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Exploring the Drivers of Inflation in Malaysia: The Roles of Money Supply, Exchange Rate, and Economic Stability

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Abstract: *Inflation remains a critical concern for policymakers due to its impact on economic stability and purchasing power. Understanding the key drivers of inflation is essential for crafting effective monetary policies. This study investigates the relationship between key macroeconomic variables—money supply (MS), exchange rate (ER), unemployment (UN), and GDP per capita (GDP)—and inflation; it is measured through the consumer price index (CPI) in Malaysia. Using Ordinary Least Squares (OLS) regression analysis, the data range is from 1992 to 2022 yearly data. The findings reveal that MS positively affects CPI, suggesting that an increase in money supply drives inflation. At the same time, ER shows a negative effect, indicating that a more robust exchange rate mitigates inflationary pressures. However, Malaysia has no significant relationship between the UN, GDP, and inflation. The study faces limitations of other inflation determinants, such as fiscal policy, external shocks, and reliance on national-level data. Future research should incorporate additional variables, explore regional dynamics, and employ advanced econometric models to capture short-term and long-term relationships. These findings provide valuable insights for policymakers seeking to manage inflation and maintain sustainable economic growth.*

Keywords: Inflation, Money Supply, Exchange Rate, CPI, Time Series Analysis, Malaysian Economy

1. Introduction

The Consumer Price Index (CPI) is the most well-known indicator of inflation, and the two are closely related. Inflation is the increase in the prices of goods and services over time. It's measured as an annual growth rate (OECD, 2024). The CPI is a measure of inflation that tracks the price changes of a basket of goods and services that households typically buy. The CPI is calculated by comparing the current year's prices to a base year (BNM, 2024). A higher CPI indicates higher inflation, while a lower CPI indicates lower inflation or deflation. The CPI is a useful indicator for macroeconomic policies because it reflects the average price level of goods and services in the economy.

Inflation is a persistent macroeconomic challenge globally, influencing policymakers' efforts to maintain affordable living standards, foster economic growth, and promote economic stability (Hashim et al., 2014). Defined as the progressive rise in the general price level of goods and services over time, inflation can positively and negatively impact the economy (Liwan & Lau, 2007). In most economies, the Consumer Price Index (CPI) is the primary indicator to assess inflation by calculating the percentage change in the price of a typical

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"basket" of goods and services. The CPI reflects average price movements and informs policymakers' decisions in formulating macroeconomic policies (Department of Statistics Malaysia, 2022).

Inflation can be categorized into two primary types: demand-pull inflation and cost-push inflation. Demand-pull inflation occurs when the money supply, government spending, or export activity increases aggregate demand. In contrast, cost-push inflation arises from rising production costs, such as higher raw material prices and wages, which reduce supply (Islam et al., 2017). Inflation trends in Malaysia have been influenced by domestic and international factors, including labour market conditions, food supply constraints, and external events such as the Asian financial crisis and the COVID-19 pandemic. For instance, Malaysia's inflation peaked at 5.3% during the 1998 financial crisis, mainly due to a sharp depreciation of the ringgit and increased import prices (Khai, 2011). More recently, global supply chain disruptions resulting from the COVID-19 pandemic and the Russia-Ukraine conflict have added new inflationary pressures.

Malaysia's inflation rate reached its highest point in 2008 at 5.4% due to rising global food and commodity prices, while it dropped to a record low of -1.1% in 2020, reflecting the pandemic's deflationary effects (Bank Negara Malaysia, 2020). Despite temporary government interventions like the withdrawal of Employees Provident Fund (EPF) savings, inflationary pressures re-emerged in 2021, driven by the rising prices of necessities such as cooking oil, chicken, and eggs (DOSM, 2022). These developments underscore the importance of understanding inflation's underlying drivers to ensure sound macroeconomic policymaking.
Inflation is a critical economic indicator that affects the cost of living, consumption patterns, and overall economic well-being. Controlling inflation is essential for ensuring sustainable economic growth, maintaining purchasing power, and preventing social discontent arising from higher costs of living (Hashim et al., 2014). Moderate inflation can support economic activity by reducing borrowing costs, whereas excessive inflation creates uncertainties for consumers and businesses, leading to market disruptions. As a small, open economy, Malaysia is particularly vulnerable to external shocks, including global commodity price fluctuations and currency volatility. The exchange rate depreciation significantly impacts import prices and production costs, further complicating inflation control efforts (Monfared & Akin, 2017).

