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Long-Run Determinants of Inflation in Malaysia and Indonesia: Does Geopolitical risk matter?

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ABSTRACT

This study attempts to investigate the determinants of inflation in Malaysia and Indonesia in the long run. By using macroeconomic variables that theoretically matter to manage inflation such as money supply and exchange rate, this study also includes geopolitical risk index as proxy of uncertainty to be investigated further as another determinant that may cause the increasing of inflation rate in Malaysia and Indonesia. The data covers the period 2014:M11 to 2023:M8. Autoregressive distributed lag (ARDL) approach is employed to determine the long-run relationship. The main findings in this study demonstrate that the money supply and geopolitical risk are among the determinants of inflation in Malaysia in the long run. Meanwhile contrary to that, only money supply determines inflation in Indonesia. The finding indicates that money supply and geopolitical risk matter to the inflation management. Hence, this study suggests that monetary authorities must take an active role towards money supply and geopolitical risk issue.

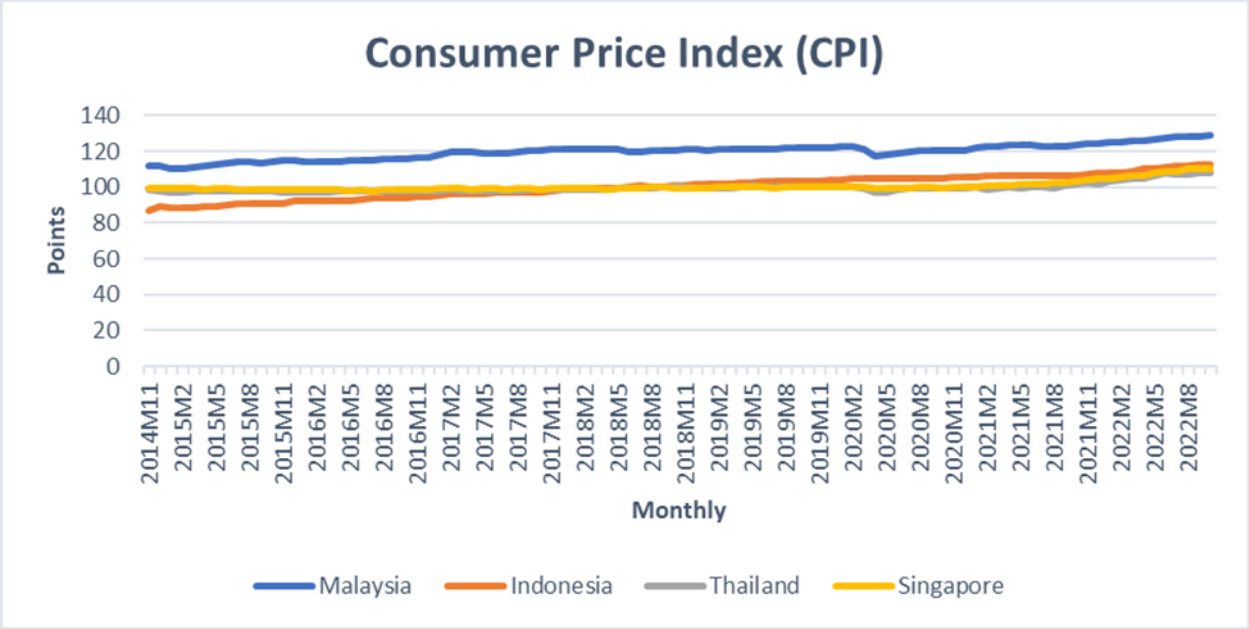
Keywords: Inflation, Money Supply, Exchange rate, Geopolitical risk

1. Introduction

One of the great economists who won the Nobel Prize in economics in 1976, Milton Friedman wrote that, “Inflation is always and everywhere a monetary phenomenon”. Inflation is a persistent problem in every country that affects policymakers' ability to maintain low living costs, rapid economic growth, and a healthy economy (Maryam, Idris & Nura, 2014). Inflation is an economic phenomenon characterised by an increase in the price of a basket of goods and services over time. Malaysia's inflation indicator is using the Consumer Price Index (CPI). According to DOSM (2022), The Consumer Price Index (CPI) measures the percentage change through time in the cost of purchasing a constant “basket” of goods and services representing the average pattern of purchases made by a particular population group in a specified time. CPI is calculated based on the international standard and procedures; known as the Laspeyres chain index method. The Laspeyres price index is an index formula used in price statistics for measuring the development of the basket of goods and services consumed in the base period. As the CPI reflects average prices in the economy, it provides a good measure of the change in the overall price level of goods and services in the economy.

Bank Negara Malaysia (BNM) governor, Tan Sri Nor Shamsiah Mohd Yunus stated that the most relevant influence on CPI in Malaysia is the exchange rate, led by crude oil prices, foreign debt, and indirect tax per capita (Yusof et.al, 2021). Throughout the past few years, it can be said that Malaysia’s inflation is caused by many factors either internal or external economic factors. Generally, there are two types of inflation; 1) demand pull inflation, and 2) cost push inflation. In terms of demand-pull inflation, the main impact comes from the demand side that factors by increase in money supply, government spending and exports. For the cost push inflation, the main comes from supply side such as increase in price of raw materials and increase in wage rate (Islam et.al, 2017). There are some debates about the topic regarding inflation among economists, policy makers and monetary authorities. One of the study cases that related to the cost of inflation in Malaysia was done by Hamid & Masih (2017). They revealed that high inflation brings higher interest rates that lead to

stronger currency. However, when the commodities want to be exported (rubber as a study case), the production is falling due to the increasing price and reduction of the demands.



