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Research Article

Comparative Study of Inflation Trends and Exchange Rate Fluctuations Across Seven ASEAN Member Countries

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Abstract: This study investigates the monetary transmission mechanisms influencing inflation and exchange rates across seven Southeast Asian countries (Myanmar, the Philippines, Indonesia, Malaysia, Singapore, Thailand, and Vietnam) over the period 2010–2023, with special focus on the impact of the COVID-19 pandemic. The research addresses the problem of macroeconomic instability, particularly the volatility in inflation and currency values during crisis periods, and aims to identify the dominant monetary factors affecting these indicators. The study employs a mixed quantitative approach using Structural Vector Autoregression (SVAR), Panel Autoregressive Distributed Lag (ARDL), and Paired Sample t-Test to analyze the short-term and long-term relationships among key variables: Gross Domestic Product (GDP), investment, money supply (M2), interest rates, inflation, and exchange rates. Findings reveal that GDP is the most influential factor impacting both inflation and exchange rates, followed by money supply and interest rates. The variance decomposition analysis confirms that these monetary variables significantly explain macroeconomic fluctuations in both pre- and post-pandemic contexts. The t-Test further indicates statistically significant changes in inflation and exchange rates before and after the pandemic, highlighting the disruptive effect of COVID-19 on economic stability. The results demonstrate that inflation declined significantly in most countries during the pandemic, while exchange rate behavior varied depending on economic resilience and policy responsiveness. The study concludes that maintaining macroeconomic stability requires not only monetary policy coordination but also effective public health crisis management. This research contributes to the regional policy discourse by offering empirical insights and evidence-based recommendations to strengthen economic resilience in Southeast Asia.

Keywords: ASEAN; COVID-19; Exchange Rate; GDP; Inflation

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1. Introduction

The COVID-19 pandemic has created global disruptions to macroeconomic stability, particularly through increased inflationary pressures and exchange rate instability. The Southeast Asian region is no exception to the significant impact (Faia et al., 2008)(Ozcelebi et al., 2021).. The Seven Countries of Southeast Asia (SCOSA) group of Myanmar, the Philippines, Indonesia, Malaysia, Singapore, Thailand, and Vietnam, showed symptoms of sharp fluctuations in macroeconomic indicators, especially during the period 2010-2022. Indonesia's inflation dropped dramatically from 3.8% in 2019 to 1.6% in 2020, before surging back to 6% in 2021(Rahmayani & Putri, 2021). On the other hand, the Rupiah exchange rate depreciated from Rp9,100/USD in 2010 to around Rp14,800/USD in 2022 (Blazsek et al., 2024). Similar trends occurred in Myanmar and Vietnam, with inflation reaching 6.6% and the Vietnamese Dong exchange rate increasing from 18,600 to 23,300 in the same period.

These symptoms reflect pandemic-induced economic shocks that require empirical evidence-based monetary policy responses (Yuniarti et al., 2021).

Based on data from the World Bank (WorldBank, 2025), there were fluctuations in inflation in the seven countries from 2010 to 2022. In Indonesia, inflation decreased from 3.8% in 2019 to 1.6% in 2020 due to decreased purchasing power during the pandemic, but jumped back to 6% in 2021 (Blazsek et al., 2024). Di Myanmar, inflasi bahkan mencapai 6,6% pada 2020. Data berikut memberikan In Myanmar, inflation even reached 6.6% in 2020. The following data gives a more detailed picture:

Table 1. exchange

Year	Myanmar	Filipina	Indonesia	Malaysia	Singapura	Thailand	Vietnam
2010	7.0	4.4	15.3	7.3	1.1	4.1	12.1
2020	6.6	1.6	1.6	-0.8	-2.9	0.9	1.8
2022	4.1	85.8	4.2	5.1	6.1	6.1	3.2

The exchange rate also shows a similar trend. The Rupiah to USD exchange rate in Indonesia rose from 9,100 in 2010 to 14,800 in 2022. On the other hand, Vietnam's exchange rate increased from 18,600 to 23,300 in the same period. This increase in the exchange rate indicates a depreciation of the local currency which has the potential to trigger imported inflation (Wagner, 2005)(Antonio Fatás, 2024).