Given the increasing importance of inflation management, a deeper understanding of the factors contributing to inflation in Malaysia is crucial for policymakers, economists, and the education sector. By identifying the economic variables that drive inflation, policymakers can design effective strategies to stabilise the economy, align education and labour market demands, and minimize the adverse impact of external shocks. This research also holds significance in guiding the private sector and financial institutions in planning for inflationary trends, ensuring that policies are responsive to both domestic and international conditions.

Although several studies have explored inflation dynamics across ASEAN countries, limited research provides a comprehensive analysis of the factors influencing inflation specifically in Malaysia. Existing studies tend to focus on either supply-side or demand-side variables, often neglecting the complex interaction between key economic indicators such as money supply (MS), unemployment rate (UN), GDP per capita (GDP), and exchange rate (ER). Additionally, most prior research emphasizes the regional impact of inflation but does not address Malaysia's specific economic challenges, including currency fluctuations and global market disruptions.

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There is a vast of studies (Okere & Ndubuisi, 2017; Zayed et al., 2018; Mose & Kaboro, 2019; Waweru, 2021; and Kaboro & Mose, 2021) explore the phenomenon of inflation worldwide using macroeconomic determinants. This research also contributes to the existing literature by offering empirical insights into the determinants of inflation within the Malaysian context while providing practical recommendations for policymakers, business leaders, and academic researchers. By addressing the interaction between multiple economic factors, the findings can inform macroeconomic policies and strategic planning to mitigate inflationary risks and promote sustainable growth.

This study aims to bridge this research gap by investigating the relationship between key macroeconomic variables – money supply (MS), exchange rate (ER), unemployment (UN), and GDP per capita (GDP) and inflation; it is measured through the consumer price index (CPI), in Malaysia, offering a nuanced understanding of the factors that drive inflation. For example, while many studies acknowledge the role of money supply and exchange rates in inflation, the interaction between these variables and other indicators, such as unemployment rates and GDP per capita, has not been thoroughly explored. Understanding these relationships will provide a more holistic view of the inflationary environment in Malaysia and inform effective policy formulation.

This paper's structure includes a literature review, methodology, findings and discussions, and a conclusion.

2. Literature Review

The Quantity Theory of Money (QTM) establishes a direct relationship between money supply and the general price level. Initially developed by Irving Fisher, this theory suggests that inflation occurs when the money supply grows faster than the economy's output. Milton Friedman (1969), a leading monetarist, expanded the theory, arguing that “inflation is always and everywhere a monetary phenomenon.” This implies that controlling inflation requires careful regulation of money supply growth. In Malaysia, Cheng and Tan (2002) demonstrated that money supply growth significantly influences inflation. Similarly, Armesh and Salarzehi (2010) confirmed the positive impact of money supply on inflation in Iran using OLS regression. However, other studies, such as Tong and Poon (2009), argue that the influence of the money supply is limited, suggesting that consumer behaviour and other demand-side factors may moderate the relationship between money supply and inflation.

The Phillips Curve framework describes an inverse relationship between inflation and unemployment, suggesting that when unemployment is low, inflation tends to rise due to wage pressures and vice versa. According to Phillips (1958), firms raise wages to attract scarce labour, which increases production costs and drives inflation. In Malaysia, several empirical studies align with this theory. Furuoka and Munir (2014) found evidence supporting a negative relationship between inflation and unemployment. Their research confirms that unemployment significantly impacts inflation in the short run as firms adjust production and wages to market conditions. However, the Phillips Curve framework faces criticism during periods of economic instability, such as the COVID-19 pandemic, where inflation and unemployment may not behave predictably. Central banks often use the Phillips Curve to guide policy decisions, balancing inflation control with efforts to maintain employment.