Source: Eikon DATASTREAM

Figure 1: Malaysia, Indonesia, Thailand, and Singapore consumer price index (CPI) points trend (2014:11-2022:10)

Based on figure 1, there are some gaps between Malaysia with Indonesia, Thailand, and Singapore CPI trends. Malaysia has the highest CPI among these countries. Observing Malaysia's inflation CPI trend and the underlying economic reasoning discovered the internal and external factors that influence the inflation in Malaysia hence will be interesting. During 2014:M11 until 2020:M2, the inflation CPI trend increased little by little at that time. One of the studies show that oil-price rationalization of subsidy reform as the factor of inflation increase in Malaysia (Lily et.al, 2019). In the mid-2010, the relationship between Malaysia's inflation and oil prices became more closely linked because of petrol price mechanism reforms. Higher oil prices led to higher inflation. Furthermore, during that time, it also led to food price inflation after effecting the subsidy reform. When crude oil increases, it pushes food price hikes and generates cost-push inflation in the food market. The transition of Malaysia economics development on agriculture and commodities based to industrial based in 2008 (Sundaram, 2014; Ibrahim, 2015) led to the crisis of food supply for a long term and eroded the low and middle -income financial well-being.

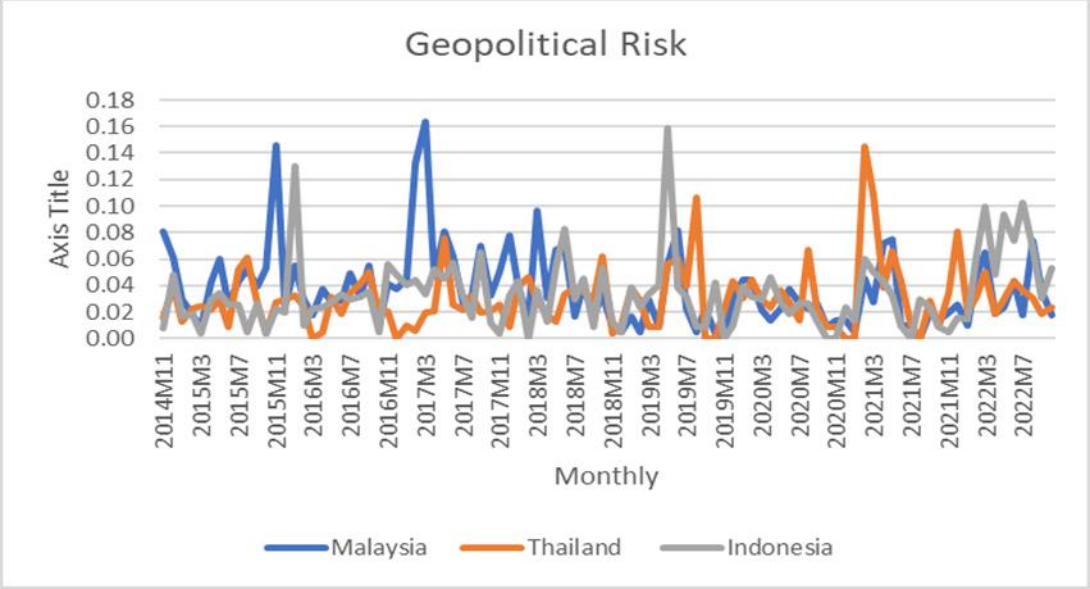
On the other hand, there are also unique precedence where during the pandemic crisis outbreak, only Indonesia has consistently increased their CPI. The plausible reason to explain this incident is that during the pandemic, numerous policies connected to large-scale social restrictions produced a drop in aggregate demand and supply relative to when activities were routine. This is because, society income was reduced because of the sluggish economic conditions caused by limited economic activity (Wicaksono and Uluwiyah, 2020). As a result, customers will often tolerate non-urgent requirements because their income is diminished.

Nonetheless, panic buying also take role in the increasing of CPI. This is because, society prompted by the concern of a dwindling market inventoryas well as a rise in demand in May due to the Ramadan festival, inflation remained consistently high. Compared with Malaysia, Malaysia has faced muted inflationary pressures since the outbreak of the pandemic, owing partly to low global crude oil prices, as have other countries (Bank Negara Malaysia, 2020). Since then, the IMF has revised its inflation forecast for 2020 downward, citing lower commodity prices and reduced economic activity as important drivers.

