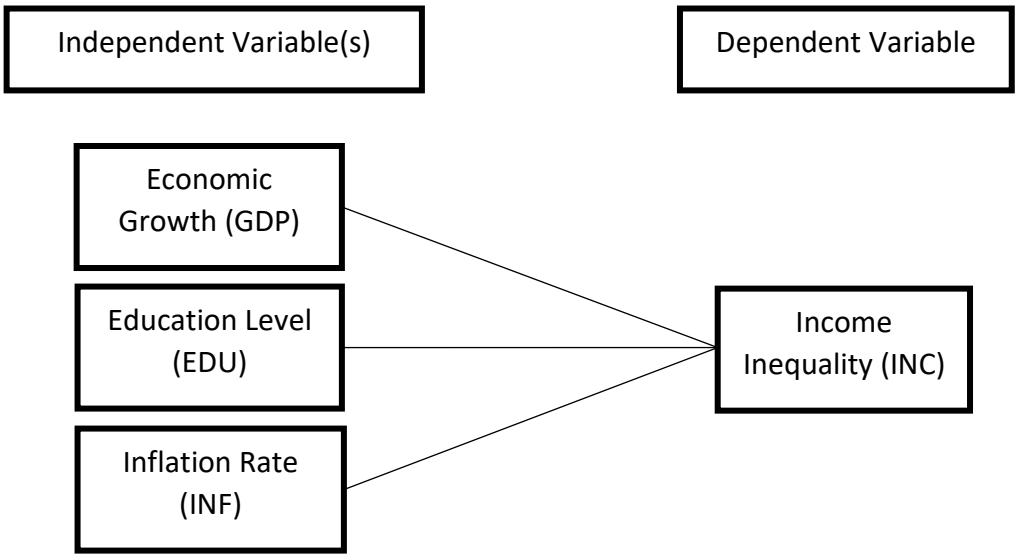

Figure 1: Framework Study of The Research

Empirical Testing Procedures

Unit Root Test

Augmented Dickey-Fuller (ADF) Test

The augmented Dickey-Fuller Test (ADF) is particularly useful in determining the stationary of a series, and it is also one of the most widely used statistical tests in use today. The ADF test method is based on the following model:

$$\Delta X_t = yX_{t-1} + \Sigma_{i=1}^{p} \beta_i \Delta X_{t-1} + \varepsilon_t$$

Phillips-Perron (PP) Test

Phillips and Perron (1988) devised the PP test to improve on the Dickey-Fuller unit root test and the it incorporates the consideration of drift and drift and trend in the series to account for the linear time trend. Nonparametric and heterogeneous character of this technique reduces the possibility of serial correlation and bias. The PP test method is based on the following model

$$\Delta X_{t-1} = \alpha_0 + yX_{t-1} + \varepsilon_t$$

Johansen and Juselius (JJ) Cointegration Test

The JJ test can assist in determining the existence of numerous cointegration vectors. Co-integration occurs when two or more sequences are integrated independently, yet certain of their linear combinations have a lower integration order. According to Nkoro & Uko (2016), there are two tests that may be used to determine the number of cointegrating vectors in the model, and they are the Trace Test and the Maximum Eigenvalue Test. Trace test can be expressed as below:

$$\lambda_{tr} = -T\Sigma_{i=q+1}^{p}\log(1-\lambda_i)$$

According to Johansen and Juselius (1990), the Maximum Eigenvalue test is better than the Trace Test. The regression of the Maximum Eigenvalue test is shown as follows:

$$\lambda_{max} = -Tlog(1-\lambda_{r-1})$$

Vector Error Correction Model (VECM) Granger Causality Test

After the cointegration vector is determined in the Johansen-Juselius cointegration test, the Vector Error Correction Model (VECM) Granger Causality is used. To minimise misspecification, the Granger Causality test was created to establish the short run link between surveyed variables. Furthermore, VECM based on the Granger Causation test can discover the direction of causality between surveyed variables from long run cointegrating vectors. The following is the hypothesis of Granger Causality-based VECM:

$H_0 =$ *The independent variable does not granger cause the dependent variable.*

$H_1 =$ *The independent variable granger causes the dependent variable.*

Diagnostic Tests

The empirical model is also subjected to a number of diagnostic tests in order to assess its eligibility for use in the estimate and data analysis of this study. The diagnostic tests that will be performed on the empirical model are the Normality Test, Autocorrelation Test, Ramsey RESET Test, and the CUSUM and CUSUM of Squares Test.