The Purchasing Power Parity (PPP) theory links exchange rates to differences in price levels between countries. It posits that when a country’s inflation rate rises relative to that of its

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trading partners, the exchange rate will adjust to maintain parity in purchasing power. According to Onyekachi and Onyebuchi (2016), inflation differentials lead to currency depreciation, affecting trade balances and import costs. Tan and Cheng (2002) found that exchange rate fluctuations influence inflation in Malaysia through import prices. During periods of currency depreciation, the rising cost of imports often triggers inflationary pressures, especially in open economies like Malaysia. This theory offers valuable insights into how global inflationary shocks translate into domestic price changes.

The Aggregate Demand and Aggregate Supply (AD-AS) model provides a broader perspective on the relationship between inflation and economic growth. In the short run, the upward sloping AS curve suggests that aggregate demand (AD) increases can lead to higher output and higher prices. However, when the economy operates near full capacity, additional increases in demand will mainly result in inflation. The model explains that inflationary pressures emerge when supply cannot keep up with rising demand, as evidenced by Malaysia's inflation surge during the 2008 financial crisis due to rising commodity prices (Khai, 2011). In the long run, the AS curve becomes vertical, indicating that changes in AD affect prices but not output. This highlights the importance of balancing supply-side policies with demand management to ensure sustainable economic growth.

The conceptual framework of this study integrates multiple macroeconomic theories to examine the relationship between inflation (CPI) and four independent variables: Money Supply (MS), Unemployment (UN), Gross Domestic Product (GDP), and Exchange Rate (ER). The framework posits that the money supply positively influences inflation, as expansionary monetary policy tends to increase the general price level. On the other hand, unemployment is expected to have a negative relationship with inflation based on the Phillips Curve, as low unemployment often leads to wage inflation. The relationship between GDP and inflation is more complex, with some studies suggesting that economic growth stimulates inflation, while others argue that inflation hinders long-term growth. Finally, exchange rate fluctuations are expected to affect inflation through import prices, with currency depreciation raising inflation by making imports more expensive.

This integrated framework provides a comprehensive understanding of the dynamics between inflation and macroeconomic variables in Malaysia. It offers insights into how domestic monetary policies, labour market conditions, economic growth, and external factors influence inflation. While the existing literature offers insights into the relationship between inflation and individual macroeconomic variables, gaps remain in understanding how these variables interact collectively, particularly in Malaysia. Studies such as Naseri and Zada (2013) and Munyeka (2014) explored the relationship between inflation and GDP growth, while Tan and Cheng (2002) focused on the effects of exchange rate. However, these studies often analysed variables in isolation, leaving a gap in the comprehensive analysis of their combined impact. Moreover, recent global disruptions, such as the COVID-19 pandemic and geopolitical conflicts, have introduced new complexities to inflation trends that traditional models do not adequately capture.

3. Methodology

This study used the econometrics analysis using Ordinary Least Squares (OLS) regression and granger causality test. The data range was from from 1992 to 2022 yearly data were obtained from the World Bank (WDI) and the Department of Statistics Malaysia (DOSM). Inflation serves as the dependent variable, while money supply (MS), unemployment rate (UN), GDP

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per capita (GDP), and exchange rate (ER) are the independent variables. The empirical model follows the framework proposed by Cheng and Tan (2002), with all variables transformed into their natural logarithmic form to explore their relationships with inflation. The basic models are expressed as:

$$CPI_t = \beta_0 + \beta_1 MS_t + \beta_2 UN_t + \beta_3 GDP_t + \beta_4 ER_t + \varepsilon_t \quad (1)$$

Where;
CPI = Consumer Price Index (%)
β_0 = Slope coefficient
MS = Money Supply (Current LCU))
UN =Unemployment rate (%)
FDP = GDP per capita
ER = Exchange rate (2010=100)
ε_t = Error term
T = Data range is from 1992 to 2022 yearly data

All variables were standardised to ensure consistency in observations. Descriptive analysis and correlation testing were performed to summarise the data and explore initial relationships between variables.

