

# Analysis of the Effect of Food Prices, GDP, Inflation, and Exchange Rate on Poverty in 4 ASEAN Countries

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## Abstract

*Poverty remains a persistent challenge in ASEAN countries despite economic growth. A 2024 World Bank report highlights that many families, especially in agriculture-dependent economies, still live below the poverty line. This study examines the impact of food prices, GDP, inflation, and exchange rates on extreme poverty in Indonesia, Malaysia, Thailand, and the Philippines from 1991 to 2021, using data from the World Bank and FAOstat. The analysis employs a pooled panel ARDL model with diagnostic tests (Wald, residual normality, and CUSUM) and robustness checks (Hausman Test and OLS). Findings indicate that, in the long run, extreme poverty is negatively and significantly influenced by food prices and exchange rates. Rising food prices increase income for farmers, improving rural livelihoods, but they also reduce the purchasing power of net consumers. Exchange rate depreciation raises import costs, affecting affordability of essentials. GDP and inflation show an insignificant effect on extreme poverty in the long run. In the short run, the exchange rate has a positive significant effect on extreme poverty, while the other variables remain insignificant. Currency depreciation boosts agricultural exports, employment, and local industries. This study recommends policies to stabilize food prices and address currency depreciation, while fostering inclusive growth and mitigating inflationary pressures to reduce extreme poverty in ASEAN nations.*

**Keywords :** Poverty, Food price, GDP, Inflation, Exchange rate, Effect

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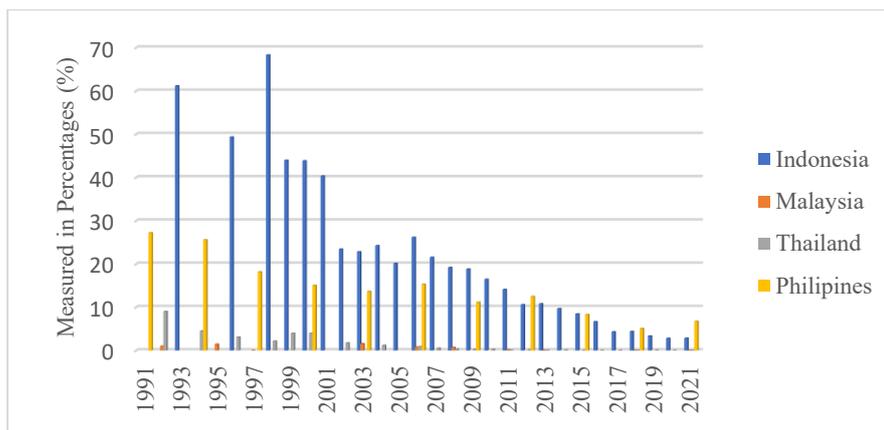
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## 1. Introduction

Poverty remains a critical issue, particularly in developing regions like Southeast Asia, despite significant economic growth in recent decades. Defined as the inability to meet basic needs [1,2], poverty is influenced by complex factors such as food prices, GDP, inflation, and exchange rates. Food price volatility, driven by events like the COVID-19 pandemic and geopolitical tensions, disproportionately affects low-income households in ASEAN countries [3,4]. Historical crises, such as the 2007–2008 food price surge, highlight the vulnerability of impoverished populations [5–7].

Rapid shifts in Southeast Asia's agricultural systems present opportunities and risks, balancing income growth with environmental sustainability concerns [8,9]. Economic growth, while vital, does not guarantee poverty reduction due to inequality [10,11]. Inflation and exchange rate volatility further exacerbate poverty, with recent spikes linked to global supply disruptions and conflicts [2,12].





**Figure 1.** *Extreme Poverty as of \$2.15 Per Day in 4 ASEAN Countries 1991-2021* (Data Source: World Bank, author's computation)

Extreme poverty remains a persistent challenge in developing economies, particularly in Southeast Asia, where economic disparities are evident across nations. The World Bank defines extreme poverty as living on less than \$2.15 per day (World Bank, 2023). Despite significant economic growth, four key ASEAN nations such as Indonesia, Malaysia, Thailand, and the Philippines continue to grapple with eradicating extreme poverty, albeit at different magnitudes and trajectories.

