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Connection Mark Swap Rupiah to Dollar American States with Inflation Rates in Indonesia: Systematic Literature Review

Alhusna Burhan Ali[1], Rahmad Dani Wahe[2], Muchriana Muchran[3]

Master Management, University Muhammadiyah Makassar

Email: husna.burhan.ali@gmai.com, rahmaddaniw@gmail.com

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ABSTRACT

This study aims to analyze the relationship between the Indonesian Rupiah (IDR) exchange rate against the United States Dollar (USD) and the inflation rate in Indonesia through a Systematic Literature Review (SLR) approach. The study adopted the PRISMA protocol to ensure a transparent and structured review process. Literature searches were conducted using the Scopus database covering publications from 2015–2025. From a total of 354 identified articles, only 10 articles fulfilled the inclusion and quality assessment criteria and were selected for further analysis. The synthesis of the reviewed studies demonstrates consistent findings that the depreciation of the Rupiah significantly contributes to inflationary pressures through the imported inflation mechanism, particularly affecting energy prices, imported commodities, and industrial raw materials. Several studies also indicate that exchange rate instability can weaken purchasing power and increase production costs in domestic industries. Methodological analysis shows that dynamic econometric models such as Autoregressive Distributed Lag (ARDL), Vector Autoregression (VAR), and Error Correction Model (ECM) are effective in capturing both short-run and long-run relationships between exchange rates and inflation. Furthermore, recent studies reveal a growing shift toward the application of machine learning approaches, especially Extreme Learning Machine (ELM) and Nonlinear Autoregressive Neural Network (NARX-NN), which demonstrate high predictive accuracy, reaching 4.57% during periods of extreme volatility such as the COVID-19 pandemic. The findings also confirm that effective monetary policy depends on interest rate differentials and the institutional credibility of the central bank in maintaining market confidence and price stability.

1. Introduction

Macroeconomic stability is one of the primary indicators of successful economic development because it reflects a country's ability to maintain sustainable growth, stable prices, and a conducive investment climate. Among various macroeconomic indicators, inflation and exchange rates are considered strategic variables because they directly influence purchasing power, production costs, international trade, and investment decisions. Stable inflation and exchange rates are therefore essential prerequisites for maintaining long-term economic resilience and sustainable development.

Globally, exchange rate volatility has become an increasingly important issue due to globalization, financial market integration, geopolitical uncertainty, and economic shocks such as the COVID-19 pandemic. Fluctuations in currency values can significantly affect domestic inflation through imported inflation mechanisms, especially in developing countries that rely heavily on imported goods and raw materials. Exchange rate depreciation tends to increase import prices, production costs, and consumer prices, while currency appreciation may reduce inflationary pressure by lowering the cost of imported products and inputs. Consequently, the relationship between exchange rates and inflation remains one of the central discussions in macroeconomic and monetary policy studies.

In the Indonesian context, the rupiah exchange rate against the United States dollar

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(USD) is highly sensitive to both domestic and global economic conditions. Indonesia still depends considerably on imports of energy, industrial raw materials, and capital goods, making the national economy vulnerable to exchange rate fluctuations. Changes in exchange rates may arise from differences in interest rates, international capital flows, trade balance conditions, and political or economic uncertainty. When the rupiah depreciates against the US dollar, import costs increase and create inflationary pressures through imported inflation mechanisms. Conversely, rupiah appreciation can suppress inflation by reducing the prices of imported goods and lowering overall production costs. Therefore, understanding the relationship between the rupiah exchange rate and inflation is important for designing effective monetary and fiscal policies in Indonesia.

The COVID-19 pandemic further intensified macroeconomic instability worldwide, including in Indonesia. During the pandemic period, the rupiah experienced significant depreciation against the US dollar, accompanied by supply chain disruptions, shifts in consumption patterns, and declining economic activity. Monetary policy adjustments, including interest rate policies and economic stimulus programs implemented by central banks and governments, also affected the movement of exchange rates and inflation levels in Indonesia. These conditions demonstrate that exchange rates and inflation are interconnected variables that require comprehensive analysis to support economic stability.