To ensure the results' validity, the time-series data's stationarity was tested using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. These tests help prevent spurious regressions by confirming whether variables are non-stationary or contain unit roots. The study applies the Granger causality test to determine the causal relationships between inflation and the independent variables. Data analysis was performed using E-Views, a statistical software package widely used for econometric modelling and forecasting. E-Views enabled the execution of key analyses, including ordinary least squares (OLS) regression, descriptive statistics, and diagnostic testing.

OLS regression was employed to estimate the relationships between variables, with R-squared values indicating the model's strength. The F-test was used to assess the overall significance of the model, while the t-statistics helped identify the significance of individual independent variables. Several diagnostic checks were conducted to ensure the robustness of the model. The Jarque-Bera test assessed the normality of residuals, confirming whether the error distribution was normal. The White test was used to detect heteroscedasticity, ensuring that the variance of the error term remained constant. The Durbin-Watson test was applied to check for autocorrelation, while the variance inflation factor (VIF) was calculated to detect multicollinearity among the independent variables.

4. Findings and Discussions

Table 1 shows the results of descriptive analysis. The findings from this study offer insights into the relationships between inflation, represented by the Consumer Price Index (CPI), and several macroeconomic variables in Malaysia. Descriptive analysis indicates that the CPI has a mean of 4.5276 and a standard deviation of 0.2136, reflecting moderate inflationary pressure during the period. The money supply (MS) shows a mean of 27.3516 with a standard deviation of 0.7794. Unemployment (UN) has a mean of 1.2111 with a standard deviation of 0.1371. GDP per capita (GDP) presents a mean of 8.9456 with a standard deviation of 0.2454. At the

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same time, the exchange rate (ER) displays a mean of 4.5938 and a standard deviation of 0.1229, indicating a tendency toward higher exchange rate values over time.

Table 1: Descriptive Analysis

	CPI	MS	UN	GDP	ER
Mean	4.5276	27.3516	1.2111	8.9458	4.5938
Median	4.5303	27.4483	1.1939	8.9458	4.5838
Maximum	4.8459	28.3894	1.5261	9.3413	4.8274
Minimum	4.1290	25.7604	0.8755	8.4773	4.4074
Std. Dev.	0.2136	0.7794	0.1371	0.2454	0.1229

Source: Eviews Output

The correlation analysis reveals a strong positive relationship between CPI and MS (0.9951) and GDP (0.9861), suggesting that increases in the money supply and economic output correspond to rising inflation. Conversely, CPI has a strong negative correlation with ER (-0.8816), indicating that a higher exchange rate is associated with lower inflation, likely due to cheaper imports. The correlation between CPI and UN (0.1980) is weak, implying that unemployment has a limited impact on inflation within the studied period.

Residual diagnostic tests confirm the robustness of the OLS model. The normality test indicates that the residuals are normally distributed (p = 0.6348). The Breusch-Godfrey LM test shows no serial correlation (p = 0.8491), and the White test confirms the absence of heteroscedasticity (p = 0.8428). The Variance Inflation Factor (VIF) value of 1.4590 indicates no multicollinearity issues among the independent variables. These diagnostic results validate the reliability of the OLS regression model for this analysis.

Table 2 depicts the results of the unit root test. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests confirm that the data become stationary at the first difference for most variables, mitigating the risk of spurious regression. Thus, the study employs an Ordinary Least Squares (OLS) model using differenced data to estimate the relationships between the variables.