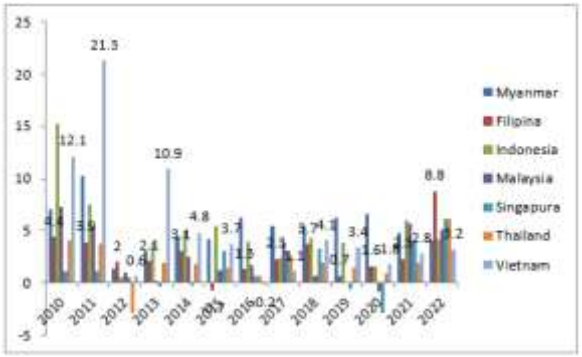

Figure 1. Southeast Asian countries

The figure above shows the annual inflation rates in seven Southeast Asian countries (SCOSA: Myanmar, Philippines, Indonesia, Malaysia, Singapore, Thailand and Vietnam) over the period 2010 to 2022. The graph illustrates sharp fluctuations in inflation, especially in Myanmar which experienced significant spikes in 2011 (21.3%) and 2012 (10.9%)(Giangrande, 2021). Meanwhile, other countries such as Indonesia and Vietnam have shown relatively more stable inflation trends, although they experienced a decline during the 2020 pandemic and increased again in 2021-2022. The Philippines recorded the second highest inflation in 2022 at 8.8%, reflecting post-pandemic economic pressures. Overall, this graph highlights the real impact of the global crisis on price stability in the Southeast Asian region (Deng et al., 2020).

A number of previous studies have examined the transmission of monetary policy to inflation and exchange rates. Pasaribu (Angelina Pasaribu et al., 2024) used the Two Stage Least Square approach to analyze the interaction between interest rates, money supply, and inflation in Indonesia. However, the approach is still limited to national studies and has not accommodated the cross-country framework and post-pandemic dynamics. Other studies by Salamah (Salamah & Wahyuni, 2021) (Yanti & Soebagyo, 2022) and Wahyudi (Wahyudi & Riana, 2021) (Rumondor et al., 2021) analyze the effect of exchange rate on inflation, but do not use a dynamic structural model that is able to capture short and long term changes simultaneously.

The research gap arises from the absence of studies that specifically integrate the Baumol-Tobin general equilibrium model with dynamic panel analysis and pre- and post-pandemic comparisons in the Southeast Asian regional context. In fact, a comprehensive understanding of the money supply and demand mechanism in a crisis situation is crucial for designing responsive and effective monetary policy.

To address this void, this study utilizes an integrated methodological approach: SVAR (Structural Vector Autoregression) to explain long-run relationships, Panel ARDL to test cross-country effects, and Paired Sample t-Test to analyze structural changes before and during the pandemic. By focusing on the variables of inflation (INF), exchange rate (KURS), investment (INV), interest rate (SB), money supply (JUB), and gross domestic product (GDP), this study is expected to provide an empirical understanding of monetary transmission in times of crisis.

Practically, this study provides data-based recommendations for fiscal and monetary authorities to design policies that are adaptive to global volatility. While theoretically, this study extends the macroeconomic literature by combining classical equilibrium models and modern econometric approaches in a cross-country and cross-time context. The main contributions of this study are as follows:

a. Develop a regional macroeconomic model that combines SVAR, Panel ARDL, and Difference Test to analyze post-pandemic monetary stability.
b. Present the latest empirical findings on the effect of investment, foreign exchange reserves, and interest rates on inflation and exchange rates in Southeast Asia.
c. Provide evidence-based monetary and fiscal policy recommendations to strengthen the economic resilience of SCOSA countries.

2. Literature Review

Money demand model aims to develop an understanding of the determinants of money demand, the function of money as a medium of exchange, and the optimization of the amount of money demanded (Chen et al., 2021). The characteristics of money demand explain the relationship of money demand with the number of transactions and the cost of holding

money. The response of money demand to the transaction plan, the cost of holding money or interest rate and inflation is the center of attention of money demand analysis (Benati et al., 2021). The basic model of real money demand considers the purpose of individuals to hold money, namely the purpose of transactions, precautions and speculation. The basic model of money demand is formulated as follows:

$$\frac{M_t}{P_t} = L(y_t, R_t)$$

The demand and supply of money is a key foundation in macroeconomic studies, especially in the context of price and exchange rate stability (Parveen et al., 2020). A widely referenced theory of money demand in modern research is the Baumol-Tobin theory, which states that money demand is not only determined by the level of income and interest rates, but also by transaction costs (Tobin, 1956) (Baumol, 1952)(Andaiyani et al., 2019).. In the modern context, this approach is still relevant, especially when combined with structural approaches such as Structural Vector Autoregression (SVAR) and Panel Autoregressive Distributed Lag (ARDL).