Furthermore, the behaviour of consumers at that time also shifted in patterns of consumption drop in expenditure for categories such as transport, restaurants, and hotels, as well as recreation and clothing, amid movement restrictions and mandatory closures of selected sectors. In the Malaysian context, the government

also allowed EPF withdrawal and moratorium to ease the burden of people at that time. Anyhow, on 2021 and onwards, the inflation CPI started to rise again due to the higher prices of chicken, eggs, cooking oils, and fish & seafood in 2021 as compared to the preceding year (DOSM, 2022) and disruption of the supply chain of wheat due conflict tension between Ukraine and Russia.

Therefore, this study includes the impact of geopolitical risk to the inflation through the consumer price index (CPI). This proxy is new insight to analyse on macroeconomic perspectives (Hoque et.al, 2021). Further, one of the questions that lead us to study is: Do geopolitical risk raise or lower inflation? According to Caldara (2023), on the "supply" side, wars and potential consequences destroy human and physical capital, divert resources to less efficient uses, hinder global supply chains, and deflect international trade and capital flows. Uncertainty about the range of results of detrimental geopolitical events may affect activity by halting firm investment and hiring, weakening consumer confidence, and tightening economic position. Increases in government expenditures, such as debt-financed military spending, that can enhance demand, may offset some of the negative effects on demand. The overall inflationary effects are determined by which of these forces is dominant. It is believed that money supply, exchange rates and global geopolitical risk from 2014:M11 until 2022:M10 can influence inflation CPI in Malaysia.



Sources: Uncertainty.com

Figure 2: Geopolitical Risks between Malaysia, Thailand & Indonesia (2014:M11-2022:M10)

Based on figure 2, the peak of geopolitical risks in Malaysia during 2015:M11 and 2017:M3. But even so, the geopolitical risk of Malaysia may not be sustainable. For example, the military involvement in Thailand in 2014 and the previous coup attempt in Turkey in 2016 both increased domestic political risk in the short term; thereby, the events' own and spillover effects may only last 1-3 months (Balli et al., 2019).

Thereby, the purpose of this research is to investigate the long-run relationship between consumer price index (CPI) and macroeconomic variables including geopolitical risk index as proxy to uncertainty. To accomplish the research objectives stated as above, this research study attempts to answer the research questions below:

1. How do significant macroeconomic variables affect inflation in Malaysia and Indonesia?

2. What is the impact of the geopolitical risk index towards inflation in Malaysia and Indonesia?

This research paper is important because it will help to determine the factors that influence inflation particularly in Malaysia and Indonesia. The main contribution of this study differentiated from other studies of inflation in Malaysia and Indonesia as geopolitical risk index is used as proxy of uncertainty variables. Further, this study also attempts to differentiate with the timetable as the period that we provide here is from 2014:M11 until 2023:M08. The remaining sections of this paper are organised as follows: Section 2 discusses

the literature review theoretically and empirically; Section 3 explains the data and methodology; Section 4 explains the findings; and the last section is conclusion and discussion.

2. Literature Review

2.1. Inflation

There are two main types of inflation which are demand pull inflation and cost push inflation. Demand pull inflation is a type of inflation, where the main impact comes from demand side. Factors such as increase in money supply, increase in government expenses, increase in exports may lead to the constant increase in demand pull inflation. Meanwhile, cost push inflation is a type of inflation, where the main impact comes from supply side. Inflation is when the price of the most goods and services continues rising upward (Tolasa, 2022). This condition may lead the cost of living to decline since we must spend a lot of money to receive the same amount of products and services that we previously purchased. It is well known that Malaysia is one of the countries that succeed to overcomes well the inflation rate during financial crisis. At the same time, Jaksic (2022) identified that, economically inflation affect many factors and lead to economic problems which can drop the economy growth of a particular country. Inflation is a scenario that causes the price level to rise steadily and without restriction in a certain country. It is a monetary phenomenon that occurs always and everywhere.

There are many theories formulated on the macroeconomic problem. Some of them are extension of its preceding school of thoughts' central ideas on causes of inflation while other theories attempt to hypothesis the issue differently. These theories include Quantity Theory of Money (QTM), the reformulated theory of money (Keynes's version), monetarism theory and structuralism theory. According to the QTM, inflation is occurred because of the central bankers' repudiation to control money supply. Friedman (1986), who asserted that a discrepancy in price mostly driven by monetary phenomenon. Monetarism theory stated that expansion of money supply beyond the growth of real output causes inflation (Friedman and Schwartz, 1965). Price is dominantly (not exclusively) determined by money supply both in short run and long run, but money supply only affects output in short run. Hence, central bank should pursue growth rate of money to optimize economic growth which also maintain price growth fairly at safe level for both consumers and producers. According to the structuralism theory, inflation is attributed to structure of the developing countries' economy (Baumol, 1967). The industrial sector is more responsive to economic policies than agricultural sector.

2.2. Money Supply

Inflation and money supply have a positive relationship with each other (Al-Mutairi et al., 2020). The relationship between these both instruments depend on money demand and money supply. Increase in money supply will increase the money growth and at last it will increase the inflation rate in a particular country too. Alnefaee (2018) and Muktadir (2018) said that there is a positive relationship between money supply and inflation rate. Both claimed that this both variables have high correlation meaning that when money supply increase then the inflation rate also will increase. Furthermore, Bedada et al. (2020) also have a same viewpoint as about the positive relationship between money supply and inflation rate. They investigated determinants of inflationary experience in Ethiopia using Johansen Cointegration methodology and Vector Error Correction approach with two lag length, to examine long run and short run macroeconomic variables.