The progress of poverty reduction in these countries has been shaped by structural economic transformations, government policies, and external shocks. The data presented in Figure 1 illustrate the declining percentage of extreme poverty over time, with notable differences in the rate of reduction among the four nations. Indonesia, Southeast Asia's largest economy, experienced the highest levels of extreme poverty in the early 1990s, with rates exceeding 60% in 1997. However, significant declines have occurred due to industrialization, social assistance programs, and rural development initiatives (World Bank, 2023). Economic shocks such as the Asian Financial Crisis (1997-1998) and the COVID-19 pandemic temporarily reversed gains, highlighting vulnerabilities in poverty reduction efforts (IMF, 2022). By 2021, Indonesia's extreme poverty rate had fallen to below 5%, demonstrating steady progress.

Malaysia, with its upper-middle-income status, has experienced the lowest levels of extreme poverty among the four nations. Figure 1 shows that Malaysia maintained a consistently low percentage throughout the observed period, reflecting its diversified economy and targeted social welfare programs (UNDP, 2023). However, regional disparities persist, particularly in rural and indigenous communities, requiring continued policy interventions (Jomo & Wee, 2023).

Thailand has also made substantial progress in reducing extreme poverty, with its percentage declining steadily since the 1990s. The country benefited from inclusive growth policies, agricultural modernization, and social safety nets (ASEAN Policy Brief, 2022). However, informal employment and rising income inequality pose significant risks to sustained poverty alleviation (ADB, 2023). By 2021, Thailand's extreme poverty rate had become negligible, signifying the effectiveness of its economic policies.

The Philippines, while experiencing rapid economic expansion, still faces challenges in fully eradicating extreme poverty. The chart indicates fluctuating trends, with poverty rates declining gradually but remaining above those of Malaysia and Thailand. Structural unemployment, inflationary pressures, and vulnerability to natural disasters contribute to the persistent poverty levels (World Bank, 2023). Government-led cash transfer programs and rural development initiatives have played a key role in poverty reduction, yet economic instability remains a major concern (Balisacan et al., 2023).

Across all four nations, economic resilience, technological advancements, and sustainable development policies are crucial in ensuring long-term poverty reduction. The role of AI and digital financial inclusion is gaining attention as a transformative tool for economic empowerment, particularly in rural areas (IMF, 2023). The chart's declining trend across all countries suggests that coordinated policies, adaptive strategies, and regional cooperation will be critical in achieving poverty eradication in the coming decades.

Food prices play a pivotal role in poverty dynamics, particularly affecting low-income households due to Engel's law, which states that lower-income groups allocate a higher proportion of their income to food. A 10% increase in food prices can elevate global poverty by 1.2%, driven by factors like supply shortages, climate volatility, and trade policies [15,16]. These linkages underscore the need for targeted interventions to stabilize food prices and promote equitable economic growth. Additionally, depending on whether a family is a net buyer or seller of a certain commodity, the effects of food price volatility may vary. According to Amolegbe et al. (2021), a family that sells more is more likely to gain from a price increase than one that buys more. According to applications of the net-benefit ratio technique, higher food prices are typically linked to greater levels of poverty in poor countries. At least a few research have offered global estimates of the changes in poverty caused by increased food prices (Heady, 2014). However, it is also claimed that poverty might be decreased by high food prices. For example, Heady & Hirvonen (2023) proposed that short-term agricultural supply responses, which boost demand for unskilled labour and propel wage rises, might account for rising prices for food.

Despite progress in poverty reduction, many families in Southeast Asia remain below the poverty line, particularly in countries heavily reliant on agriculture and food sectors [2]. Previous research often isolates these factors or neglects demographic nuances, such as rural-urban disparities or gender dynamics. Rising food prices, driven by geopolitical tensions and supply chain disruptions, have exacerbated poverty, especially in import-reliant ASEAN countries. Limited agricultural research funding further hampers sustainable development, making the region vulnerable to food price volatility [17,18]. Due to the controversial, conflicting and inconclusive results by previous authors, this study proposed to answer how does food price, GDP, inflation, and exchange rate affects poverty in selected 4 ASEAN countries in both short-term and long-term from 1991-2021. Furthermore, this study examines how food prices, GDP, inflation, and exchange rates collectively influence poverty in Indonesia, Malaysia, Thailand, and the Philippines over the period 1991–2021, capturing significant economic changes, including pre-and post-financial crises. This study addresses research gaps by incorporating cross-country comparisons and demographic considerations, aiming to provide actionable insights for academics, policymakers, and future practitioners. By exploring these dynamics in both short- and long-term perspectives, it seeks to inform inclusive policies to mitigate poverty in the ASEAN region.