The element of uncertainty causes individuals to make the decision to hold stocks of cash and other financial assets, i.e. bonds, stocks, deposits and banking system loans at any given period. Individuals divide the nominal endowment [y] into cash [Mt] and other financial assets [Bt]. Periods [t + 1] and [t + 2] contain an element of uncertainty in consumption, so the maximum expected utility is:

$$E(u) = q\ u\ [c_{t+1}] + (1-q)\ u\ [c_{t+2}]$$

Investment according to Lypsey (Lipsey, 1997) is spending on goods that are not consumed immediately, but are used to obtain future income. Investment can be divided into short, medium, and long term, and involves considerations of time, inflation, and uncertainty. In Keynes' theory (Keynes, 1936), investment decisions are determined by the comparison between the Marginal Efficiency of Capital (MEC) and the real interest rate. If the MEC is greater than the interest rate, then the investment is feasible. Conversely, if it is smaller, the investment is not made. Thus, investment not only depends on the rate of return, but is also strongly influenced by the cost of capital or interest rate(Gereziher & Nuru, 2021).

Foreign exchange reserves are the central bank's foreign currency deposits used to guarantee monetary liabilities and maintain exchange rate stability (Kuncoro, 2024). A decrease in foreign exchange reserves can encourage speculation on exchange rates, especially the Rupiah (Ito & McCauley, 2020). Money supply reflects the total money in the economy at any given time (Ambarwati et al., 2021), (Panjaitan et al., 2021). M1 includes currency and demand deposits, while M2 includes M1 and quasi-money. The liquidity preference theory (Safitri & Primadhita, 2022) (Amaliyah & Aryanto, 2022) explains the link between JUB and interest rates, while the Mundell-Fleming theory explains its relationship with exchange rates.

Interest rates affect inflation and are determined by the interaction of the demand and supply of money in the market (DRECHSLER et al., 2021). According to the liquidity preference theory, interest rates and money demand have a negative relationship (Vayanos & Vila, 2021). The relationship between interest rates, JUB, and inflation is explained in the Fisher Effect. Inflation is the continuous rise in the prices of goods and services (Lipsey, 1997) (Bielecki et al., 2020). Monetarists argue that inflation is caused by the growth of money supply, while Keynesians emphasize the role of aggregate demand, money and goods markets, and the importance of fiscal and monetary policy coordination (Jaravel, 2021). According to Keynes' theory (Keynes, 1936), inflation and exchange rates are linked through the imbalance between people's income and production capacity. When demand exceeds aggregate supply, an inflationary gap occurs which causes price increases and affects the exchange rate.

Several previous studies have contributed to identifying the determinants of inflation and exchange rates in different countries. (Hastuti, P. & Arifin, 2020) showed that exchange rate has a positive influence on inflation in Malaysia, while (Purba & Tarigan, 2021) confirmed the significant relationship between exchange rate, money supply, and inflation in Indonesia. However, these studies still use a simple linear regression approach and are limited to one country, thus lacking the ability to capture simultaneous cross-time and cross-country dynamics.

In a more advanced study, (Widiarsih & Romanda, 2020) applied the Two Stage Least Square method to analyze the demand and supply of money in Indonesia. Although this approach is more complex, its scope is still limited to the pre-pandemic, and does not consider the structural effects of the global crisis such as COVID-19. On the other hand, the SVAR approach as used by (Prayogi, 2022) (Wardhono et al., 2020) in China has shown effectiveness in capturing the long-run relationship between macroeconomic variables. However, not many studies have combined SVAR with heterogeneous panel data in the context of post-pandemic ASEAN countries.

Other studies using Panel ARDL, such as those conducted by (Al Makhrus & Priyadi, 2022), (Sikder et al., 2022), prove that the dynamic panel approach is effective for observing the interrelationships among economic variables in developing countries. However, most of these studies still do not explicitly compare changes before and after the pandemic, and have not included paired t-test as a verification tool for structural shifts in the monetary system. Based on the literature review, it can be concluded that there is no study that comprehensively combines the Baumol-Tobin theory, SVAR approach, Panel ARDL, and t-test to analyze the dynamics of money demand and supply during the pandemic in Southeast Asia. This study fills the gap by building a cross-country macroeconomic model (SCOSA) that integrates theoretical and empirical approaches to analyze the influence of variables such as exchange rates, inflation, interest rates, investment, and GDP in a crisis context. This research not only

enriches the literature on monetary policy transmission, but also provides tangible policy contributions for ASEAN countries in the face of global economic volatility.