According to data from the Central Statistics Agency (BPS), Indonesia's inflation rate fluctuated significantly during the 2020–2025 period. In 2020, inflation was relatively low at 1.68% due to weakened economic activity during the COVID-19 pandemic. Inflation slightly increased to 1.87% in 2021 as economic recovery began. However, inflation surged to 5.51% in 2022, driven by rising global energy and food prices, supply chain disruptions, and the weakening rupiah exchange rate. Inflation subsequently declined to 2.61% in 2023 and remained stable in 2024, indicating the effectiveness of inflation control policies implemented by the government and Bank Indonesia. In 2025, inflation slightly increased to 2.92% but remained within the national inflation target range. These fluctuations indicate that exchange rate dynamics continue to play a significant role in shaping inflation trends in Indonesia.

Various empirical studies have examined the relationship between the rupiah exchange rate and inflation in Indonesia, although the findings remain inconsistent. Yolanda (2017) found that macroeconomic variables, including exchange rates and money supply, simultaneously affect inflation and subsequently influence poverty levels. Kuncoro (2020) demonstrated that exchange rate volatility is closely associated with the effectiveness of interest rate policies within the Inflation Targeting Framework. Suhendra et al. (2022) reported that central bank interest rates significantly influence rupiah exchange rate volatility against major international currencies in the long term. Siska et al. (2023) emphasized that macroeconomic stability, including exchange rate and inflation control, is a prerequisite for capital market development. Meanwhile, Arisanti et al. (2022) showed that machine learning models can accurately predict rupiah depreciation trends during the COVID-19 pandemic.

Although previous studies have contributed important insights regarding exchange rate and inflation dynamics, several research gaps remain. First, prior studies tend to focus on specific variables, periods, or analytical methods, resulting in fragmented findings. Second, inconsistencies among empirical results indicate the absence of a comprehensive synthesis explaining the overall relationship between exchange rates and inflation in Indonesia. Third, limited studies systematically classify research methods, determinants, and contextual factors that strengthen or weaken exchange rate effects on inflation. Therefore, a systematic and integrative review is necessary to synthesize previous findings and identify potential directions for future research.

Based on these gaps, this study specifically addresses the following research problems: (1) how the rupiah exchange rate against the US dollar relates to inflation levels in Indonesia according to previous empirical studies; (2) what research methods are commonly used to analyze the relationship between exchange rates and inflation; and (3) what factors strengthen or weaken the influence of exchange rates on inflation in Indonesia.

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Accordingly, this study aims to: (1) identify and synthesize previous studies examining the relationship between the rupiah exchange rate and inflation in Indonesia; (2) analyze patterns and trends found in prior empirical research; (3) classify the research methods used in the literature; and (4) provide comprehensive conclusions regarding the relationship between exchange rates and inflation in Indonesia based on scientific evidence through a Systematic Literature Review (SLR) approach.

Theoretically, this study contributes to the macroeconomic literature by enriching understanding of exchange rate transmission mechanisms toward inflation within the Indonesian context. This study also provides a comprehensive synthesis of various methodological approaches used in previous research, thereby helping future researchers identify potential research opportunities and methodological improvements. Practically, the findings are expected to provide evidence-based references for policymakers, central banks, and economic practitioners in formulating exchange rate stabilization and inflation control policies. In addition, this study may serve as an academic reference for students, researchers, and academics interested in Indonesian macroeconomic studies. The novelty of this research lies in its systematic synthesis of empirical findings, methodological classifications, and identification of moderating factors affecting the exchange rate–inflation relationship in Indonesia through the SLR approach.

2. Literature Review

2.1 Conceptual and Theoretical Foundations

Macroeconomic stability reflects a country's ability to maintain sustainable economic growth, stable prices, and balanced financial conditions. Two of the most important indicators of macroeconomic stability are inflation and exchange rates. Inflation refers to a continuous increase in the general price level, while the exchange rate reflects the value of one currency relative to another. In Indonesia, the movement of the Rupiah exchange rate against the United States Dollar (USD) has become an important determinant of domestic inflation because Indonesia still depends heavily on imported raw materials, energy, and capital goods.

Theoretically, the relationship between exchange rates and inflation can be explained through the Imported Inflation Theory, which states that depreciation of the domestic currency increases import prices and production costs, thereby encouraging inflationary pressure. Conversely, currency appreciation may reduce imported inflation by lowering the prices of imported goods. This mechanism is highly relevant in emerging economies such as Indonesia, where external economic shocks strongly influence domestic price stability.

The relationship between exchange rates and inflation is also supported by Purchasing Power Parity (PPP) Theory, which argues that changes in exchange rates reflect differences in inflation rates between countries. According to this theory, countries experiencing higher inflation tend to face currency depreciation over time. In addition, the Interest Rate Parity Theory explains that differences in interest rates between countries influence capital flows and exchange rate movements, which subsequently affect inflation dynamics.