Prior to that, Nguyen (2015) investigates the effects of fiscal deficit and broad money supply M2 on inflation in Asian countries from 1985 to 2012, specifically Bangladesh, Cambodia, Indonesia, Malaysia, Pakistan, the Philippines, Sri Lanka, Thailand, and Vietnam. Using the Pooled Mean Group (PMG) estimation-based error correction model and the panel differenced GMM (General Method of Moment) Arellano-Bond estimator, the study also discovers that broad money supply M2 has significantly positive impact on inflation only in the method of PMG estimation. Moreover, Abate (2020) said that money supply and inflation rate have a direct or positive relationship only in the long term for Ethiopia. An increase in money supply in a money market will increase the demand for goods and services as well. Therefore, more amount of money chasing towards less amount of goods and services will results the problem of inflation in the long run. Meanwhile, Tolasa et al. (2022) said that money supply has a positive relationship only in the short run for Ethiopia during 1981 until 2020. On the contrary, Ellahi (2017) used ARDL tests and found money supply had a negative impact on inflation in Pakistan based on the observations between 1975 to 2015.

According to the quantity theory of money, under monetarist model, Friedman (1986) the father of monetarism and Nobel laureate in economics said that excess supply of money in an economy leads to domestic inflation. He also said that inflation is always and everywhere a monetary phenomenon and argued that the changes in overall price level are only brought about by the changes in monetary stock or money supply. This means that, when money supply increases by a certain percentage, it will affect the price level to be increase by the same percentage respectively. This theory also mentioned that inflation rate caused by the rise in money supply, but it is not followed by an increase of output in economy.

2.3. Exchange Rate

Tolasa et al. (2022) examined the Ethiopia's macroeconomic determinants of inflation for period the 1981–2020 using ARDL method. They conclude that real effective exchange rate is positive and significant determinants of inflation in the long run. This is supported by Loua et al. (2018), who's concluded that exchange rate positively and significantly affected inflation in Republic of Guinea. The Johansson's co-integration test result also shows the existence a long-run and short-run link between inflation and exchange rate. Abate (2020) also experiences the same way using Ethiopia annual data spanning over 1985 to 2018. The OLS econometric model showed that, both in long run and short run, real effective exchange rate is significant determinants of inflation. Meanwhile, Mohamed et al. (2021) using ARDL model discovered that the Nigerian inflation would have a long-run equilibrium relationship with exchange rate during 2005: Q1 to 2019: Q4. In contrast, Alnefaee (2018) reveal that inflation was negatively determined by the exchange rate in the long run by employed Johansen and Julius cointegration tests on Saudi Arabia for the period of 1987-2017. This result is supported by Muktadir (2018).

There is also a study on cross country analysis which done Aslanoglu et al. (2016) studied how inflation rates of an emerging panel data of 17 and 23 industrial economies (2002-2012) was affected by real effective exchange rate. Their results showed that the real effective exchange rate had a higher negative impact on inflation in the emerging economies than that of the industrialised economies. Money growth explained inflation in emerging economies but was insignificant for industrialised economies. Demand for currencies of industrialised economies prevented the link from money growth to inflation.

2.4. Geipolitical Risk Index

The relationship between inflation and geopolitical risk index is complex and not always direct. Inflation can sometimes be driven by geopolitical risk, with political tensions creating a sense of uncertainty and driving up the cost of doing business. On the other hand, rising inflation can also be a sign of a strong economy, which can sometimes reduce geopolitical risk. The two are not necessarily linked, but they can influence each other in certain circumstances. Caldara et al. (2023) utilizing long-run historical data for 43 nations, researchers discovered that geopolitical risks are associated with high inflation, reduced economic activity, an increase in military spending and public debt, and a decline in trade with the rest of the world. Greater geopolitical risks are also connected with more uncertain inflation and higher inflation upside risks. They confirm that global geopolitical risks lead to higher inflation, with the inflationary effects of higher commodity prices and currency depreciation more than offsetting the deflationary effects of lower consumer sentiment and tighter financial conditions. They do this by using a structural VAR model estimated on global data from the 1970s.

It can be concluded that there is no consensus on the determinant of inflation. Most of the previous literature only focused on studying the impact of macroeconomic indicators on inflation to enhance and support the views of inflation theories. The findings show that the countries studied are pronouncedly heterogeneous because each of the economies studied has its own set of country specific factors that differ from one another. In addition, few studies have investigated the effects of geopolitical risk on inflation rates. Thus, this paper should help Malaysia's policymakers gain a better understanding of the inflation dynamics.

3. Method

Following the principle of parsimony, we would like to keep our regression model as simple as possible. If we can explain the behaviour of consumer price index "substantially" with 2 or 3 explanatory variables and if our theory is not strong enough to suggest what other variables might be included, why introduce more variables? Let error term represent all other variables. Of course, we should not exclude relevant and important variables just to keep the regression model simple.