Table 2: Results of unit Root Test

Variables	Augmented Dickey-Fuller Test Equation			Philips-Perron Test Equation		
	Level	1st Difference	2nd Difference	Level	1st Difference	2nd Difference
CPI	-2.2591	-4.4672***	-8.2386***	-2.3579	-4.4672***	-11.0304***
MS	-2.3162	-5.1824***	-9.6005***	-4.5363***	-5.3567***	-26.1684***
UN	-3.6766**	-5.0074***	-6.1224***	-2.4176	-4.7304***	-11.8835***
GDP	-1.0971	-5.2147***	-6.8985***	-1.1449	-6.1341***	-14.8252***
ER	-1.3869	-4.8351***	-6.9623***	-1.0962	-7.0276***	-14.0203***

Source: Eviews Output

The CPI (Inflation) regression equation is shown below:

$$\Delta CPI_t = 0.0134_{t-1} + 0.0906\Delta MS_{t-1} + 0.0157\Delta GDP_{t-1} - 0.0457\Delta UN_{t-1} - 0.1611\Delta ER_{t-1}$$

[1.7438*] [0.1260^{ns}] [-1.2118^{ns}] [-2.8586***]

R^2 = 0.3149, Adjusted R^2 = 0.2053

Δ= first difference data

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The regression results show that the explanatory variables account for approximately 31.5% of the variation in CPI ($R^2 = 0.3149$). Specifically, the money supply (MS) and the exchange rate (ER) are statistically significant, with MS positively influencing CPI ($\beta = 0.0906$, $p < 0.10$) and ER negatively impacting CPI ($\beta = -0.1611$, $p < 0.01$). These results align with economic theory, as an increase in money supply typically fuels inflation, while a more robust exchange rate mitigates inflation by lowering import prices.

In contrast, unemployment (UN) and GDP per capita (GDP) are not statistically significant in explaining inflation, with p-values of 0.2369 and 0.9007, respectively. These findings suggest that unemployment and GDP may not have direct short-term effects on inflation within the scope of this study.

5. Conclusion

The findings of this study underscore the significant role of monetary factors, particularly the money supply (MS) and exchange rate (ER), in influencing inflation (CPI) in Malaysia. The positive relationship between MS and CPI indicates that an increase in the money supply contributes to inflationary pressures, consistent with monetary theory. Conversely, the negative relationship between ER and CPI suggests that a more robust exchange rate can mitigate inflation by lowering import costs. These findings emphasise the importance of managing the money supply and maintaining exchange rate stability to control inflation.

However, the study finds no statistically significant relationship between CPI and variables such as unemployment (UN) and GDP per capita (GDP) during the observation period. This suggests that inflation in Malaysia is less influenced by labour market conditions or aggregate output fluctuations in the short run. Instead, external factors or structural issues may play a more dominant role in determining inflation. Policymakers should, therefore, focus on short-term monetary interventions to manage inflation effectively.

Several limitations of this study must be acknowledged. First, the analysis is based on a limited set of macroeconomic variables, potentially overlooking other key determinants of inflation, such as fiscal policy, global oil prices, or political factors. Second, the study uses aggregated national data, which may mask regional disparities or sector-specific dynamics. Third, the absence of long-term cointegration relationships indicates that the results are primarily relevant for short-term policy analysis and may not capture long-term structural trends.

Future research should consider incorporating additional variables, such as fiscal expenditure, trade policies, or external economic shocks, to develop a more comprehensive understanding of inflationary dynamics. A broader dataset could offer more granular insights, including sectoral or regional data. Additionally, exploring non-linear relationships and using more sophisticated econometric models, such as structural vector autoregression (SVAR) or dynamic stochastic general equilibrium (DSGE) models, could further enhance the robustness of future analyses.

In conclusion, while this study highlights the significance of monetary factors in driving inflation in Malaysia, future research and policy efforts should aim for a more holistic approach, accounting for domestic and global factors to ensure sustainable price stability.

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