However, to improve the quality and scientific contribution of this study, it is necessary to strengthen the conceptual framework in a more structured manner, by systematically structuring the linkages between variables based on the underlying theory. In addition, it is important to expand the scope of empirical references by including study results from countries with similar economic characteristics outside ASEAN as a comparison, in order to strengthen the external validity of the model built. The use of integrative approaches such as the combination of Baumol-Tobin theory, SVAR, Panel ARDL, and T-test needs to be supported by a deeper description of the basic assumptions and methodological advantages of each technique so that readers understand the justification for their selection. In addition, there is still a need to strengthen the justification for the selection of time periods and sample countries so that they are aligned with the research objectives and are able to answer research questions in a relevant and contextual manner. The addition of a visual theoretical framework (e.g. conceptual model or theory map) is also recommended to provide a clearer picture of the direction of the relationship between the variables tested. With these improvements, this study is expected to not only fill the gap in the existing literature, but also provide more solid theoretical and practical contributions in the development of regional monetary policy after the global crisis.

3. Proposed Method

This research uses an associative quantitative approach, which is an approach that aims to determine the relationship and influence between variables simultaneously or partially, both in the short and long term (Akbar et al., 2024). The type of data used is secondary data in the form of quantitative data obtained from official sources such as the World Bank, CEIC Data, and Trading Economics, covering the period 2010-2023 as well as monthly data before and after the COVID-19 pandemic (January 2019 - December 2023). Data collection techniques are carried out through documentation studies by collecting and processing macroeconomic data such as inflation, exchange rates, foreign exchange reserves, foreign direct investment, money supply, and interest rates.

The data analysis method used in this study consists of three main models, namely (1) Structural Vector Autoregression (SVAR) to analyze the reciprocal relationship between macroeconomic variables simultaneously supported by stationarity test, Granger causality test, Johansen cointegration test, Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD); (2) Panel ARDL model to test the short-term and long-term relationship between variables in cross-country panel data with cointegration assumptions if the coefficient is negative and significant (<0.05); and (3) Paired Sample T-

Test to determine significant differences in inflation and exchange rate variables before and after the COVID-19 pandemic in the seven ASEAN countries that are the focus of this study.

4. Results and Discussion

During the covid-19 pandemic, the exchange rate in Indonesia, Malaysia, Myanmar, Singapore and Thailand experienced a depreciation of inflation during the covid-19 pandemic. Only the Philippines and Vietnam experienced an increase in inflation during the covid 19 pandemic. Indonesia, Malaysia, Myanmar, Singapore and Thailand have a significant value <0.05. This can be interpreted that there are differences in results before and after the occurrence of covid 19. However, philiphina and Vietnam are not significant during the covid 19 pandemic. The economic crisis in 2020 was caused by the covid-19 outbreak which forced the governments of all countries in the world to carry out Lockdown, restrictions on flight activities between countries, this had an impact on the decline in the number of tourism businesses and retail and food businesses, this was due to a decrease in people's purchasing power which resulted in higher supply than demand, therefore many retail businesses. food and others make large discounts, Because inflation discusses not only the consumer side but also the producer, the cause of the decline in inflation in the 2020 economic crisis is because people's purchasing power has decreased while the supply in the market is too much until producers make large discounts to increase people's purchasing power. In line with the opinion of (Mamuaja et al., 2024) low inflation could be due to a declining demand factor due to weakening economic activity due to the covid-19 pandemic.

This is in line with research conducted by (Hamzah et al., 2021) which states that there is an influence between before and after covid 19 on inflation. the results of this study indicate that inflation has an influence on the velocity of money. This means that any increase in inflation will increase the velocity of money or in other words, the higher the level of inflation in a country will have an impact on increasing the velocity of money. In accordance with the quantity theory that M x V = P x T, which if inflation occurs or P (price) increases, while T (total output) and M (money supply) are constant, then in order for equilibrium to occur, the value of V (velocity of money circulation) also increases (Simon, 2023).