Thus, as guided by literature reviews in the past, the aim of this study was to investigate the dynamic causal relationship between consumer price index, money supply, real effective exchange rate and global geopolitics risk from the period of 2014: M11 to 2023: M8. A conceptual framework can be summarized in Figure 3.

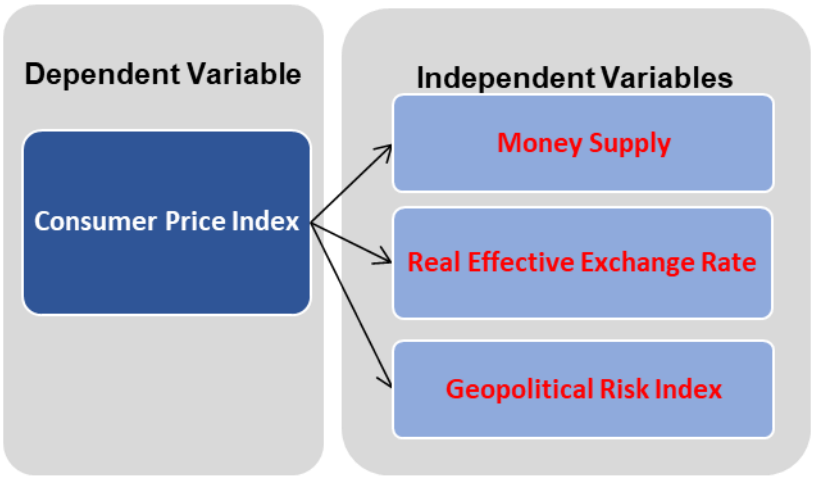


Figure 3: Conceptual Framework

An ARDL model was used in this study since it allows for the testing of a combination of level variables with different integration orders, such as I (0) or I (1), but not I (2) regressors. Changing the order, according to Pesaran, Shin, and Smith (1999), allows for simultaneous correction of the serial correlation and endogenous regressor problems.

The data of consumer price index were obtained from Department of Statistics Malaysia (DOSM). The data on broad money supply (M2) was obtained from Central Bank of Malaysia. The data of real effective exchange rate was obtained from EIKON DATASTREAM while the data of global geopolitics risk index was collected from the Economic Policy Uncertainty website. All data are expressed in natural logarithm form.

The estimation of the baseline models in this study are as follows:

$$\ln CPI_t = \alpha_0 + \alpha_1 LM2_t + \alpha_2 LREER_t + \alpha_3 LGPR_t + e_t$$

Where :

Table 1. Description of the variables

Variable	Meaning	Data Source
LCPI	Consumer Price Index	EIKON DATASTREAM
LM2	Money supply	EIKON DATASTREAM
LREER	Real Effective Exchange Rate	EIKON DATASTREAM
LGPR	Global Geopolitics Risk	UNCERTAINTY.COM
α	Coefficient	
e	Error term	

The consumer price index, which measures the price range of goods and services that domestic consumers purchase, has advantages over the GDP deflator and is used as a proxy for the inflation growth rate in the study. Because it only focuses on consumer goods, the CPI incorporates all imported goods and represents a portion of all goods and services produced domestically, in contrast to the GDP deflator, which excludes changes in the price of imported goods. The broad money supply (M2) is used because it represents the money supply including all the cash people have on hand plus all the money deposited in checking accounts, savings accounts, and other short-term saving. The real effective exchange rate used instead of exchange rate because it presents the weighted average of a country's currency in relation to an index or basket of other major currencies. For non-macroeconomic variables, we used the external variables which is global geopolitical risk

index from which represented the global risk. The global geopolitical risk index captures the paper-based scores on political uncertainty, war, and terrorist attacks. Higher value of GPR index indicates high geo-political uncertainties.

The null hypothesis of no cointegration is H_0: B_1 = …=B_5 = 0, and the alternative hypothesis that cointegration exists is H_1: at least one parameter not equal to zero, by the means of the F-test. Because there is a long-run relationship, the conditional autoregressive distributed lag model will be employed to calculate the long-run coefficient. Approximating a restricted ECM is the second step in the second stage of the bounds testing ARDL method. The magnitude of any divergence from long-run symmetry influences the time paths of cointegrated variables, which is a key aspect. After all, the movements of at least some of the variables must respond to the amount of disequilibrium if the system is to restore to long-run equilibrium. The following equation specifies the conditional ECM:

$$\Delta\, lnCPI_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta\, LCPI_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta\, LM2_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} \Delta\, EXR_{t-i} + \sum_{i=0}^{q3} \alpha_{5i} \Delta\, LGPR_{t-i} + \; vECT_{t-1} + \varepsilon_t$$

Where ECT stands for Error Correction Term, which denotes the speed with which a short-run shock is adjusted to a long-run equilibrium. To demonstrate that the variables were converted to the long-term equilibrium, it must be statistically significant and negative. The diagnostic test included serial correlation LM test, ARCH heteroscedasticity test and stability test and the probability fail to reject must exceed 0.05.

4. Result and Discussion

From table 2, it finds that all the variables are integrated at first difference I (1) except the real effective exchange rate and geopolitical risk index at I (0). Since the variables are integrated at I (1) there is probability of the spurious relationship.

