



The Impact of Corruption on Economic Growth in Malaysia

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ABSTRACT

The impact of corruption on economic growth has been the subject of theoretical debate among economists, with some arguing that corruption hinders growth and development. In contrast, others suggest that it can positively affect the development process. As such, the effects of corruption on economic growth remain inconclusive. This study examines corruption's impact on economic growth, as measured by real GDP per capita (constant 2015 US\$) in Malaysia. The study utilized the autoregressive distributed lag (ARDL) method to investigate the relationship between corruption and economic growth in Malaysia. The data used in the analysis were obtained from the World Bank and International Country Risk Guide data repository and covered the period of 1992-2021 annually. The Corruption Index was used to measure corruption. At the same time, other variables included economic growth (GDP), Gross Capital Formation (GCF), General Government Final Consumption Expenditure (GE), Individuals Using the Internet (INT), Labor Force (LF), and School Enrollment (SE) in Malaysia. The study's primary results are as follows: (1) corruption and economic growth in Malaysia have a long run relationship when considering the measures of GCF, GE, INT, LF, and SE in the model; (2) when the measures of GCF, GE, INT, LF, and SE were included interchangeably and combined in the model, corruption had a positive and significant impact on economic growth in Malaysia; (3) corruption and economic growth in Malaysia have a significant short-run relationship when considering the measures of GCF, GE, INT, LF, and SE in the model. The study's limitation relates to the data used, as alternative corruption measures beyond the corruption index could yield different outcomes. The study's distinctive contribution is exploring the

impact and relationship between corruption and economic growth, specifically in Malaysia.

Keywords: Economic Growth, Corruption, ARDL, Malaysia

INTRODUCTION

The difficulty in defining corruption stems from the fact that, in general, corruption is a process that occurs whenever state authority is exercised and is not limited to any single political system. According to economics, corruption occurs when a corrupt agent's benefit from working against a principal's expectation surpasses the cost or when a public good, service, or position is sold for self-benefit [1]. According to this definition, bribery, extortion, fraud, embezzlement, nepotism, cronyism, appropriation of public assets and property for private use, and influence peddling are all characteristics of corrupt behaviour. Fraud and embezzlement are examples of corrupt conduct that a single authority may carry out without the assistance of a second party. Several, such as bribery, extortion, and influence peddling, involve two participants in a corrupt transaction: the provider and the receiver. *Corruptere* is a Latin word that means to break. What is broken by the act of corruption is the question to be answered in this study. The apparent explanation is that the law and moral principles have been violated. However, it is crucial to realize that corruption can potentially destroy societies and individuals. Corruption tears communities apart because it weakens predictability, responsibility, social openness and trust. Because corruption entails lying, deception, and living by two (contradictory) sets of rules, the integrity of the individual is compromised. The most significant long-term damage caused by corruption may be social disintegration and the loss of personal integrity [2]. Corruption is when a public official abuses their power for the private benefit [3].

Corruption has existed for decades and will continue to live in the future unless authorities can devise effective strategies to counteract it. It won't be easy because most corruption is done behind closed doors. Corruption is a severe problem that affects many countries, not just Malaysia. Whether they like it or not, every country must deal with the issue of corruption. Corruption is a nationwide problem, and various attempts have been made to counteract it, especially in Malaysia. The Global Future Council on Transparency and Anti-corruption estimated that corruption costs around 5.0 per cent of the global Gross Domestic Product (GDP), or United States Dollar (USD) 3.6 trillion annually. The bribery amount is estimated at more than USD 1.5 trillion annually, with the developing world bearing an annual cost of corruption of almost USD 80 billion [4]. Although corruption is nothing new in Malaysia, it has become more severe in recent years, as evidenced by several large-scale corruption scandals that have made international headlines. According to the 2020 corruption ranking Transparency International (TI), Malaysia placed 57th out of 180 countries with a Corruption Perceptions Index (CPI) 51. The ranking of Malaysia has experienced a decline, reaching the 62nd position, and the country's CPI has dropped to 48 in 2021, as shown in Figure 1. However, as stated by the International Country Risk Guide (ICRG) database, a particular country's Corruption Index (CI) has remained stable over 19 years, spanning from 2002 to 2021, with a constant value of 2.50.