Recent empirical evidence supports the importance of these theoretical frameworks. Ibrahim and Sukmana (2023) demonstrated that monetary policy tightening through higher interest rates contributes to Rupiah appreciation and inflation control. Similarly, Suhendra et al. (2022) confirmed that central bank interest rates significantly affect exchange rate volatility in both the short and long term. Meanwhile, Narayan et al. (2019) emphasized the important role of global oil prices in influencing the Rupiah exchange rate and domestic inflation dynamics.

The development of machine learning approaches has also enriched the theoretical understanding of exchange rate forecasting and inflation risk mitigation. Arisanti et al. (2022) found that adaptive machine learning models such as Extreme Learning Machine (ELM) and Non-Linear Autoregressive Neural Network (NARX NN) provide highly accurate exchange rate predictions during periods of economic turbulence such as the COVID-19 pandemic.

2.2 Review of Empirical Studies

Previous studies examining the relationship between the Rupiah exchange rate and inflation in Indonesia have produced diverse findings depending on methodological approaches, observation periods, and macroeconomic contexts.

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Yolanda (2017) found that exchange rates, money supply, and oil prices simultaneously influence inflation in Indonesia and indirectly affect poverty levels. The study highlighted the importance of macroeconomic stability in supporting social welfare. Kuncoro (2020) further demonstrated that exchange rate volatility is closely related to interest rate policy effectiveness within the Inflation Targeting Framework in Indonesia.

Suhendra et al. (2022) examined the short-run and long-run effects of central bank interest rates on exchange rate volatility and concluded that monetary policy significantly influences Rupiah stability, although the adjustment period varies across currencies. Similarly, Ibrahim and Sukmana (2023) confirmed that contractionary monetary policy contributes to Rupiah appreciation and inflation stabilization.

Research by Siska et al. (2023) extended the discussion to the capital market sector, showing that inflation and exchange rate stability are important determinants of stock market development in Indonesia. Luwihono et al. (2021) also found that exchange rate fluctuations directly influence banking stock performance and broader financial market stability.

From a methodological perspective, traditional econometric models such as ARDL, VAR, ECM, and GARCH remain dominant in macroeconomic studies because they effectively capture long-run equilibrium and short-run dynamics. However, recent studies have increasingly adopted machine learning approaches. Arisanti and Puspita (2022) demonstrated that NARX Neural Network models can accurately forecast USD/IDR exchange rate movements under extreme market conditions. Likewise, Arisanti et al. (2022) proved that the ELM method achieved high predictive accuracy during the COVID-19 period.

Despite extensive research, previous studies tend to focus separately on monetary policy, exchange rates, inflation, or forecasting models. Limited studies comprehensively synthesize these findings through a systematic literature review approach.

2.3 Identification of the Research Gap

Based on the synthesis of previous literature, several important research gaps can be identified.

First, prior studies generally focus on partial relationships between exchange rates and inflation without comprehensively integrating the roles of monetary policy, oil prices, foreign exchange reserves, and global economic shocks. This fragmented approach limits the understanding of the broader transmission mechanism between exchange rates and inflation.

Second, most previous studies rely heavily on traditional econometric models such as ARDL, VAR, ECM, and GARCH. Although these methods are effective in identifying structural relationships, they often fail to capture non-linear dynamics during periods of extreme economic volatility, such as the COVID-19 pandemic.

Third, there remains limited systematic synthesis comparing the effectiveness of conventional econometric methods and emerging machine learning techniques in analyzing exchange rate and inflation dynamics in Indonesia. Existing literature also lacks comprehensive discussion regarding how technological developments in forecasting models may support macroeconomic policy decision-making.

Finally, previous studies rarely employ a Systematic Literature Review (SLR) approach using PRISMA standards to critically evaluate methodological trends, empirical consistency, and future research directions regarding the relationship between the Rupiah exchange rate and inflation.

Therefore, this study contributes by synthesizing empirical evidence from previous studies, comparing methodological approaches, and identifying factors influencing the exchange rate-inflation relationship in Indonesia through a systematic literature review approach.

2.1 Development of the Conceptual Framework

This study focuses on the relationship between the Rupiah exchange rate against the US Dollar and inflation in Indonesia. The exchange rate is positioned as the primary independent variable influencing domestic inflation through imported inflation mechanisms.