Table 2. Unit root test

Malaysia					
Variables	Level		First Difference		Integration degree
	Constant	Constant & Trend	Constant	Constant & Trend	
ADF					
LCPI	-0.7293	-2.4022	-7.4443***	-7.4089***	I(1)
LM2	-0.4766	-2.3969	-11.0817***	-11.0225***	I(1)
LREER	-2.6971*	-2.4871	-9.1810***	-9.3134***	I(0)
LGPR	-4.3535***	-4.3554***	-13.1114***	-13.0478***	I(0)
PP					
LCPI	-0.3828	-1.9199	-7.0888***	-7.0414***	I(1)
LM2	-0.4831	-2.3651	-11.1908***	-11.1323***	I(1)
LREER	-2.8786*	-2.4871	-9.1691***	-9.2808***	I(0)
LGPR	-4.3095***	-4.3152***	-16.7754***	-16.6332***	I(0)
Indonesia					
Variables	Level		First Difference		Integration degree
	Constant	Constant & Trend	Constant	Constant & Trend	
ADF					
LCPI	-1.445344	-3.065108	-11.6493***	-11.5422***	I(1)
LM2	-0.465243	-2.705503	-14.6517***	-14.5860***	I(1)
LREER	-2.477444	-2.474431	-10.6339***	-10.5895***	I(1)
LGPR	-4.3535***	-4.3560***	-13.1117***	-13.0478***	I(0)
PP					
LCPI	-1.4673	-3.103854	-11.7076***	-11.5886***	I(1)
LM2	-0.764507	-3.700492**	-17.2462***	-17.0418***	I(0)
LREER	-3.23010**	-3.21880*	-13.9484***	-14.1768***	I(0)
LGPR	-4.3072***	-4.3140***	-16.7725***	-16.6300***	I(0)

Thus, the ARDL bound test cointegration is included in this research to prove there is no spurious relationship between the variables. A very close result is also found in the unit root test of Indonesia's data, except, contrary to Malaysia, money supply variable found to be integrated at level. Hence, both data indicate that there is a probability of spurious relationship between the variables and thus the bound test is also included in the Indonesia's data.

The result of bound test for Malaysia and Indonesia itself is available in the table 3. It finds that the value of F-statistics of Malaysia's data is (4.558), which is greater than upper bound I (1) at 5% significance level. Meanwhile the value of F-statistics of Indonesia's data is (4.785), which is also greater than upper bound I (1) at 5% significance level. This means that the data is co-integrated, and this implies that there is a connection between the variables in the long term.

Table 3. ARDL bound test cointegration.

Critical value bonds of the F-statistic: Intercept and no trend						
Malaysia						
	90% level		95% level		99% level	
F-Stat	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
(4.558)	2.72	3.77	3.23	4.35	4.29	5.61
Indonesia						
F-Stat	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
(4.785)	2.72	3.77	3.23	4.35	4.29	5.61

From Table 4, it finds that the money supply and geopolitical risk have a significant impact on the consumer price index in Malaysia. This means that a one percent increase in money supply will increase the inflation level which is represented by consumer price index by 0.258% holding the other variables constant. And for geopolitical risk, one percent increase in geopolitical risk will increase the consumer price index by 0.049% holding the other variables constant. Meanwhile, contrary to Malaysia, it finds that in Indonesia, only money supply that generates the rising of Inflation where other determinants such as exchange rate and geopolitical risk does not give rise to the inflation. With 1% significance level, it finds that every time money supply increases by one percent, it will stimulate the inflation level to 0.283%.

Table 4. ARDL long-run

Malaysia				
Variables	Coefficient	Std. Error	T-statistics	Prob-value
LM2	0.258752***	0.027770	9.317806	0.0000
LREER	0.073848	0.074241	0.994718	0.3225
LGPR	0.048525***	0.016969	2.859610	0.0053
Indonesia				
LM2	0.283003***	0.053292	5.310289	0.0000
LREER	0.206355	0.280620	0.732354	0.4641
LGPR	0.117008	0.098496	1.187947	0.2380

Since there is a cointegration (long-run) relationship, the error correction model is performed. This is intended to seek in what period the determinant variable could affect inflation. It finds that the error correction term (ECT) is a negative sign and highly significant which indicates convergence. From the result in table 5, we can conclude that the adjustment of the effect is taken place after 7.9 months in Malaysia while in Indonesia, the adjustment of money supply toward inflation is taken place after 30 months.

Table 5. The results of Error Correction Model

ECM_{t-1}	
Malaysia	
Coefficients	Probability
-0.125904	0.0000
Indonesia	
-0.032850	0.0000

For testing the serial correlation and heteroscedasticity of errors, Breusch Godfrey LM and ARCH test have been performed. The results of Table 6 confirmed that there is no longer serial correlation between errors and the errors of the model have constant variance because the P-value of both tests are more than 0.05, which we can't reject the null hypothesis of autocorrelation and heteroscedasticity.