This study focuses on four ASEAN countries (Indonesia, Malaysia, Thailand, and the Philippines) which are considered pivotal members of the ASEAN organization. These nations significantly influence the overall economic and social dynamics of the region. Consequently, any economic or social challenges faced by these countries have profound implications for ASEAN as a whole. These challenges, particularly those related to poverty, have been substantial barriers to the transition of these nations from developing to developed economies. Addressing these issues is also critical to advancing the United Nations Agenda 2030, specifically the Sustainable Development Goal (SDG) of eradicating poverty ("No Poverty").

Poverty, as defined by Indonesian institutions, is a condition marked by an inability to fulfil basic human needs such as food, housing, education, and health, often caused by complex, interrelated factors (BAPPENAS, 2008; Government Regulation No. 42, 1981). Rising food prices, inflation, and volatile exchange rates significantly exacerbate poverty by reducing purchasing power, especially among vulnerable households [21–23]. Conversely, inclusive GDP growth and effective monetary policies can alleviate poverty by improving household consumption and economic stability [24,25]. A multi-dimensional approach, considering economic, cultural, and structural poverty types, is essential for targeted interventions to reduce poverty and enhance societal welfare [26,27].



Key studies emphasize the practical implications of using household consumption as a metric to design poverty alleviation policies, underlining the importance of food price stabilization, income equality, and macroeconomic stability [28–30].

## 2. Method

This study employs a descriptive quantitative approach to analyse the effects of food price, GDP, inflation, and exchange on extreme poverty in four ASEAN countries (Indonesia, Malaysia, Thailand, and the Philippines). Additionally, this study uses pool panel data, which combines time series and cross-sectional data obtained from the World Bank (2024) and FAOstat (2024). The cross-sectional data encompasses 4 ASEAN countries as mentioned above, while the time series covers the period from 1991 to 2021. To facilitate the interpretation of the results, data obtained were calculated, arranged, and sorted with the aid of the Microsoft Excel application and were imported into EViews, and Stata statistical software for regression purposes wherein, prior tests were estimated and employed such as descriptive statistic test to examine the characteristics of the actual data, unit root test for stationarity, to ensure the stability of the employed data, cointegration to examine long-run relationships of the data. Albeit, the main model utilized in this study is the Pool Panel ARDL and other tests such as the Wald test, residual normality test, and CUSUM to ensure fewer errors and unbiased estimation results derived from the main model. Additionally, a robustness check of the main result presented by the main Panel ARDL model was ensured by tests such as the Hausman test and panel OLS.

**Table 1.** Operational definition of variables

Status	Variable Name	Symbol	Variable Definition	Units	Source
Dependent	Extreme Poverty as of \$2.15 per day	POV_EXT	The International Poverty Line is \$2.15 per day, and living below it is considered extreme poverty. Both inflation and variations in living expenses among nations have been factored into this data. It is related to do with per capita consumption or income after taxes and incentives.	Percent	World Bank
Independent	Food Price Index	FPI	Food prices are measured from the producer price index consisting of the prices of Bananas, Cassava, Chili and Green Peppers, Cocoa Beans, Ginger, Chicken Eggs, Corn, Mango, Guava and Mangosteen, Buffalo Meat, Chicken Meat, Goat Meat, Coconut Oil, Papaya, Pepper, Rice, Sugar, and Tomatoes in 4 ASEAN countries, such as Indonesia, Malaysia, Thailand, and the Philippines	Index	FAOstat
	Gross Domestic Product	GDP	GDP is the sum of gross value added generated by all producers in the economy plus product taxes and minus subsidies that are not included in the value of products.	Percent	World Bank
	Inflation	INFL	Inflation as measured by the consumer price index reflects the annual percentage change in the average cost to consumers of obtaining a basket of goods and services that may be fixed or changing at specific intervals, such as annually.	Percent	World Bank
	Exchange Rate	EXR	The exchange rate is measured as the amount of local currency required to buy one unit of US dollar (USD) currency, calculated into index form for all countries to ensure uniformity with the aid of Microsoft Excel application.	Index	World Bank