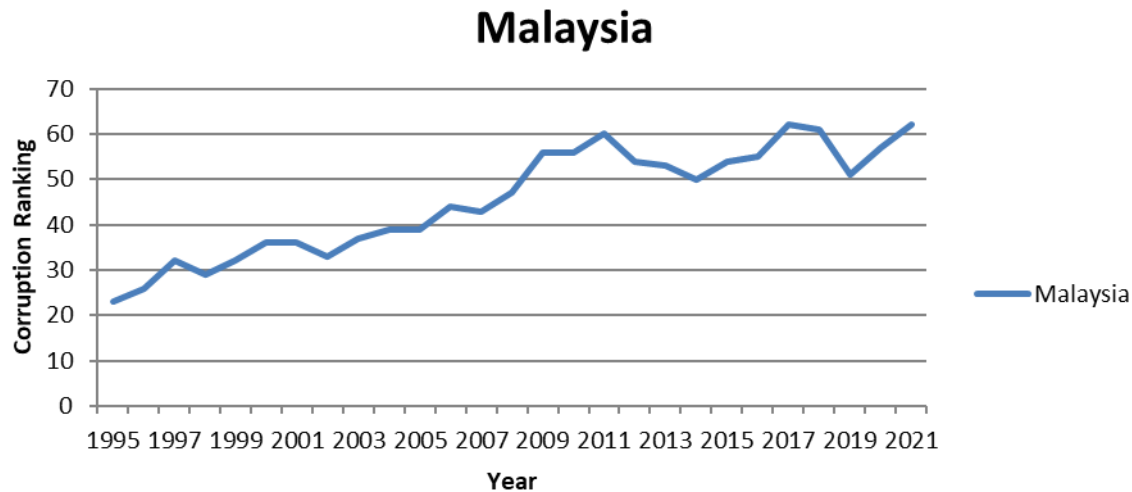


Figure 1: Corruption ranking based on the CPI value

Transparency International Malaysia (TI-M) and the World Bank estimate that Malaysia has been losing nearly 4 per cent of its GDP yearly since 2013. Based on GDP figures, this amounts to Ringgit Malaysia (RM) 40 to 60 billion every year, which might be underestimated considering Malaysia's large number of unsolved corruption cases. However, the number of corruption cases in Malaysia has decreased over the past few years based on Malaysian Anti-Corruption Commission (MACC) data. Specifically, the data indicates that the total number of corruption offences decreased from 919 cases in 2014 to 828 cases in 2021, based on the MACC database. This suggests that efforts to curb corruption in the country may yield positive results. However, it is essential to note that corruption remains a significant problem in Malaysia, and more work needs to be done to address this issue effectively.

LITERATURE REVIEW

Corruption has been proven empirically to impact economic growth in previous studies worldwide. This research studies the direct and indirect impacts of corruption in Malaysia, whether beneficial or detrimental to economic growth. Malaysia's CI, as a developing nation, reveal unfavourable results to their socioeconomic, implying that the issue of corruption should be handled seriously. As a result, corruption is notoriously difficult to quantify, and empirical economic study on the topic is limited. Still, corruption has proven empirically to be one of the main barriers to Malaysia's economic growth [5, 6]. This study targeted to explore and analyze the empirical evidence of corruption impacts on economic growth in Malaysia using time series data from 1992 to 2021, as specified by the World Bank and International Country Risk Guide (2017) database. But in terms of the GDP (constant 2015 US\$) by the World Bank database, Malaysia's GDP value in a million is 431857.370 and 438481.352 in 2020 and 2021, respectively. The fact suggests that there has been a shift in the GDP value, even though the CI value has stayed the same. In other words, there has been a change in the economic output of a country or region, even though there has been no apparent change in the level of corruption within that area. The data implies that an econometrics analysis is necessary to understand the relationship between the CI and the GDP since their relationships cannot be comprehensively explained without such a study. At 2015 constant prices, the GDP is an essential metric for determining a country's economic status.

In addition to the variables mentioned above, the study incorporated other independent variables, such as General Government Final Consumption Expenditure (GE), School Enrollment (SE), Labor Force (LF), Gross Capital Formation (GCF), and Individuals Using the Internet (INT). The inclusion of these variables was motivated by the study's aim to apply the Exogenous Growth Theory, which emphasizes the role of factors such as capital inputs, labour inputs and technological progress in promoting long-term economic growth. Therefore, these variables were considered relevant to the analysis as potential economic development determinants and included in the study's regression model as control variables. In addition, many prior studies have demonstrated that government expenditure is essential and has a long-run effect on economic growth [7-10]. However, other studies found that government expenditure positively correlates with economic growth. Other scholars, however, have discovered a negative association between government spending and economic growth [11-13].

Economists have demonstrated a renewed focus on exploring the relationship between human capital and economic growth in recent years. In contrast, earlier research has primarily focused on education as a straightforward indicator of human capital and its effects on economic growth. The study by Maneejuk and Yamaka [14] analyzed the non-linear impact of education, with a particular focus on higher education, on the economic growth of the ASEAN-5 nations, which include Singapore, Malaysia, Thailand, Indonesia, and the Philippines. The results indicated that an increase in secondary and higher education enrollment rates could positively impact economic growth at an individual and regional level within the ASEAN-5 countries. Enhancing the quality of human capital through continuous improvements in the labour force is an essential objective, which aligns with the Malaysian Education Blueprint (2013-2025) set forth by the government. Applying the Cobb-Douglas Production Function in developing a Multiple Regression Linear Model, a study conducted in Malaysia between 1970 and 2013 revealed that the labour force has a long-term impact on economic growth [15].

This paper incorporates gross capital formation as an essential factor contributing to economic growth. As per Solow's [16] theory, the accumulation of physical capital increases production levels, leading to increased economic growth. Topcu et al. [17] used the Panel Vector Autoregressive (PVAR) approach; 124 countries were analyzed from 1980- 2018, with classification based on varying income levels. The findings indicate that gross capital formation positively influences economic growth in high-income nations. In contrast, increased natural resources, energy consumption, and urbanization affect middle-income countries' GDP growth. However, in low-income countries, capital formation has a negative impact. The findings above illustrate that the effect of this variable varies depending on the income level of the country in question. The increasing significance of telecommunications technology and its role in enhancing the world has prompted numerous scholars and researchers to examine the influence of telecommunications technology on economic growth within a nation [18]. Raeskyesa and Lukas [19] researched eight ASEAN middle-income countries between 1999 and 2014 using GDP per capita growth as the dependent variable and physical capital, human capital, and Information and Communications Technology (ICT) indicators as independent variables. The results indicated that ICT indicators have a substantial and favourable influence on economic growth.