Table 6. Serial Correlation and Heteroscedasticity tests

Serial Correlation LM Test	Heteroscedasticity test (ARCH)
Malaysia	
13.39843 (0.3408)	4.749402 (0.9658)
Indonesia	
0.474580 (0.8254)	2.306653 (0.0409)

To check the stability and the accuracy of the estimated model, we used the cumulative sum of the recursive residuals (CUSUM) and CUSUM of the squares. The results confirmed the model are stable within the period because the CUSUM and CUSUM of squares are within the 5% significance lines for both Malaysia and Indonesia.

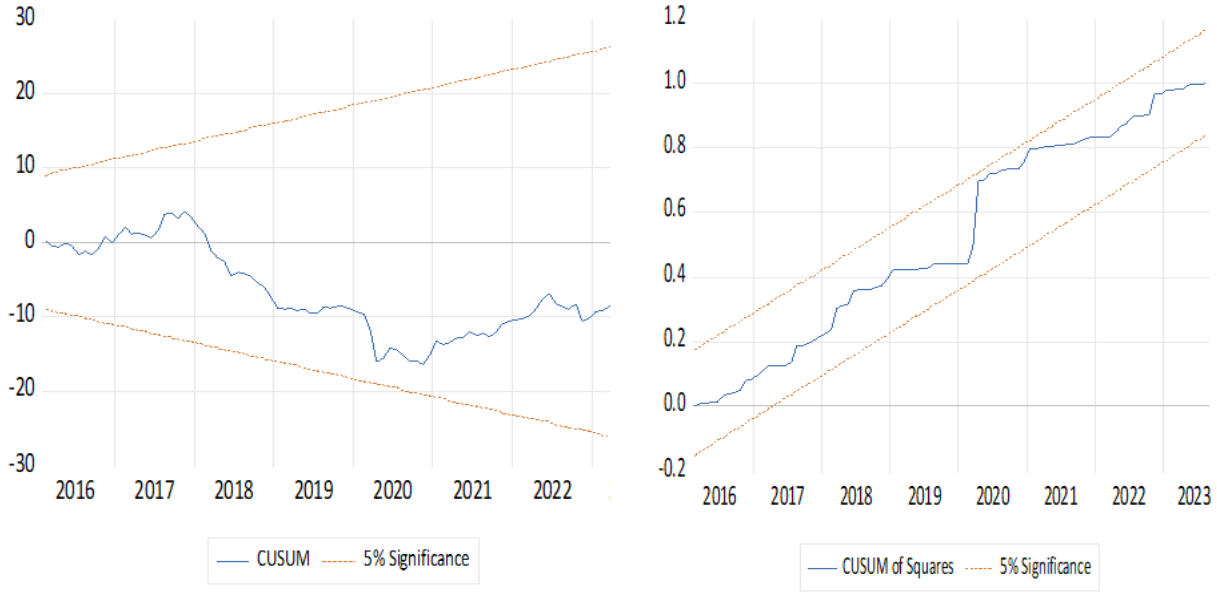


Figure 4. CUSUM and CUSUM Square Malaysia

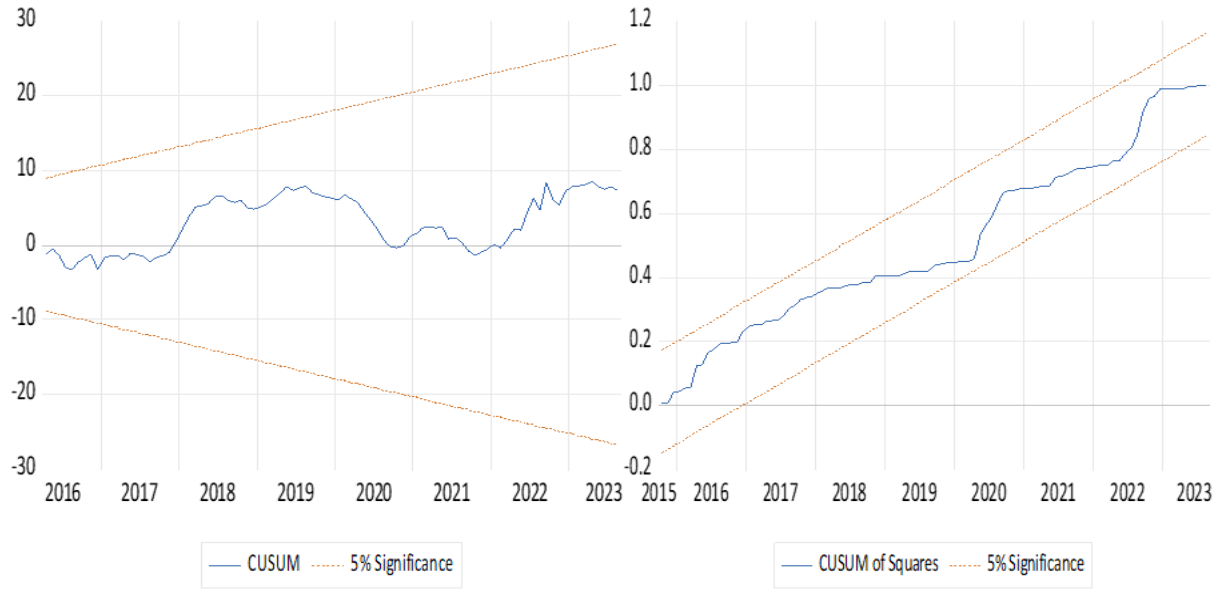


Figure 5: CUSUM and CUSUM Square Indonesia

The ARDL results find that money supply is detrimental to the increasing of inflation rate in both cases of Malaysia and Indonesia. This result is theoretically proving the impact of volatility of money through the quantity of money theory (Mankiw, 2016) where according to Ascarya (2017) and Akbar and Faizin (2019) there is a significant influence of money supply towards the increasing of inflation. Further, we may also know that the increase in money supply cannot be separated from the transactional of federal reserve banking ratio (Meera and Larbani, 2009; Ishaq and Mahjabeen, 2015; Laina, 2015), hence proper reserve banking ratio is also detrimental to manage the rate of inflation. Specifically, if we look at the ECM results, there is some difference phenomenon happening with the two countries. While ECM from Malaysia shows that the impact of exogen variable such as money supply and geopolitical risk happens in the 7th period, compared to Indonesia, this is much shorter, where it finds that the impact of money supply happens in the 30th period. This undoubtedly urge the monetary authorities, particularly in Malaysia to precariously handle the federal reserve banking ratio.

On the other hand, the ARDL result shows that there is no relationship between exchange rates and inflation in the long term in both countries, Malaysia, and Indonesia. This result is consistent with Ghosh (2007) who stated that exchange rate is having partial or incomplete impact toward the increasing of inflation rate. This is because the volatility of the exchange rate does not have significant impact on the firm's transaction, particularly those who are actively participating in international trade, because firms are able to sell to at different prices in different markets (Dornbusch, 1987; Krugman, 1987; Menon 1995).

Furthermore, in relation to the geopolitical risk, it finds that geopolitical risk has an impact on the inflation rate particularly in Malaysia. Meanwhile, geopolitical risk does not have an impact on inflation in Indonesia. This is undoubtedly raising several issues that need to be address further particularly toward the macro-prudential policy hence the market is more secure towards the fluctuation of price due to the geopolitical risk.

5. Conclusion

This paper investigated the determinants of inflation in Malaysia over the period of November 2014 until August 2023. We have applied ADF and PP unit root tests to test stationarity of the variables. Further, the ARDL bounds testing approach to cointegration was employed to investigate the long and short-run relationships between the variables. The findings reveal that in Malaysia inflation would have long run equilibrium relationship with money supply and global geopolitical risk index. However, there is no relationship between inflation rate and Real Effective Exchange Rate in the long run as it is insignificance at 1%, 5% and 10% level of significance. The coefficient of ECT is significant at the 1% level of significance. Approximately 13.3% of the disequilibrium of the previous month's shock is converged and adjusted back to the long run equilibrium. In terms of the speed of adjustment, it will take nearly 7.5 months to reach long run equilibrium in the model.