Rupiah depreciation tends to increase import prices, particularly for energy products, industrial raw materials, and consumer goods. As production costs rise, domestic prices increase and contribute to inflationary pressures. Conversely, Rupiah appreciation reduces import costs and helps stabilize inflation.

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Monetary policy variables, especially interest rates, play an important role in moderating this relationship. Higher interest rates generally attract foreign capital inflows, strengthen the Rupiah exchange rate, and reduce inflationary pressures. Foreign exchange reserves also function as an economic buffer that stabilizes exchange rate volatility and limits inflation pass-through effects.

External variables such as global oil prices and international economic uncertainty strengthen the transmission effect between exchange rates and inflation. During periods of global instability, including the COVID-19 pandemic, exchange rate volatility tends to intensify inflationary risks.

In methodological terms, previous studies show that econometric approaches such as ARDL, VAR, ECM, and GARCH effectively capture structural relationships, while machine learning models such as ELM and NARX NN provide superior predictive capabilities under volatile conditions.

2.5 Hypotheses or Research Propositions

Because this study adopts a Systematic Literature Review (SLR) approach, the study develops research propositions rather than statistical hypotheses.

Proposition 1:
Rupiah depreciation against the US Dollar tends to increase inflationary pressure in Indonesia through imported inflation mechanisms.

Proposition 2:
Monetary policy, particularly interest rate adjustments, significantly influences the relationship between exchange rates and inflation in Indonesia.

Proposition 3:
External factors such as global oil prices, foreign exchange reserves, and international economic shocks strengthen or weaken the transmission effect of exchange rates on inflation.

Proposition 4:
Machine learning approaches provide higher predictive accuracy in forecasting exchange rate movements compared to conventional econometric models during periods of extreme economic volatility.

3. Research Methods

3.1 Research Design

This study employs a Systematic Literature Review (SLR) approach to synthesize empirical findings regarding the relationship between the Rupiah exchange rate and inflation in Indonesia. The SLR approach was selected because it allows researchers to systematically identify, evaluate, and integrate findings from previous studies in a transparent and reproducible manner. The study adopts the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol developed by Haddaway et al. (2022) to ensure methodological rigor and transparency throughout the review process.

3.2 Research Context and Setting

The study focuses on the Indonesian macroeconomic context, particularly the interaction between the Rupiah exchange rate against the US Dollar and domestic inflation dynamics. Indonesia was selected because its economy remains highly dependent on imports of energy, raw materials, and capital goods, making exchange rate fluctuations highly relevant to inflationary pressures and monetary policy effectiveness.

3.3 Population and Sample / Research Participants

The population of this study consists of scientific articles discussing exchange rates, inflation, monetary policy, and macroeconomic stability in Indonesia. Articles were obtained from the Scopus database covering the publication period 2015–2025.

Using PRISMA-based screening procedures, 354 articles were initially identified. After several stages of filtering and eligibility assessment, 10 high-quality articles meeting the inclusion criteria were selected for final analysis.

The inclusion criteria were:

a. Articles published in reputable international journals indexed by Scopus.
b. Studies discussing exchange rates and inflation in Indonesia.
c. Empirical studies employing quantitative or predictive analytical methods.
d. Articles published between 2015 and 2025.

The exclusion criteria included inaccessible articles, citation-only papers, studies lacking methodological rigor, and studies unrelated to the Indonesian context.

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3.4 Data Sources and Data Collection

This study used secondary data obtained from scientific articles indexed in the Scopus database during the period 2015–2025. The literature search was conducted using keywords related to exchange rates, inflation, monetary policy, and Indonesia. The data collection process followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines proposed by Haddaway et al. (2022) to ensure transparency, consistency, and methodological rigor in the article selection process.

The selection procedure consisted of four stages: identification, screening, eligibility assessment, and inclusion. At the identification stage, 354 articles were initially identified from the Scopus database. Subsequently, duplicate records and articles automatically marked as ineligible were removed. During the screening stage, articles whose titles and abstracts did not meet the research relevance criteria were excluded. The remaining articles then underwent full-text eligibility assessment to evaluate methodological quality and relevance to the study objectives.