This study provides policymakers in Malaysia with valuable insights on how to enhance their efforts in combating corruption and promoting economic growth. This is in line with previous research findings, which have demonstrated the adverse impact of corruption on economic development and other control variables mentioned above. By conducting this study, we hope to contribute to the existing literature and offer practical recommendations that can be used to improve the overall economic performance of Malaysia.

Growth Theory

The study utilized growth theory to explain the determinant of economic growth in a country, specifically focusing on the exogenous growth theory as a framework. The central concept of growth theory is utilizing the production function to identify the factors that contribute to the growth of national output in an economy. According to the neoclassical model, the output level is determined by two factors, namely labour and capital, along with the existing technology.

$$Q = f(AK, L) \quad (1)$$

The Cobb-Douglas function, which is named after Charles Cobb and Paul Douglas, expresses the relationship between the aggregate output (Q), capital inputs (K), labour inputs (L), and the state of technology or technological progress (A).

Exogenous Growth Theory – Solow Growth Model:

Exogenous growth theory presents the neoclassical growth model, also called the Solow [20] growth model, an extension of the Harrod-Domar (1946) growth model. The Solow model asserts that the output is a function of capital stock, the sole factor of production. It is widely regarded as the foundation of economic growth analysis, serving as the basis for nearly all subsequent research. As per the neoclassical growth model, the short-term economic growth rate is determined by the rate of capital accumulation, which is influenced by the saving and depreciation rates. In the long run, economic growth is exogenously determined by the rate of population growth and the rate of technological progress. While the Solow model is straightforward and widely used, economists have criticized it for its limitations. One of its main shortcomings is that it oversimplifies the economy by ignoring crucial factors such as government policies, multiple goods, changes in employment, natural resources, geography, and social institutions.

Furthermore, many economists argue that the Solow model emphasizes investment and capital while neglecting the crucial role of total factor productivity (TFP). TFP represents the portion of output that cannot be explained by the number of inputs used in production. Therefore, the Solow model fails to provide a comprehensive understanding of economic growth. Alternative models considering a broader range of factors are required to better capture real-world economies' complexities. In addition, the Solow model fails to account for the reasons why investment and productivity rates vary across different countries, and it does not provide a comprehensive theory of long-term economic growth sustainability. However, its simplicity allows for a better comprehension of the role of capital, labour, and knowledge in the analysis of economic growth. The neoclassical growth model posits that capital is subject to diminishing returns to scale. This model assumes that output ($Y(t)$) is a function of the capital stock ($K(t)$) and augmented labour ($A(t)L(t)$). The neoclassical growth model can be summarized as follows:

$$Y(t) = f [K_t^\alpha (A_t L_t)]^\beta \quad (2)$$

Where $\alpha + \beta = 1$ depicting constant returns to scale.

The neoclassical growth model proposes that the short-term economic growth rate is influenced by capital accumulation, which is determined by saving and depreciation rates. In the long run, economic growth is exogenously driven by the population and technological progress growth rates. However, the neoclassical growth model implies that shocks in infrastructure stock can only temporarily affect income as long-run growth is predominantly influenced by labour force growth and technological progress. On the other hand, the Solow model does not provide a comprehensive explanation of long-term growth but highlights the possibility of avoiding per capita production stagnation by introducing technical progress with positive external effects. The increase in production resulting from exogenous technological progress cannot be considered a self-sustaining and cumulative phenomenon due to the exogenous nature of progress, which is considered to be achieved outside the economic sphere. Moreover, each factor's marginal productivity decreases, limiting its cumulative effects over time. Solow's neoclassical exogenous model, which highlights the importance of technical progress in economic growth, represents a crucial turning point in the development of economic growth theory. Since the introduction of Solow's model, subsequent research has aimed to address the question of long-term growth, building upon and expanding the original model.

Corruption and Economic Growth

Corruption occurs in a variety of dimensions, styles, and shapes. Corruption may be present in the issuing of import-export licences, the stance to investigate a criminal trial, the reservation of applicants to academic institutions, the selection of men for federal jobs, the safety checks of construction standards in new housing developments and the awarding of contracts with direct award. Despite the nation's vast resources, corruption stifles economic progress and reduces economic efficiency. Corruption tarnishes the country's reputation and results in the loss of revenue. The effects of corruption on economic growth have been theorised to include lower levels of investment, worse quality investment, greater levels of indirect taxes, and resource misallocation owing to warped incentives. Previous research, which examined data from 60 nations and took into consideration a nation's level of economic freedom, came to somewhat contradictory opinions that their findings showed corruption diminishes economic growth in nations with low economic freedom [21]. Another research claimed that the proof for the "grease the wheel" theory is poor, that there is a large negative association between wealth per capita and corruption, and that the impact of corruption on GDP per capita would lead to unsustainable development [22]. From 2000 to 2015, later research of 17 Asian nations found that the corruption index has a statistically significant beneficial influence on economic growth [23].

Corruption is a complicated social, political, and economic problem that exists to variable degrees in all nations. There is no universal agreement on what constitutes corruption. Research conducted by Mo [24] discovered that a 1 per cent rise in corruption decreases the economic growth rate by roughly 0.72 per cent. Put another way, a one-unit increase in the corruption index reduces the economic growth rate by 0.545 percentage points. Corruption is

frequently characterized in the literature as the abuse of public authority for personal profit [25]. It is no prejudice to claim that corruption may be found at all phases of economic growth, in diverse shapes and degrees, and all sorts of political regimes. Othman et al. [26] research on the causes of corruption in Malaysia revealed three patterns from qualitative research: power, opportunity, and moral standards. Despite this, other research evidence demonstrates that corruption has no substantial influence on economic growth in all thirteen Asia-Pacific nations, including Malaysia [5].