The implications of the findings for policy formulations are profound. To minimise the increase in cost of living, contractionary monetary policy is now a popular method of controlling inflation implemented by Bank Negara Malaysia. The primary objective of monetary policy in Malaysia is to maintain price stability while giving due regard to developments in the economy. Under the Central Bank of Malaysia Act 2009, the Monetary Policy Committee (MPC) of Bank Negara Malaysia is responsible for formulating monetary policy and the policies for the conduct of monetary policy operations. The MPC decides on the policy interest rate, the Overnight Policy Rate (OPR), to influence other interest rates in the economy. The goal of a contractionary policy is to reduce the money supply within an economy by increasing interest rates. Further, both Malaysia and Indonesia monetary authorities are also urged to seek another alternative policy, particularly related to the reserve banking ratio as it may stimulate the increasing of money supply. Some studies suggest that reserve banking ratio with backed of gold is one of the options that may be considered (Ahmad and Yaacob, 2014).

Although the Real Effective Exchange Rate does not affect inflation and it is statistically insignificant but as a recommendation and a strong argument, the Real Effective Exchange Rate variable is still relevant. The Real Effective Exchange Rate represents the relative price of domestic and imported goods for a small country like Malaysia and Indonesia. In this regard, the Government must continue to adopt a flexible exchange rate policy, where movements in the ringgit exchange rate are determined by the market. This flexibility in the exchange rate is critical to help the economy withstand external shocks by facilitating adjustments in Malaysia's international transactions. As a highly open economy that faces large cross-border capital flows, this flexibility

can occasionally lead to significant volatility in the ringgit exchange rate. This is particularly evident when investors reacted to major global and domestic developments, including uncertainties surrounding the COVID-19 pandemic.

In addressing the issue of the rising inflation that caused by the global geopolitical uncertainty risk such as wars, oil price shocks and financial panics etc, a macro-prudential policy approach must be multi-dimensional that would ensure Malaysia's business environment remains friendly and conducive. Macro-prudential authorities monitor the financial system and identify risks and vulnerabilities. Policies addressing such risks and vulnerabilities can be put in place and limit them from building up further and spreading across the financial system. So, in essence macro-prudential policies are there to promote financial stability. If we have a stable and sound financial system, we are better placed to withstand shocks and avoid the worst effects of financial crises and economic recession.

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