During the covid-19 pandemic, the exchange rate in Indonesia, South Korea and Malaysia experienced exchange rate depreciation during the covid-19 pandemic. Changes in the exchange rates of the seven countries are only Malaysia and Singapore which do not experience significant changes, changes in exchange rates before and after the covid-19 pandemic with a significant value> 0.05 so that it is declared insignificant.

The results of research (Purba & Tarigan, 2021) (Abdi et al., 2024) the covid-19 pandemic has a real impact on fluctuations in the Rp / US$ exchange rate, a 1% increase in covid-19 cases will cause a depreciation of the Rupiah exchange rate against the US $ by 0.02%. If the covid-19 case continues to increase, the exchange rate in a country depreciates

and vice versa, this is because if the covid-19 case surges in a country, the Lockdown policy and restrictions on community activities will be limited, this causes the economy to not run. To stabilize the exchange rate during the current pandemic, the government must be able to suppress cases of the spread of covid-19.

The covid-19 case continues to increase, the exchange rate in a country depreciates and vice versa, this is because if the covid-19 case surges in a country, the Lockdown policy and restrictions on community activities will be limited, this causes the economy to not run. To stabilize the exchange rate during the current pandemic, the government must be able to suppress cases of the spread of covid-19. Thus the exchange rate conditions in the country with the lowest unemployment rate in the world have changed, but only Indonesia and Japan have experienced significant changes in exchange rates. This is in line with research conducted by Pebri (Hastuti, P. & Arifin, 2020) with the title "Rupiah Exchange Rate Phenomenon Before and During Covid-19" which shows the results that there is a significant difference between the rupiah exchange rate before and during the Covid-19 pandemic.

Government efforts are needed to mitigate the weakening of the exchange rate with a series of policy mixes that must be realized immediately. Because the delay in making decisions in overcoming this national disaster will have a long-term and widespread impact on various aspects of life, the COVID-19 pandemic has become one of the biggest shocks to the global economy in recent decades. The impact is not only felt in the health sector, but also spreads to all aspects of the economy, including the monetary and financial sectors. One of the most sensitive indicators to economic changes due to the pandemic is the exchange rate. In the midst of the uncertainty and global crisis caused by the pandemic, currency exchange rates in many countries are under enormous pressure.

Research shows that during the COVID-19 pandemic, countries such as Indonesia, South Korea, and Malaysia experienced exchange rate pressures that tended towards depreciation. However, the rate of depreciation is uneven among these countries. According to Haryanto's research data from Bappenas (2020), the depreciation of the Rupiah against the US Dollar is strongly influenced by the increase in COVID-19 cases. In his findings, it is stated that every 1% increase in COVID-19 cases contributes to the depreciation of the exchange rate by 0.02%. This means there is a significant linear relationship between the number of COVID-19 cases and the exchange rate, suggesting that public health instability can lead to economic instability through monetary channels.

During the pandemic, all three countries experienced exchange rate fluctuations that reflected internal and external economic shocks. Indonesia experienced significant exchange rate depreciation, especially at the beginning of the pandemic in 2020. The rupiah weakened sharply, touching around IDR 16,000 per US dollar. This was due to a combination of global investor concerns, declining exports, and foreign capital outflows from domestic financial markets.

South Korea, despite having stronger economic fundamentals and large foreign exchange reserves, also experienced exchange rate pressure. However, the Won depreciation was not as deep as the Rupiah as South Korea quickly took mitigation measures, including fiscal stimulus and monetary easing, as well as relatively more effective pandemic control in the early days of the outbreak. Meanwhile, Malaysia and Singapore are two countries in the region that show more stable exchange rate resilience. Both countries did not experience statistically significant exchange rate changes during the pandemic. This is evidenced by the significance value of exchange rate changes before and after the pandemic which is greater than 0.05, which means that the changes are statistically insignificant. This resilience can be explained in terms of economic structure, responsive government policies, as well as political stability and investor confidence.

The pandemic caused mobility restrictions (lockdowns), decreased consumption and investment, and disrupted global supply chains. The combination of these factors lowers national productivity and weakens market confidence. Under these conditions, investors tend to withdraw their funds from emerging economies and move them into perceived safe assets such as the US Dollar or gold. This phenomenon is known as flight to safety, and is the main trigger of exchange rate depreciation in many countries.