Zain et al. [27] utilized the OLS method to analyze the relationship between numerous macroeconomic indicators (government spending, human capital, investment and trade openness) and corruption in Malaysia from 1994 to 2016. Because the corruption index suggests that a more significant value implies terrible outcomes and a lower value indicates good results, they discovered that all factors had a positive relationship with corruption. To eliminate corruption, a government should emphasize guaranteeing quicker, more sustainable economic growth rather than immediately limiting corruption. Such an approach is more successful because changes and regulations targeted at economic growth would not face the same level of opposition as implementing a flexible tax rate or increasing penalties for corruption [28]. From 1990 to 2016, the fixed effect model (FEM) demonstrates that a 1.0 per cent rise in corruption reduces GDP by 0.07 units and negatively affects economic growth in Bangladesh, India, and Pakistan [29]. The panel Full Modified Ordinary Least Square (FMOLS) estimates in the developing nations subsample show that economic growth positively influences financial development. Still, corruption has a negative influence [30].

Sanding the Wheels or Greasing the Wheels Theory:

Regardless of these concerns, there is no apparent convergence of proof regarding the consequences of corruption on economic growth. Various researchers provide two theories to comprehend the link between corruption and economic growth. The first hypothesis characterizes corruption as an impediment to economic growth. This is called "sanding the wheels" [31, 32].

In the long and short run, the negative association between corruption and economic growth in 48 countries from 2012 to 2019 supports the "sanding the wheels" idea [33]. The second hypothesis, named the "greasing the wheels" concept, on the other hand, suggests a positive relationship between corruption and economic growth. This positive association develops when there is too much bureaucracy and inefficiency, which stifles the growth of new enterprises. Because of the distortions generated by the failure of governmental institutions, corruption is considered the second-best remedy. In other words, when economic actors pay bribes to avoid bureaucracy, corruption may boost economic growth. Akkoç and Durusu-Ciftci's [34] investigation in Turkmenistan supports the "greasing the wheels" theory. Turkmenistan has the lowest corruption control, and it is also ranked last in the globe.

METHODOLOGY

Table 1: Source of Data

Variable	Description	Source
GDP	real GDP per capita (constant 2015 US\$)	World Bank
CI	corruption index	International Country Risk Guide (2017)
GCF	gross capital formation (constant 2015 US\$)	World Bank
GE	general government final consumption expenditure (% of GDP)	World Bank
INT	individuals using the internet (% of the population)	World Bank
LF	labour force (total)	World Bank
SE	school enrollment (% gross)	World Bank

Theoretical Framework

Sekaran and Bougie [32] stated that a theoretical framework is a logically developed, described and explained network of association among variables of interest to a research study. The justification of the theoretical framework is based on the literature review, as stated in Part 2. To analyze the impact of corruption on economic growth in Malaysia, this study refers to exogenous growth theory by adapting Solow [20] model. In the study by Farida and Ahmadi-Esfahani [36], the Solow model is expanded to incorporate corruption as a factor affecting multifactor productivity. Corruption is defined as the exploitation of public power for personal gain. The research focuses on a simplified economy that produces only one good, without the put being generated by a well-behaved neoclassical production function characterized by positive and strictly diminishing marginal product of physical capital. The Inada conditions ensure that as the values of capital and labour approach zero, the marginal effects of both approach infinity, while as their values approach infinity, the marginal products of both approach zero. The production function used in this study is the Cobb-Douglas functional form:

$$Y_t = K_t^\alpha H_t^\beta [G_t(\rho) L_t]^{1-\alpha-\beta} \quad (3)$$

The given economic model includes variables such as the aggregate level of real income (Y_t), physical capital (K_t), human capital (H_t), labour (L_t), government expenditure (G_t), and corruption (ρ) in a country. The corruption level (ρ) is positively related to government expenditure $G_t(\rho)$ and is less than zero. The production function in this model exhibits constant returns to scale and diminishing returns to each point, with $0 < \alpha < 1$, $0 < \beta < 1$, and $\alpha + \beta < 1$. The neoclassical results obtained from this model indicate that an increase in investments in physical capital and a decrease in population growth, depreciation rate of capital, and initial level of output per worker can accelerate the growth rate of output per worker. The sustainable growth model can be estimated using the Mankiw, Romer, and Weil (1992) framework of the exogenous growth model, which has been adapted by researchers such as Farida and Ahmadi-Esfahani [36] to incorporate corruption in a Cobb-Douglas production function framework, the standard equation denoting the sustainable growth model is estimated through equation below:

$$GDP = f(CI, GCF, GE, INT, LF, SE) \quad (4)$$

Where:

- GDP represents real GDP per capita (constant 2015 US\$),
- CI represents THE corruption index,
- GCF represents gross capital formation (constant 2015 US\$),
- GE represents the general government's final consumption expenditure (% of GDP),
- INT represents individuals using the internet (% of the population),
- LF represents the labour force (total),
- SE represents school enrollment (% gross),