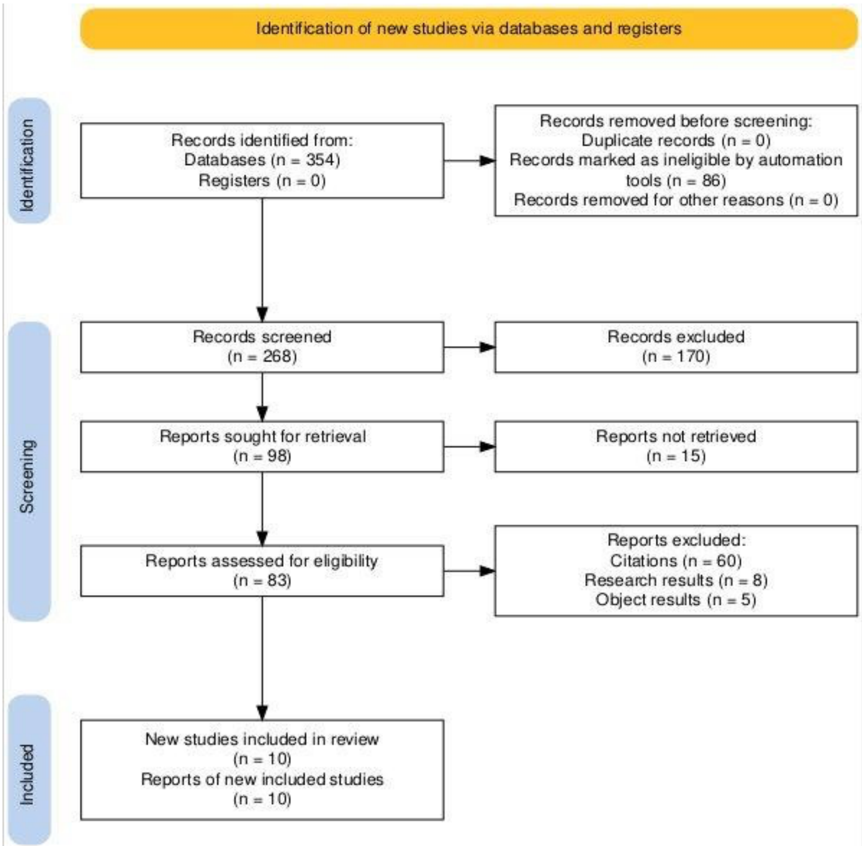

Fig 1. PRISMA Flow Diagram of Article Selection Process

Based on the PRISMA flow diagram, of the 354 articles initially identified, 86 articles were excluded during the initial filtering process, leaving 268 articles for screening. During the screening stage, 170 articles were excluded because they did not meet the relevance criteria based on title and abstract evaluation. Of the 98 full-text articles sought for retrieval, 15 articles could not be accessed. Furthermore, 73 articles were excluded during the eligibility assessment stage due to citation-only content, insufficient methodological quality, or inappropriate research objects. Finally, 10 articles fulfilled all inclusion criteria and were included in the final systematic literature review.

3.5 Measurement of Variables and Research Instruments

The main concepts reviewed in this study include:

a. Rupiah exchange rate against the US Dollar,
b. Inflation rate,
c. Interest rates,
d. Foreign exchange reserves,
e. Oil prices,
f. Money supply,
g. Exchange rate volatility, and
h. Machine learning forecasting accuracy.

The study employed a data extraction framework as the primary research instrument to

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classify:

a. Research objectives,
b. Analytical methods,
c. Variables examined,
d. Main findings, and
e. Policy implications.

The extracted information was synthesized comparatively across selected studies.

3.6 Data Analysis Techniques

The study applies qualitative content analysis and comparative synthesis techniques. The selected articles were analyzed to identify:

a. Patterns of findings,
b. Consistency of empirical evidence,
c. Methodological trends,
d. Determinants influencing exchange rate-inflation relationships, and
e. Emerging research directions.

The analysis particularly compared the effectiveness of traditional econometric methods (ARDL, VAR, ECM, GARCH) and machine learning approaches (ELM and NARX NN).

3.7 Validity, Reliability, and Trustworthiness

To ensure validity and reliability, this study employed several procedures:

a. Application of PRISMA guidelines to ensure systematic article selection,
b. Use of Scopus-indexed journals to maintain source credibility,
c. Transparent inclusion and exclusion criteria,
d. Comparative synthesis across multiple studies to reduce interpretative bias.

These procedures strengthen the trustworthiness and academic rigor of the literature review findings.