This research employs the Autoregressive Distributed Lag (ARDL) analysis method, which models the relationship between dependent and independent variables using current and lagged values. As highlighted by [31], the ARDL model accommodates variables of mixed orders of integration, I(0) or I(1), and is effective for short time-series data. It simultaneously estimates short- and long-term effects while mitigating autocorrelation issues, providing consistent long-run coefficient estimators and valid inferences through Ordinary Least Squares (OLS). The analysis utilizes EViews and Stata software.

The study investigates the effect of food prices, GDP, inflation, and exchange rates on poverty within four ASEAN countries, framed by the Cobb-Douglas production function, which represents output ( $Y_t$ ) as a function of capital ( $K_t$ ), labour ( $L_t$ ), and technology ( $E_t$ ). Grounded in neoclassical and endogenous growth theories, this model captures the dynamics of productivity and growth. The formulated empirical model is expressed as:

$$POV_{it} = \alpha_0 + \beta_1 FPI_{it} + \beta_2 GDP_{it} + \beta_3 INFL_{it} + \beta_4 EXR_{it} + u_{it} \dots\dots\dots(1)$$

Where POV represents extreme poverty as of \$2.15 per day threshold, FPI is the food price index, GDP denotes GDP growth, INFL refers to consumer price inflation, EXR is the exchange rate, i represent the numbers of countries and t represent time. The coefficients ( $\beta_1, \beta_2, \beta_3, \beta_4$ ) capture the short- and long-run effects, with  $u_t$  as the random disturbance term.

The results reveal significant short- and long-term effects of these variables on poverty when the null hypothesis ( $H_0: \beta_i \neq 0$ ) is rejected at a 5% significance level ( $p < 0.05$ ). Conversely, acceptance of  $H_0$  ( $p > 0.05$ ) suggests no significant influence. This comprehensive approach underscores the nuanced interrelations among macroeconomic factors and poverty in the ASEAN context.

This study employs the linear ARDL Panel model, implemented using EViews and Stata, to investigate both short-run dynamics and long-run equilibrium relationships between variables. Widely utilized in macroeconomic research, the ARDL model effectively evaluates these interactions. Following [28] and [32]), extreme poverty as of \$2.15 per day, alongside food prices, GDP, inflation, and exchange rates as explanatory variables. The long-run effects of these variables on extreme poverty are assessed using the bounds-testing approach developed by Pesaran et al. (2001). To enhance analytical rigor, the study reformulates the models in equations (1) into an error correction form, shown in equations (2), capturing cointegration between the I(0) and I(1) processes. This approach strengthens the robustness of findings and provides a detailed understanding of dynamic interactions in the pool panel ARDL framework.

$$\Delta POV_{EXT_{it}} = \alpha_0 + \sum_{j=1}^p \beta_{ij} \Delta POV_{EXT_{it-j}} + \sum_{j=1}^{q1} \delta_{ij} \Delta FPI_{it-j} + \sum_{j=1}^{q2} \gamma_{ij} \Delta GDP_{it-j} + \sum_{j=1}^{q3} \phi_{ij} \Delta INFL_{it-j} + \sum_{j=1}^{q4} \varphi_{ij} \Delta EXR_{it-j} + \lambda ECT_{it-1} + \lambda_1 FPI_{it-1} + \lambda_2 GDP_{it-1} + \lambda_3 INFL_{it-1} + \lambda_4 EXR_{it-1} + u_{it} \dots\dots\dots(2)$$

The symbol  $\Delta$  is the difference operator, p for the optimal lag for the endogenous variable integrated in the linear equation as an explanatory variable in the short run, q1.....4 for the optimal lag for the exogenous variable, and j for the lag for the explanatory variable, i for the cross-section, and t for the length of time,  $\lambda ECT_{it-1}$  is the error correction term obtained from the long-run cointegration relationship between the I(0) and I(1) processes.  $POV\_EXT_{it}$ . On the other hand  $\lambda_1 FPI_{it-1} + \lambda_2 GDP_{it-1} + \lambda_3 INFL_{it-1} + \lambda_4 EXR_{it-1}$  shows the variation of the long-run parameters obtained after correcting the short-run error. The residuals from the cointegration regression will be used to estimate both of these. The *Wald* test is performed using the F statistic on the coefficients of the infinite ECT variable considering significance thresholds of 1%, 5%, and 10%.