The variables in the study will be converted into natural logarithm form in the econometrics model to prevent non-linear relationships and facilitate analysis of outcomes in percentage terms. This transformation also helps avoid inconsistent and insignificant results from using a linear approach and is a standard method for normalizing highly skewed variables. The equation for the log version is as follows:

$$\ln GDP_t = \alpha_{1t} + \beta_1 \ln CI_t + \beta_2 \ln GCF_t + \beta_3 \ln GE_t + \beta_4 \ln INT_t + \beta_5 \ln LF_t + \beta_6 \ln SE_t + \varepsilon_t \quad (5)$$

The ARDL model was chosen because it has several superiorities, one of which is that it may be used regardless of whether the time series variables are I(0), I(1), or frictionally integrated [37]. Endogeneity issues can also be prevented, and the ARDL approach's small sample features are more dependable than Johansen and Juselius' cointegration methodology. Pesaran et al. [37] ARDL introduced the bound test to determine the presence of a long-run relationship between variables using the following unrestricted error correction model (UECM):

$$\begin{aligned} \Delta \ln GDP_t = & \beta_0 + \theta_0 \ln GDP_{t-1} + \theta_1 \ln CI_{t-1} + \theta_2 \ln GCF_{t-1} + \theta_3 \ln GE_{t-1} + \theta_4 \ln INT_{t-1} + \theta_5 \ln LF_{t-1} + \theta_6 \ln SE_{t-1} + \\ & \sum_{i=1}^a \beta_i \Delta \ln GDP_{t-i} + \sum_{i=0}^b \gamma_i \Delta \ln CI_{t-i} + \sum_{i=0}^c \delta_i \Delta \ln GCF_{t-i} + \sum_{i=0}^d \lambda_i \Delta \ln GE_{t-i} + \sum_{i=0}^e \vartheta_i \Delta \ln INT_{t-i} + \sum_{i=0}^f \psi_i \Delta \ln LF_{t-i} \\ & + \sum_{i=0}^g \tau_i \Delta \ln SE_{t-i} + v_t \dots (6) \end{aligned}$$

The existence of cointegration will be tested by comparing the calculated value of F-statistics with the critical value tabular by Pesaran et al. [37] and Narayan [38]. For Pesaran et al. [34], the critical value is applied for a large sample size, while the Narayan [38] crucial value is used for a small sample size from 30 to 80. The ARDL error correction representation will become significantly more efficient if the F-statistics (Wald test) demonstrates that there is a single long-run relationship and the sample data size is modest ($n \leq 30$) or finite [36]. To estimate the long run relationship, the hypothesis is written as; $H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0$ (no cointegration) $H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq 0$ (cointegration exists). If the calculated F-statistics exceed the upper bound critical value I (1), it shows evidence of the long-run relationship's existence, thus rejecting the null hypothesis. While if the F-statistics is smaller than the lower bound I (0), it shows no presence of a long-run relationship, thus failing to reject the null hypothesis. However, the results are too inconclusive if the F-statistics lie between the upper and lower bound.

If the result shows the presence of long-run cointegration relationship between variables, then long-run cointegration model can be estimate as follows:

$$LNGDP_t = \alpha_0 + \alpha_1 LNGDP_{t-1} + \alpha_2 LNLCI_{t-1} + \alpha_3 LNGCF_{t-1} + \alpha_4 LNGE_{t-1} + \alpha_5 LNINT_{t-1} + \alpha_6 LNLFF_{t-1} + \alpha_7 LNSE_{t-1} + \nu_t \dots (7)$$

After the long run coefficient was estimated, to find short run coefficient and the speed of adjustment that drive the variables back to the long run equilibrium, Error Correction Model was regressed as below:

$$\Delta LNGDP_t = \beta_0 + \theta ECT_{t-1} + \sum_{i=1}^a \beta_i \Delta LNGDP_{t-i} + \sum_{i=0}^b \gamma_i \Delta LNLCI_{t-i} + \sum_{i=0}^c \delta_i \Delta LNGCF_{t-i} + \sum_{i=0}^d \lambda_i \Delta LNGE_{t-i} + \sum_{i=0}^e \vartheta_i \Delta LNINT_{t-i} + \sum_{i=0}^f \psi_i \Delta LNLFF_{t-i} + \sum_{i=0}^g \tau_i \Delta LNSE_{t-i} + \varpi_t \dots (8)$$

Where k (a, b, c, d, e, f, g) is the lag based on the selected lag length in the long-run equation and ect_t is the error correction term. ECT is speed of adjustment that drive the variables back to the long run equilibrium. θ also should be negative and significant.

ANALYSIS

To meet the bound test assumption, the ARDL model first examines the unit root test to guarantee that each variable is either I (0) or I (1). Then, the series stationarity is confirmed using Augmented Dickey-Fuller (ADF) test statistics proposed by Dickey and Fuller [37] and Phillips-Perron (PP) test by Phillips and Perron [41]. The series is not stationary when there is a unit root in the unit circle. At levels or after the initial differences, the series must be stationary. That is, the series should be integrated in order 0 or 1. The null hypothesis to be tested is: H_0 = The series has unit root (non-stationary) H_1 = The series has no unit root (stationary) In this test, the decision criterion is to reject the null hypothesis if the probability value (p-value) is below a significance level of 10%.

Conversely, if the p-value exceeds the significance level, the null hypothesis will not be rejected. The primary objective of this test is to reject the null hypothesis, indicating that the series is stationary. The results of the unit root test are presented in Table 2.