Empirical Results

Table 2

Augmented Dickey-Fuller (ADF) unit root test results

Series	Level		First Difference	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept
INC	-0.239 (1)	-1.557 (3)	-7.357 (0)**	-18.172 (6)**
GDP	-3.029 (1)**	-3.793 (1)**	-5.186 (2)**	-5.231 (2)**
EDU	-2.207 (0)	-1.874 (0)	-4.591 (0)**	-4.846 (0)**
INF	-4.214 (0)**	-5.215 (0)**	-7.010 (1)**	-6.865 (1)**

Notes: Asterisks (**) indicates statistically significant at 5% level. Figures in the parentheses are the lag lengths.

Table 3
Phillip-Perron (PP) unit root test results

Series	Level		First Difference	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept
INC	-1.105 (0)	-3.105 (1)	-7.732 (2)**	-12.139 (7)**
GDP	-3.934 (3)**	-4.810 (2)**	-14.718 (12)**	-18.517(15)**
EDU	-2.281 (3)	-1.853 (2)	-4.592 (1)**	-5.296 (4)**
INF	-4.320 (3)**	-5.236 (3)**	-10.895 (2)**	-10.5998 (2)**

Notes: Asterisks (**) indicates statistically significant at 5% level. Figures in the parentheses are the lag lengths.

The findings of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests demonstrate that the stationarity of the variables at level is varied. The ADF test demonstrates that at level, GDP and INF are significant at the 5% significance level, rejecting the null hypothesis that the variable has a unit root. The rest of the variables do not reject the null hypothesis and are not stationary at level. The findings of the PP unit root test at level are similar to those of the ADF test, with only GDP and INF rejecting the null hypothesis of unit root. Both the ADF test and PP test reveals that at first difference, all variables reject the null hypothesis that the variables have a unit root, indicating that the variables are stationary. In conclusion, both the unit root test findings show that all variables in the research are stationary in the first order of integration, *I(1)*.

Table 4
Johansen and Juselius Cointergration Test Results

k = 3 r = 1					
Null	Alternative	λ-max Unadjusted	95% C.V.	Trace Unadjusted	95% C.V.
r = 0	r > 1	29.360**	27.584	51.826**	47.856
r < 1	r > 2	13.392	21.132	22.466	29.797
r < 2	r > 3	8.790	14.265	9.074	15.495
r < 3	r > 4	0.283	3.841	0.283	3.841

Notes: Asterisks (*) denote statistically significant at 5% level. The *k* is the lag length and *r* is the cointegrating vector(s). Choosen r: number of cointegrating vectors that are significant under both tests.

The results shows that both trace statistics and maximum eigenvalue statistics yielded comparable results, where r = 0 is rejected at a 5% significant level, because the values of both tests above the critical value. After the correction, the findings show that there is only one cointegrating vector between the four investigated variables. As a result, the variables in Malaysia are considered to have a long-term linear equilibrium relationship. With that being said, the income inequality, economic growth, education level, and inflation rate are all interrelated in the long run.

Table 5
VECM Granger Causality Test Results

Dependent variable	INC	GDP	EDU	INF	ECT	
	x^2 – statistics (p – value)				Coefficient	t – ratio
INC		0.031 (0.860)	0.432 (0.511)	0.778 (0.378)	0.020	1.095
GDP	4.507 (0.034)**	-	0.025 (0.874)	4.665 (0.031)**	-0.130	-4.710**
EDU	0.033 (0.856)	0.191 (0.662)	-	0.043 (0.835)	-0.003	-0.231
INF	2.019 (0.155)	0.174 (0.677)	0.060 (0.807)	-	0.012	0.581

Notes: The x^2 – statistics tests the joint significance of the lagged values of the independent variables, and the significance of the error correction term(s). Δ is the first different operator. Asterisks (**) indicate statistically significant at 5% level.

According to the results in Table 5, ECT reveals that GDP is statistically significant at the 5% level since the t-ratio is -4.710, which is more than the critical value of 1.96. The ECT coefficient for GDP has the right sign, which is negative, it is less than one, and it is statistically significant at the 5% level. The coefficient -0.130 of the ECT is about 13% annually, and it takes approximately 7.69 years to return to the system's long term equilibrium. As a result, this result suggests that GDP adjusts itself in the long run. The study by Stewart (1999) supported this evidence as it was suggested that increased equality results in greater domestic economy, greater use of economies of scale, and hence more industrialisation and growth. Furthermore, INC and INF do have a short-run relationship with GDP, and the probability of INC is 0.034 and INF is 0.031, which is statistically significant at the 5% level and therefore reveals that INC and INF do granger cause toward GDP.