In assessing the cointegration relationship between the selected variables, previous studies used the cointegration approach created by [33] and this study follows it. Therefore, to



ensure that this approach is used, it is important to arrange the variables in a consistent order. Short-run dynamics that anticipate ECT lags can be achieved if long-run cyclical relationships between variables are found. Pesaran et al. (2001).

The ARDL cointegration test is based on the following hypothesis:

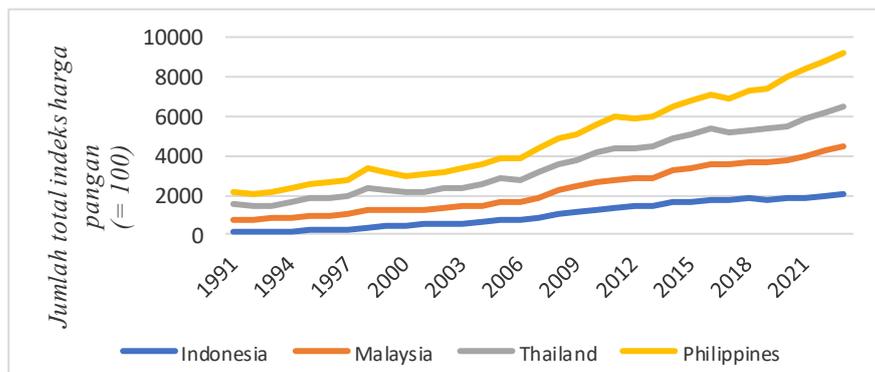
$H_0 : \alpha = \beta_1 = \delta_1 = \gamma_1 = \phi_1 = \varphi_1 = 0$  This indicates a lack of cointegration. As a result, there is no relationship between the variables in the long-run.

$H_1 : \beta_1 = \delta_1 = \gamma_1 = \phi_1 = \varphi_1 \neq 0$  This indicates cointegration. As a result, there is a relationship between the variables in the long run.

### 3. Results and Discussion

#### General Description

Figure 2 illustrates the trends in food price indices and food price growth in Indonesia, Malaysia, Thailand, and the Philippines from 1991 to 2023. Food price increases were moderate until the early 2000s but surged significantly in 2008, particularly in the Philippines, where the index peaked at 2,349.2. This spike aligns with the 2007–2008 global food crisis caused by increased demand, supply disruptions, and market speculation. Notably, the Philippines' longstanding protection of its rice industry, including the Rice Tariff Act of 2019, further influenced domestic prices and import policies [35–37]. Post-2008, the food price index showed a steady upward trend, with significant hikes in 2011 and 2021, driven by supply chain disruptions from COVID-19, climate change, and rising transportation costs. Indonesia's proactive food security measures, initiated during Soeharto's New Order era, included BULOG's efficient logistics and rice price stabilization strategies [38]. However, corruption allegations and the Asian financial crisis challenged these efforts. Reforms are ongoing, focusing on diversifying agriculture while addressing systemic inefficiencies. Globally, food insecurity remains a critical issue, with 2.3 billion people facing moderate to severe food insecurity in 2021 [29,39]. Asia, particularly South and Southeast Asia, has the highest prevalence of malnutrition, exacerbated by climate change, the COVID-19 pandemic, and geopolitical conflicts [39,40]. Efforts toward achieving SDG 2, "Zero Hunger," are essential to addressing these challenges and improving food access worldwide [15].