Table 2: Results of ADF and PP unit root tests

Country	Stage	Variable	ADF unit root test		PP unit root test	
			Intercept	Trend and Intercept	Intercept	Trend and Intercept
Malaysia	Level	LGDP	-2.104	-2.862	-2.126	-2.739
		LCI	-1.868	-1.108	-1.718	-1.260
		LGCF	-1.243	-2.472	-1.632	-2.566
		LGE	-2.228	-5.063***	-2.242	-2.826
		LINT	-11.876***	-8.067***	-29.539***	-19.728***
		LLF	-1.231	-1.275	-1.285	-1.543
		LSE	-1.694	-1.952	-1.642	-2.024
		LGDP	-4.912***	-5.208***	-4.950***	-5.251***
	First Difference	LCI	-5.598***	-5.894***	-5.595***	-5.890***

		LGCF	-5.472***	-5.350***	-5.916***	-5.689***
		LGE	-3.870***	-3.769**	-5.813***	-5.776***
		LINT	-6.058***	-6.483***	-6.197***	-6.255***
		LLF	-4.733***	-4.763***	-4.714***	-4.741***
		LSE	-5.422***	-5.503***	-5.427***	-5.805***

Note: t-statistics are in parentheses. *** shows significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 2 displays the t-statistic of all variables (GDP, CI, GCF, GE, INT, LF, and SE) in both level and first difference forms with trend and intercept. The ADF and PP tests examined unit roots in the time series data. The results indicate that most variables are significant at the first difference, while only GE and INT are significant at both level and first difference. GE is significant only at the level on the ADF test and at the trend and intercepts with a value at a 1% significance level. INT also shows a significant value at the 1% level of significance at the level. These results suggest that the null hypothesis of no unit root or stationarity at the level is rejected. The p-values for GDP, CI, GCF, GE, INT, LF, and SE show significance only at the 1% and 5% significance levels, rejecting the null hypothesis of no unit root or stationarity at first difference. Thus, the study concludes that it has a mixed stationary result for the unit root test. The initial step in the ARDL approach involves assessing whether a long-run relationship exists among the variables. In the bound test approach of cointegration, the first step is to estimate the ARDL model using an appropriate lag-length selection criterion. This study used the Schwarz criterion (SIC) as a guide, and a maximum lag order of 2 was chosen for the conditional ARDL model. After that, the Wald test (bound test) was conducted to examine the joint significance of the coefficients. The Wald test was implemented by imposing constraints on the estimated long-run coefficients of gross domestic product (GDP), corruption index (CI), gross capital formation (GCF), government expenditure (GE), individuals using the Internet (INT), the labour force (LF) and school enrolment (SE). Table 3 provides a summary of the results of the bound test.

Table 3: Results of ARDL cointegration

Country	Maximum lag	Lag order (p, q, r, s, t, u)	F-statistic	Result
Malaysia	(2, 2)	(1, 2, 2, 0, 0, 0)	29.740	Long run exists
Critical values for F – statistics [#]			Lower [I(0)]	Upper [I(1)]
		1%	2.88	3.99
		5%	2.27	3.28
		10%	1.99	2.94

*Denotes rejection of the null hypothesis of no cointegration at a 10% significance level. ** denotes rejection of the null hypothesis of no cointegration at a 5% significance level. *** denotes rejection of the null hypothesis of no cointegration at a 1% significance level. [#]The critical values are obtained from Pesaran et al. (2001) based on Case III: Unrestricted intercept and no trend.

The F-statistics value, as shown in Table 3, is 29.740. This indicates that the null hypothesis of no cointegration must be rejected, given that the F-statistics values surpass the upper bound critical value as stated by Pesaran et al. [37] at least at a 10% significance level. Consequently, based on the interpretation from ARDL Bound Test, it can be inferred that there is a cointegration among the series being examined. Furthermore, the F-statistics values for

Malaysia demonstrate a long-run relationship between variables, thereby rejecting the null hypothesis of no cointegration.

Table 4 of a restricted error correction model (ECM) can be conducted to determine the speed at which the variables adjust back to the long-run equilibrium. The short-run adjustment is considered significant when the coefficient displays a negative sign. Therefore, the following table presents the ECM results for the underlying ARDL model for Malaysia. Table 4 shows the short-run relationship between the variables through the error correction model (ECM). As anticipated, the coefficient of the ECM is in the correct sign, and only CI and LF have a positive short-run coefficient. ECM coefficient is negatively significant at a 1% significance level, implying that the shock disequilibrium from the previous year will adjust to the long-run equilibrium at a high convergence speed, namely 11.81% per year. The R^2 value and adjusted R^2 values were 79.059% and 71.730%, respectively, indicating a good fit for the model. Long-run coefficients for Malaysia are present in Table 4, including the sign of each variable and the order of ARDLs. The results indicate that the null hypothesis was rejected for all variables, namely gross domestic product (GDP), corruption index (CI), gross capital formation (GCF), government expenditure (GE), individuals using the Internet (INT), the labour force (LF) and school enrolment (SE). GCF, GE and SE were found to have negative and significant coefficients at a 1% significance level, while INT were found to have negative and significant coefficient at 10% significance level.

The results for a long-run elasticities demonstrate that a 1% increase in corruption index (CI), government expenditure (GE) and school enrolment (SE) will correspond to a decrease in the gross domestic product (GDP) by 0.369%, 0.331%, and 0.325%, respectively. In contrast, a 1% increase in gross capital formation (GCF), individuals using the Internet (INT) and labour force (LF) will lead to a long-run increase in the gross domestic product (GDP) by 0.230%, 0.001% and 1.216% respectively.