Galina Hale's research (Hale et al., 2025) identifies that the increase in COVID-19 cases has a direct impact on exchange rate depreciation. This is related to lockdown policies and restrictions on economic activity, which reduce national output and increase economic uncertainty. As COVID-19 cases rise, economic activity falls, state revenues decrease, and fiscal deficits increase. This lowers market confidence in the country's currency and leads to depreciation (Liang et al., 2024).

One important conclusion from studies during the pandemic is that exchange rate stability is highly dependent on government policy responses. Countries that are quick to control the spread of COVID-19, and have solid economic recovery strategies, tend to be able to stabilize their exchange rates better. This is reflected in the experience of Malaysia and Singapore, which managed to control the pandemic relatively early, provide security guarantees for investors, and keep capital flows stable. The governments of Indonesia and South Korea also implemented various policies to contain the depreciation rate. Their central banks intervened in the foreign exchange market, lowered benchmark interest rates, and issued quantitative easing policies to support market liquidity. However, the effectiveness of these policies is highly dependent on market perceptions of the prospects for economic recovery and pandemic control.

One of the big lessons from this pandemic is that public health and economic stability are inseparable. Exchange rate stability is not only influenced by conventional factors such as interest rates or inflation, but also by external factors such as social stability and public health. A spike in COVID-19 cases can trigger negative sentiment towards a country's economy,

generate fear of default risk, and ultimately trigger exchange rate depreciation. International research, such as that conducted by Tores (Torres-Favela & Luna, 2025), shows that countries with more effective health responses in the form of mass testing, contact tracing, rapid vaccination, and transparent communication experience less exchange rate pressure. Conversely, countries with slow and inconsistent responses tend to experience greater exchange rate depreciation as the market perceives it as a long-term risk (Utama & Mustika, 2022)(Sella & Ardini, 2022)..

Exchange rate fluctuations during the COVID-19 pandemic show how public health variables can be important determinants of monetary stability (Suganda et al., 2024). Countries such as Indonesia and South Korea experienced exchange rate depreciation due to the surge in COVID-19 cases and market fears of economic uncertainty. Meanwhile, Malaysia and Singapore showed higher exchange rate stability due to a combination of rapid response to the pandemic and stable economic management (Raza et al., 2024). These findings confirm that to maintain exchange rate stability in times of crisis, the government should not only focus on monetary policy, but also on non-monetary aspects such as health systems and risk management. This crisis provides a lesson that the economy and public health are closely intertwined, and both must be managed in an integrated manner for the country to survive the complex global challenges.

5. Conclusions

This study concludes that Gross Domestic Product (GDP) is the most dominant variable affecting inflation and exchange rates, both in the short and long term. A strong GDP reflects a healthy economic foundation, capable of increasing aggregate demand steadily without generating excessive inflationary pressures, and attracting foreign investment that can strengthen the exchange rate. In addition, investment makes an important contribution in the long run, especially when directed towards productive sectors that support growth in production capacity and exchange rate stability. Money supply (JUB) has a significant influence on inflation and exchange rates, especially in the short term. An increase in money supply that is not matched by real output will drive inflation and weaken the exchange rate. Interest rates also act as an effective monetary instrument in regulating capital flows and controlling inflation. High interest rates can strengthen the exchange rate, while low interest rates tend to encourage consumption and investment.

In the context of the COVID-19 pandemic, the results show that inflation has decreased significantly in most Southeast Asian countries, such as Indonesia, Malaysia, Myanmar, Singapore, and Thailand, due to weakened demand and disrupted global supply chains. This decline confirms that the health crisis has a real impact on price stability and demands responsive fiscal and monetary policies. As for the exchange rate aspect, the impact is more varied. Countries such as Myanmar and the Philippines experienced significant depreciation,

while Malaysia and Singapore were relatively statistically stable. In contrast, Indonesia, Thailand and Vietnam experienced a spike in inflation with significant exchange rate differences. This shows that the response and resilience of each country's economy largely determines the magnitude of the pandemic's impact on macroeconomic indicators. Overall, inflation and exchange rate stability are influenced by a combination of fundamental economic variables such as GDP, investment, money supply, and interest rates, as well as external factors such as the pandemic and its mitigation policies. Therefore, synergy between monetary and non-monetary policies is needed to maintain economic stability, especially in times of global crisis.

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