3.8 Ethical Considerations

This study uses publicly accessible secondary data from published academic articles; therefore, no direct human participants were involved. Nevertheless, academic integrity was maintained by properly citing all sources and avoiding plagiarism throughout the review process.

3.9 Research Procedure

The research procedure consisted of several stages:

a. Formulating research questions,
b. Identifying relevant keywords,
c. Conducting literature searches in the Scopus database,
d. Screening articles using PRISMA criteria,
e. Assessing article eligibility,
f. Extracting and organizing data,
g. Synthesizing empirical findings, and
h. Drawing conclusions and implications.

3.10 Methodological Limitations

This study has several methodological limitations. First, the literature search was limited to the Scopus database, potentially excluding relevant studies indexed elsewhere. Second, the number of selected articles was relatively limited, which may affect the comprehensiveness of the synthesis. Third, differences in methodologies, observation periods, and variables across studies may influence comparability of findings. Despite these limitations, the systematic review approach provides a comprehensive overview of exchange rate and inflation dynamics in Indonesia.

4. Results and Discussion

4.1.1 Sample Description and Descriptive Statistics

This study reviewed 10 selected articles published between 2017 and 2023 that discuss the relationship between the Rupiah exchange rate and inflation in Indonesia. The reviewed studies employed diverse analytical methods, including ARDL, VAR, ECM, GARCH, multiple regression, and machine learning models such as ELM and NARX Neural Network.

Most studies focused on macroeconomic variables such as exchange rates, inflation, interest rates, money supply, oil prices, foreign exchange reserves, and stock market indicators. The observation periods varied considerably, ranging from pre-pandemic periods to the COVID-19 crisis period.

4.1.2 Data Quality and Preliminary Analysis

The article selection process followed the PRISMA protocol to ensure transparency and methodological rigor. From the 354 articles initially identified, 86 articles were automatically excluded during the initial filtering process. Subsequently, 170 articles were removed during title and abstract screening because they did not meet the relevance criteria.

Of the 98 articles subjected to full-text

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review, 15 were inaccessible. During the eligibility assessment stage, 73 additional articles were excluded due to citation-only content, methodological weaknesses, or inappropriate research objects. Finally, 10 articles fulfilled all inclusion criteria and were included in the final synthesis.

4.1.3 Main Analytical Results

The analysis demonstrates that Rupiah depreciation consistently contributes to rising inflationary pressure in Indonesia through imported inflation mechanisms. This relationship is particularly visible in sectors highly dependent on imported raw materials and energy products.

Studies using ARDL, VAR, and ECM models consistently found both short-run and long-run relationships between exchange rates and inflation. Monetary policy variables, especially interest rates, significantly influence exchange rate stability and inflation control.

Machine learning models such as ELM and NARX Neural Network demonstrated superior predictive capabilities during periods of extreme volatility, particularly during the COVID-19 pandemic. Forecasting accuracy ranged between 2.75% and 4.57%, indicating strong predictive performance under unstable market conditions.

4.1.4 Hypothesis Testing Results / Key Findings

The synthesis produced several key findings:

a. Rupiah depreciation significantly increases inflationary pressures in Indonesia.
b. Interest rate policy plays a critical role in stabilizing exchange rates and controlling inflation.
c. External variables such as oil prices, foreign exchange reserves, and global economic shocks influence the strength of exchange rate pass-through effects.
d. Machine learning approaches provide higher predictive accuracy during periods of economic instability compared to conventional econometric models.

4.1.5 Visual Presentation of Results

The findings indicate a methodological evolution in macroeconomic studies in Indonesia. Conventional econometric methods remain important for identifying structural relationships, while machine learning techniques increasingly support predictive analysis and economic risk mitigation under uncertain global conditions.

4.2 Research Discussion

4.2.1 Interpretation of Key Findings

a. Monetary Policy and Exchange Rate

Monetary policy plays an important role in influencing exchange rate stability and inflation in Indonesia. Tightening monetary policy through increases in interest rates generally encourages the appreciation of the Rupiah. Ibrahim and Sukmana (2023) empirically demonstrated that contractionary monetary policy during the period 2009–2022 effectively strengthened the domestic exchange rate. A stronger Rupiah reduces the cost of imports, particularly imported raw materials and consumer goods, thereby helping to control inflation and stabilize domestic prices.