Table 4: Estimation of short-run and long-run elasticities

Country/ARDL	Malaysia
	(1, 2, 2, 0, 0, 0, 0)
	Short-run elasticities
ΔLCI_{-1}	0.268***
	(0.081)
	[3.286]
$\Delta LGCF_{-1}$	-0.156***
	(0.036)
	[-4.278]
ΔLGE	-0.395***
	(0.070)
	[-5.609]
$\Delta LINT$	-0.009*
	(0.011)
	[-0.859]
ΔLLF	2.019***
	(0.404)
	[4.996]

Δ LSE	-0.651***
	(0.114)
	[-5.694]
Long-run elasticities	
LCI	-0.369***
	(0.096)
	[-3.823]
LGCF	0.230***
	(0.053)
	[4.306]
LGE	-0.331***
	(0.058)
	[-5.650]
LINT	0.001
	(0.007)
	[0.202]
LLF	1.216***
	(0.103)
	[11.836]
LSE	-0.325***
	(0.109)
	[-2.979]
C	3.226
	(0.612)
	[5.272]
ECT_{t-1}	-1.181***
	(0.221)
	[-5.339]

Notes: Standard error in () and t-statistic in []. *** show significance at 1% level, ** significance at 5% level and * show significance at 10% level.

After identifying the long-run and short-run relationships between the variables, the next step is to conduct diagnostic tests, mainly the serial correlation LM test, normality test and heteroscedasticity test, to ensure that the study does not suffer from any diagnostic issues. Table 5 presents the results of the diagnostic tests.

Table 5: Results of diagnostic checking

Country	Serial correlation	Normality	Heteroscedasticity
	$\chi^2(1)$	$\chi^2(2)$	$\chi^2(1)$
	[P-value]	[P-value]	[P-value]
Malaysia	1.957	0.405	1.213
	[0.178]	[0.817]	[0.353] lag 2 1.361 {0.272} lag 1

The number in brackets [] are P values.

Table 5 shows the diagnostic testing performed in this study. Based on the results, the null hypothesis for the underlying ARDL of Malaysia could not be rejected. The p-value of the LM test for serial correlation, Jarque Bera normality test and Heteroscedasticity Breush Pagan Godfrey test yielded a P-value of 0.178, 0.817 and 0.353, respectively. Therefore, this study must not reject the null hypothesis of no autocorrelation, normality and heteroscedasticity issue.

For the long-run stability test, CUSUM Test and CUSUM Square Test also were performed to ensure the stability of the model. To determine if a model is stable, it is necessary to analyze a plot displaying its performance over time. This plot typically includes a blue line representing the model's performance and a set of critical bounds indicated by a dotted red line. The necessary bounds are based on a 5% significance level. Therefore, if the blue line falls within the critical bounds, the model is considered stable, as shown in Figure 2. On the other hand, if the blue line falls outside of the essential bounds, it may indicate that the model's performance is inconsistent or unpredictable.

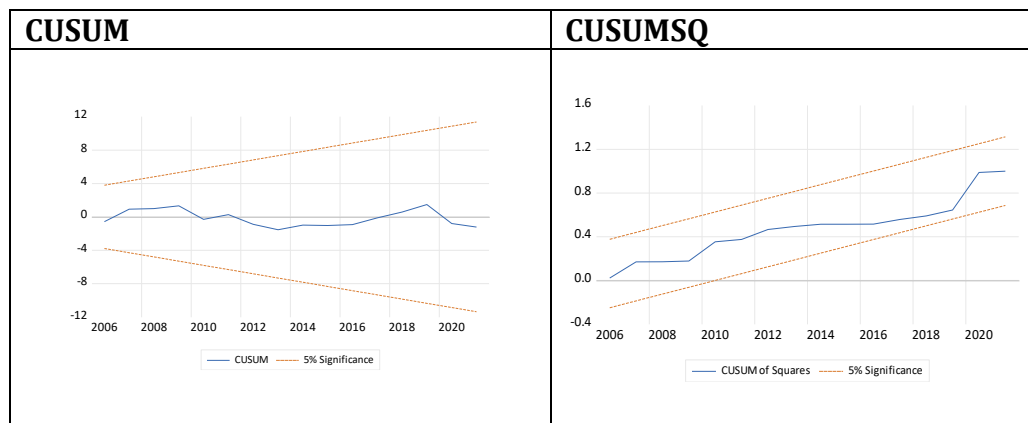


Figure 2: CUSUM and CUSUMSQ stability tests

CONCLUSIONS AND POLICY RECOMMENDATIONS

The first objective is the existence of the long-run relationship between the dependent variable and independent variables. This study has discovered a long-run relationship between the dependent and independent variables, indicating cointegration among the considered series. As per this finding, it can be concluded that there is a connection between the corruption index (CI) and economic growth in the long run. Thus, this study has fulfilled the first objective by demonstrating that the results can explain this long-run relationship. Additionally, the findings align with the Solow [20] growth theory that all variables have a long-run relationship.