Table 6
Diagnostic Test Results

Jarque-Bera Normality Test	0.845 (0.655)
Breusch-Godfrey Serial Correlation LM Test	9.186 (0.010)**
Ramsey RESET Test	0.574 (0.457)
CUSUM Test	Not stable
CUSUM of Squares Test	Not stable

Notes: Asterisks (**) indicates statistically significant at 5% level.

Table 6 demonstrates that the diagnostic tests reveal that the model is normally distributed, that there is evidence of serial correlation, that there is no misspesification error in the model, and that it is not stable under both the CUSUM and CUSUM of Squares tests. The findings show that the error components in the model are normally distributed, that they have a connection with one another, that the model is accurately defined, and that the cumulative sum does not have extreme or substantial volatility in the mean.

Conclusion and Policy Recommendation

Conclusion

The primary goal of this study is to examine the determinants of the income inequality in Malaysia, in which the determinants are economic growth, education level, and inflation rate, as well as to investigate the short run and long run relationships between the dependent variable and the independent variables. The findings reveal that all of the variables in the first difference for unit roots test had the same order of integration at *I(1)*. Because all of the variables are integrated, a cointegration test is performed, and the results demonstrate that there is only one cointegration vector among the four variables. That is to say, this shows that long run relationship exists between income inequality, economic growth, education level and inflation rate in Malaysia. According to the short run granger causality test, distinct directions exist in Malaysia between income inequality, economic growth, education level, and inflation rate. The findings indicate that education level has little short run causality to economic growth. Income inequality and the inflation rate are the other two variables that demonstrate the presence of unidirectional causality to economic growth. The unidirectional causality of variables such as income inequality and inflation rate on economic growth would finally contribute to Malaysia's overall economic development. Conversely, the long run granger causality test reveals that one long run association was discovered. Variable GDP has a long run causality which implies that it has a long run relationship towards other variables (INC, EDU and INF).

Policy Recommendation

Introduce a tax progressive system

In industrialised nations, the substantial empirical set establishes that the growth-inequality nexus is beneficial. This suggests that increased economic growth will worsen inequality. The government can introduce a tax progressive system that raises the income tax rate for the wealthy while lowering the rate for the poor. Malaysia has a low tax rate for the highest income group of 25%, compared to other Asian nations such as Korea (38%), and Thailand (35%). Raising this tax to more than 25%, in line with other nations, will assist to minimise income inequality in Malaysia. As a result, the government can lessen the wage disparity by redistributing money. In developing countries, economic expansion is beneficial to inequality since it reduces inequality. The government must boost the economy through raising expenditure in order to provide more job possibilities in the market. At the same time, the government should decrease taxes, increasing consumers' purchasing power. As purchasing power rises, so will the demand for products and services. As a result, authorities may be able to reduce inequality through increasing economic development in emerging nations.

Enact legislation making secondary school attendance mandatory

Because Malaysia provides free education and makes it mandatory for its citizens, the government may continue to develop better policies for this level of education. The government should enact legislation making secondary school attendance mandatory. This indicator may not only result in a higher secondary completion rate, but will also motivate more students to pursue higher education at the tertiary level, increasing the enrolment rate for tertiary education, which will have both a positive and significant impact on GDP growth in the short and long run (Singh, Lai & Saukani, 2018). When there are more highly skilled people, pay disparity decreases. Conversely, when innovators from underprivileged origins

have the skills and resources to thrive, it is less expected that high-earning employers would usually emerge from among the better-off. For example, in Korea, 43% of the labour force holds a bachelor's degree or more, compared to 34% in Sweden, 32% in the United States, 25% in Malaysia, and 17% in Brazil. This helps to explain why Korean market income inequality has become one of the lowest in the world.

Monitor the Inflation Rate

Although strong inflation might reduce income inequality, the government should manage the inflation rate since excessive inflation can pull the economy down, leading to an inflation crisis. Under inflation targeting, the government can use monetary tools to manage inflation. When inflation exceeds the intended rate, the central bank may raise interest rates, and when inflation falls below the target, the central bank may lower interest rates. As a result, inflation can serve to regulate and eliminate income inequality.

More indicators can be evaluated or updated to provide important information and suggestions to the Malaysian government, allowing policymakers to devise the most effective methods to improve the country's existing situation. Furthermore, different indicators employed in the study yielded varied results to explain whether they differed with previous few findings, and this might provide additional empirical proof about the country's present environmental challenges.

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