Theoretically, the interest rate differential provides a more accurate explanation of exchange rate movements than a single domestic interest rate. Differences between domestic and foreign interest rates influence international capital flows because investors tend to allocate funds to countries offering more attractive returns. As a result, higher domestic interest rates can increase foreign capital inflows and strengthen the Rupiah exchange rate.

Conversely, lower central bank interest rates may reduce exchange rate volatility and support long-term inflation stability. Suhendra et al. (2022) found that central bank interest rates significantly affect Rupiah exchange rate volatility in both the short and long term, although the adjustment period differs across currencies. These findings indicate that the effectiveness of monetary policy depends not only on technical interest rate decisions but also on the credibility and institutional independence of the central bank. Consistent inflation-targeting policies strengthen market confidence and support macroeconomic stability amid global uncertainty and commodity price fluctuations.

b. Exchange Rate and Economic Stability

The Rupiah exchange rate against the United States Dollar is one of the key indicators of Indonesia's macroeconomic stability. Exchange rate fluctuations directly affect inflation through changes in import and export costs. Depreciation of the

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Rupiah increases the prices of imported goods and production inputs, which subsequently contributes to domestic inflationary pressure.

During the COVID-19 pandemic, the Rupiah experienced significant depreciation due to global economic instability and disruptions in international trade. This depreciation increased import costs and intensified inflationary pressures in Indonesia. Arisanti et al. (2022) demonstrated that the Extreme Learning Machine (ELM) model was capable of predicting Rupiah depreciation trends ranging from 2.75% to 4.57% during March–September 2020 with high predictive accuracy. These findings indicate that adaptive machine learning algorithms can serve as effective tools for mitigating future macroeconomic risks and supporting monetary policy decision-making.

c. Factors Influencing the Relationship Between Exchange Rates and Inflation

1) Oil Prices and Exchange Rates

Global oil prices are an important external factor influencing the Rupiah exchange rate and inflation in Indonesia. Narayan et al. (2019) found a long-run relationship between world oil prices and the Rupiah/USD exchange rate, particularly under a floating exchange rate regime. Rising oil prices tend to affect Indonesia's trade balance and increase inflationary pressure because Indonesia remains highly dependent on imported energy products.

Yolanda (2017) also confirmed that oil prices significantly influence inflation in Indonesia alongside exchange rates and money supply. Increases in global oil prices raise transportation and production costs, which are then transmitted into higher domestic prices.

2) Non-Oil and Gas Exports

Exchange rates and inflation significantly influence the performance of Indonesia's non-oil and gas exports. Stable domestic prices and competitive exchange rates are essential for maintaining export growth. A stronger Rupiah may reduce export competitiveness because Indonesian products become relatively more expensive in international markets. Conversely, excessive inflation increases production costs and reduces export efficiency.

These findings imply that exchange rate stability and inflation control are crucial for improving Indonesia's export competitiveness and maintaining sustainable economic growth.

3) Stock Market and Macroeconomic Variables

Macroeconomic variables such as exchange rates, inflation, and interest rates also influence the Indonesian stock market. Rupiah depreciation and rising inflation generally reduce investor confidence and negatively affect stock market capitalization. Siska et al. (2023) concluded that macroeconomic stability is a fundamental prerequisite for stock market development in Indonesia.

Similarly, Luwihono et al. (2021) found that fluctuations in the Rupiah exchange rate and Bank Indonesia interest rates directly affect banking sector stock performance. These results indicate that exchange rate stability is important not only for inflation control but also for maintaining broader financial sector stability.

4) Foreign Exchange Reserves and Money Supply

Studies using the Error Correction Model (ECM) approach show that foreign exchange reserves, external debt, and money supply significantly influence Rupiah exchange rate fluctuations in both the short and long term. Adequate foreign exchange reserves increase market confidence and reduce exchange rate volatility, thereby moderating the inflation pass-through effect.

Furthermore, money supply growth may intensify inflationary pressure if not accompanied by productive economic expansion. Therefore, effective monetary management is essential for maintaining exchange rate and price stability.

d. Synthesis of Literature Findings

Based on the review of ten selected articles, a clear methodological pattern emerges regarding the analysis of exchange rate and inflation dynamics in Indonesia. Traditional econometric models such as ARDL, VAR, and ECM are consistently used to examine long-run structural relationships and short-run macroeconomic adjustments. These models confirm that exchange rate stability is a key determinant of inflation control, export growth, and financial market performance.