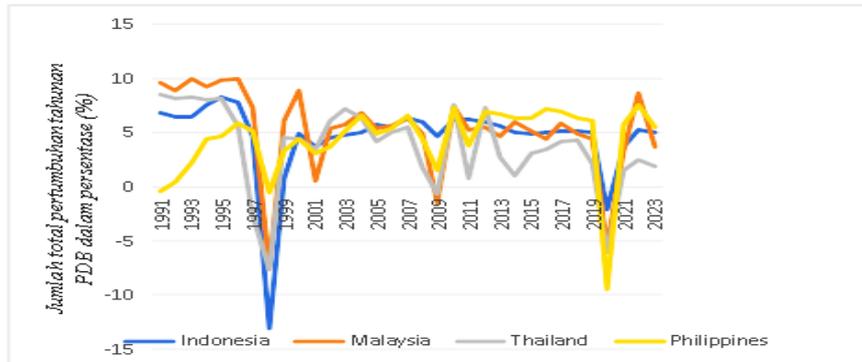


**Figure 2.** Food Price Index of 4 ASEAN Countries 1991-2023  
(Data source: FAOsat (2024))

Figure 3 presents the growth of Gross Domestic Product (GDP) in Indonesia, Malaysia, Thailand, and the Philippines from 1991 to 2023. Notably, Indonesia experienced a sharp GDP contraction of -13.127% in 1998, while the Philippines saw a significant GDP growth of 7.334% in 2010, reflecting the post-2008 global financial crisis recovery and economic reforms. However, in 2020, the Philippines faced a severe GDP decline of -9.518%, likely due to the COVID-19 pandemic and reduced global trade [41]. Despite economic challenges, GDP growth showed positive trends from 2021 onward.

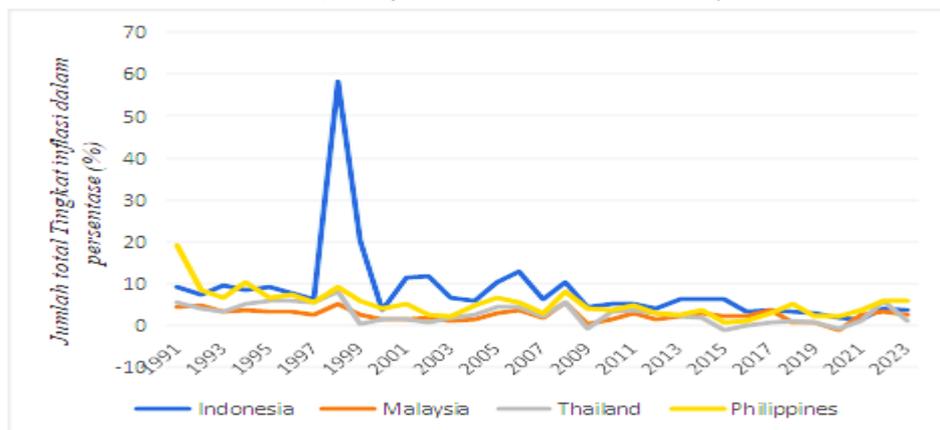
Studies show that economic growth and poverty are closely linked to income distribution. For instance, although the Philippines experienced GDP growth, high income inequality

hindered significant poverty reduction [42]. In contrast, Indonesia's steady growth helped reduce poverty, although challenges remain, especially in rural areas reliant on agriculture, which is vulnerable to price fluctuations and climate change [43]. The study highlights the importance of inclusive and sustainable growth.