The second objective is to determine the long-run impact of the Corruption Index (CI), Gross Capital Formation (GCF), General Government Final Consumption Expenditure (GE), Individuals Using the Internet (INT), Labor Force (LF), School Enrollment (SE) on economic growth (GDP) in Malaysia. The result shows a negative significant correlation between Malaysia's gross domestic product and the corruption index. The results demonstrate that a 1% increase in the corruption index (CI) will correspond to a decrease in the gross domestic product (GDP) by 0.369%. It is important to note that the corruption index used in this study, provided by the International Country Risk Guide (ICRG), is scored on a scale of 0 to 6, with 0

indicating the highest level of corruption and 6 indicating the lowest level. As a result, the negative association discovered between the corruption index and economic growth implies that as the level of corruption increases in Malaysia, the country's economic growth improves. Statistically, this finding provides evidence for the "greasing the wheel" theory. The economists who believe that corruption can contribute positively to economic growth and act as a lubricant to the wheels of commerce are known as the "greasers" [39]. This positive association develops when there is too much bureaucracy and inefficiency, which stifles the growth of new enterprises. Because of the distortions generated by the failure of governmental institutions, corruption is considered the second-best remedy. In other words, when economic actors pay bribes to avoid bureaucracy, corruption may boost economic growth. Leff [40] and Huntington [41] were among the early scholars who argued that there could be a positive correlation between systematic corruption and strong economic performance.

Furthermore, in this regard, they suggest that corruption may allow investors to circumvent bureaucratic procedures, thereby minimizing the detrimental effects of red tape. In addition to the previous scholars, Lui [42], Beck and Maher [43], and Lien [44] provided further arguments that corruption could lead to efficient time allocation and ensure that projects are given to the most capable firms who are likely to benefit the most from paying bribes. An additional instance of corruption serving as a grease for economic growth is evident in what is known as 'the Asian paradox.' Despite being perceived as corrupt, Asian countries have been experiencing rapid growth. Rock and Heidi [45] coined the Asian paradox' to describe this phenomenon of high corruption and high growth coexisting in Asian nations. Studies by Cabaravdic and Nilsson [39], as well as Akkoç and Durusu-Ciftci [31], have provided support for the idea that corruption can effectively "grease" the wheels of commerce and contribute to sustained economic growth. The analysis revealed that GE and SE exhibited negative and significant coefficients at a 1% significance level, while INT had a positive and insignificant coefficient.

In contrast, GCF and LF had a positive and significant coefficient at a 1% significance level. Specifically, the results indicate that a 1% rise in GE and SE corresponded to a 0.331% and 0.325% decrease in GDP, respectively. Conversely, a 1% increase in GCF, INT, and LF was found to lead to a long-run increase in GDP by 0.230%, 0.001%, and 1.216%, respectively. These results suggest that variables such as GCF, INT, and LF positively impacted economic growth in the long run compared to GE and SE.

The third objective of this study aims to investigate the short-run impact of the Corruption Index (CI), Gross Capital Formation (GCF), General Government Final Consumption Expenditure (GE), Individuals Using the Internet (INT), Labor Force (LF), and School Enrollment (SE) on the economic growth of Malaysia. To achieve this objective, a restricted error correction model (ECM) was used to analyze the data and determine the speed of adjustment of the variables back to the long-run equilibrium. The study's results showed that the speed of adjustment for the short run was 77.4%, indicating the convergence rate towards the long-run equilibrium. This suggests that the variables under consideration significantly impact economic growth in Malaysia. Furthermore, the study's findings reveal the importance of these variables in determining the country's economic growth in the short term. Overall, this study sheds light on the factors that impact economic growth in Malaysia and provides insights into the dynamics of the country's economy.

A government shouldn't promote corruption to foster economic growth, as it can harm society by eroding trust in institutions, exacerbating income inequality, and creating unfair advantages for corrupt individuals. Instead, governments should focus on implementing policies that enhance transparency, accountability, and the rule of law to curb corruption and create a level playing field for businesses and individuals. Such policies may include strengthening anti-corruption laws, improving regulatory oversight, promoting transparency in public procurement and budgeting processes, fostering civic engagement, and investing in education and training programs to promote ethical behaviour and integrity. In addition, governments can address the root causes of corruption by reducing bureaucratic red tape, streamlining regulatory processes, improving access to legal services, and promoting economic growth and job creation fairly and inclusively. By promoting good governance and addressing the underlying drivers of corruption, governments can pave the way for a more stable, prosperous, and sustainable future for their citizens.

Governments can take various measures to decrease bureaucracy and prevent corruption as a "greaser". These include simplifying regulations and administrative procedures, adopting e-government solutions to automate processes and minimize human interaction, creating unambiguous guidelines for public officials and employees, and establishing independent oversight mechanisms to monitor and investigate corruption cases. Moreover, promoting transparency and accountability in decision-making and providing public access to information can also help reduce corruption. Finally, it is crucial to provide training and support to public officials to enhance their skills and knowledge of ethical behaviour and integrity and encourage public engagement in policymaking. By implementing these measures, governments can develop a more efficient, effective, and responsible public administration less vulnerable to corruption.

Therefore, the Government of Malaysia should implement many anti-corruption measures and strategies that combine preventive and enforcement approaches. The Malaysian Anti-Corruption Commission (MACC) has undergone significant reorganization, increasing its capacity and powers. Despite the extensive efforts to combat corruption in Malaysia, there is limited evidence to suggest that the situation has improved. Instead, recent evidence shows that the Corruption Index and Corruption Perceptions Index have remained stagnant, and there has been no discernible improvement. This study proposes to place the Malaysian Anti-Corruption Commission (MACC) under Parliament. This move aims to enhance the independence and transparency of the MACC's check and balance process. If implemented, the appointment of the MACC Chief Commissioner would become the prerogative of Parliament rather than requiring the consent of the Yang di-Pertuan Agong on the Prime Minister's advice.

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