**Figure 3.** Gross Domestic Product in 4 ASEAN Countries 1991-2023  
(Data source: World Bank (2024))

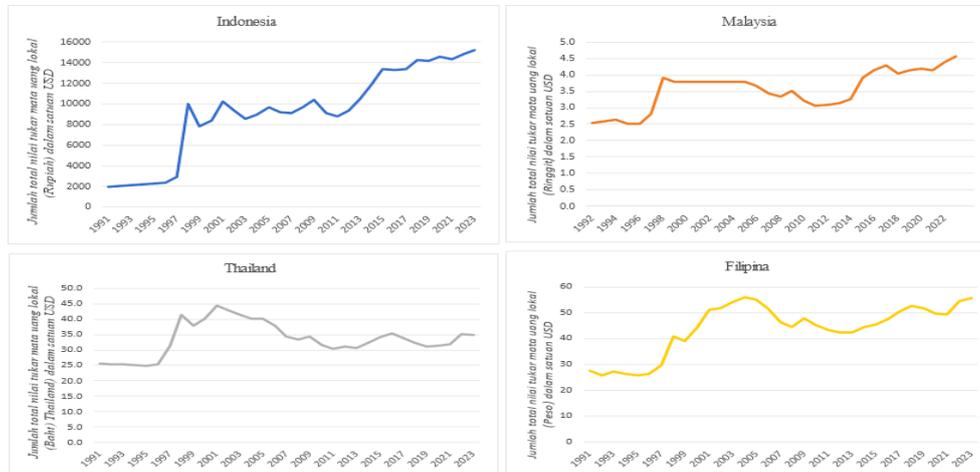
Figure 4 presents inflation data for Indonesia, Malaysia, Thailand, and the Philippines from 1991 to 2023. In 1998, Indonesia experienced a dramatic inflation rate of 58.45%, driven by the Asian economic crisis, which caused a sharp depreciation of the rupiah and significant economic disruptions. Other ASEAN countries, such as Malaysia (5.27%), Thailand (7.99%), and the Philippines (9.23%), also faced rising inflation, though not to the same extent. Inflation rates remained elevated in Indonesia until 1999 when they declined to 20.48%. In 2008, inflation surged again due to the global food and energy crisis, with all countries, including Indonesia (10.23%), facing significant increases. Thailand saw periods of deflation, including in 2015 (-0.90%) and in 2009 and 2020, reflecting weak demand and low commodity prices. In 2020, the COVID-19 pandemic contributed to low or negative inflation across ASEAN countries due to disrupted global demand and supply chains.



**Figure 4.** Inflation Rate in 4 ASEAN Countries 1991-2023  
(Data source: World Bank, 2024)

Figure 5 and 6 illustrates the exchange rate trends in Indonesia, Malaysia, Thailand, and the Philippines from 1991 to 2023. Indonesia saw a sharp increase in its exchange rate in 1998 due to the Asian economic crisis, reaching 10,013.62 rupiah per USD. Similarly, Thailand and the Philippines experienced depreciation, though less severe. Malaysia, on the other hand, saw a temporary strengthening in 1998. Indonesia faced another significant rise in 2001, followed by a gradual decline, while other countries maintained more stable rates. In 2015, the

exchange rates weakened across all countries, likely due to global fluctuations. Between 2022 and 2023, rates rose again, reflecting global inflationary pressures and post-pandemic uncertainty. Studies indicate that exchange rate volatility impacts essential goods, such as food and energy, which are crucial for low-income households. A weaker currency makes imports more expensive, contributing to inflation and deepening poverty [44].



Results are the main part of a scientific article, containing: clean results without data analysis process, hypothesis testing results. Results can be presented with tables or graphs, to clarify the results verbally

Discussion is the most important part of the entire content of a scientific article. The objectives of the discussion are: Answering research problems, interpreting findings, integrating findings from research into existing bodies of knowledge and developing new theories or modifying existing theories.

Table 1. Elemental composition of sampling sites

Site	TiO <sub>2</sub> (wt%)	Al <sub>2</sub> O <sub>3</sub> (wt%)	MnO (wt%)	MgO (wt%)	Na <sub>2</sub> O (wt%)
GIJ	0.5	16.4	0.19	2.74	3.00
GPW	0.78	19.0	0.18	4.57	2.55
GSR	0.62	16.3	0.17	3.09	3.09
KLB	0.67	15.7	0.14	5.07	2.59
KSG	1.90	17.1	0.15	3.79	3.33
PWH	0.58	20.9	0.12	1.55	3.00
SKP	0.68	17.8	0.16	3.12	2.75

The table is created with a line width of 1 pt and the tables caption is placed above the table. Table descriptions that consist of more than 2 rows are written using single space.

Table lines are prioritized only as horizontal lines while vertical lines are omitted.

#### 4. Conclusions and Suggestions

Contains conclusions and suggestions. Conclusions contain answers to research questions. Suggestions refer to research results and take the form of practical actions, state for whom and what the suggestions are intended for. Written in essay form, not in numerical form.

#### Thank-you note

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