However, recent studies indicate that conventional linear models often fail to fully capture market dynamics during periods of extreme

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economic shocks, such as the COVID-19 pandemic. In this context, machine learning approaches provide important contributions because of their ability to process non-linear and highly volatile data. Models such as ELM and NARX Neural Network demonstrate superior predictive capabilities compared to conventional regression approaches.

The synthesis also highlights that the transmission of exchange rates to inflation is influenced not only by monetary policy but also by external variables such as global oil prices, foreign exchange reserves, and international economic uncertainty. These variables function as important buffers against external shocks and determine the magnitude of inflation pass-through effects.

Overall, the literature demonstrates an evolution in macroeconomic analytical approaches in Indonesia. While econometric models remain important for verifying structural relationships and policy transmission mechanisms, intelligent predictive algorithms increasingly play a strategic role in economic risk mitigation and policy forecasting under conditions of global uncertainty.

4.2.2 Comparison with Previous Studies

The findings are consistent with Yolanda (2017), who found that exchange rates and oil prices significantly influence inflation in Indonesia. Similarly, Ibrahim and Sukmana (2023) demonstrated that contractionary monetary policy contributes to Rupiah appreciation and inflation stabilization.

The results also support Suhendra et al. (2022), who confirmed the long-run influence of interest rates on exchange rate volatility. Furthermore, the findings align with Arisanti et al. (2022), which emphasized the predictive superiority of machine learning methods during the COVID-19 crisis.

However, unlike many previous studies that focused on single methodologies or isolated variables, this study synthesizes multiple methodological perspectives and integrates broader macroeconomic determinants into a unified analytical framework.

4.2.3 Theoretical Contributions

This study contributes theoretically by strengthening the relevance of Imported Inflation Theory, Purchasing Power Parity Theory, and Interest Rate Parity Theory in explaining exchange rate-inflation dynamics in emerging economies.

The study also extends existing literature by integrating machine learning approaches into macroeconomic analysis. The findings suggest that non-linear predictive models complement traditional econometric methods and enhance understanding of exchange rate volatility under crisis conditions.

4.2.4 Practical and Policy Implications

The findings imply that Bank Indonesia should maintain monetary policy credibility and institutional independence to stabilize exchange rates and inflation expectations. Adequate foreign exchange reserve management is also essential to reduce exchange rate volatility and inflation pass-through effects. In addition, structural policies aimed at reducing dependence on imported energy and raw materials may help minimize inflation vulnerability caused by exchange rate depreciation.

The adoption of machine learning forecasting systems can support more responsive and accurate macroeconomic policy decision-making, particularly during periods of economic uncertainty.

4.2.5 Integration with the Research Gap

This study successfully addresses the identified research gap by systematically integrating empirical findings related to exchange rates, inflation, monetary policy, and predictive methodologies in Indonesia. Unlike previous fragmented studies, this research provides a comprehensive synthesis of methodological trends, structural relationships, and technological developments in exchange rate forecasting.

4.2.6 Acknowledgement of Study Limitations

Although this study provides comprehensive insights, several limitations should be acknowledged. The synthesis was restricted to selected Scopus-indexed articles, which may limit broader generalization. Differences in methodologies and observation periods among reviewed studies may also influence consistency of findings. Furthermore, the rapidly changing global economic environment may affect the future applicability of current conclusions.

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5. Conclusion

5.1 Summary of Key Findings

This study demonstrates that the relationship between the Rupiah exchange rate against the US Dollar and inflation in Indonesia is significant and multifaceted. Rupiah depreciation consistently increases inflationary pressure through imported inflation mechanisms, particularly in energy prices, imported raw materials, and consumer goods.

The findings also confirm that monetary policy, especially interest rate adjustments, plays an essential role in stabilizing exchange rates and controlling inflation. In addition, external factors such as global oil prices, foreign exchange reserves, and global economic uncertainty influence the transmission effect between exchange rates and inflation.

Methodologically, traditional econometric models remain effective for identifying structural relationships, while machine learning approaches provide superior forecasting accuracy during periods of high volatility.

5.2 Theoretical Contributions

This study contributes to macroeconomic literature by strengthening the relevance of Imported Inflation Theory, Purchasing Power Parity Theory, and Interest Rate Parity Theory in the Indonesian context. The study also extends previous research by integrating discussions of machine learning approaches into exchange rate and inflation analysis, thereby enriching methodological perspectives in macroeconomic studies.

5.3 Practical and Policy Implications

The findings suggest that Bank Indonesia should maintain policy credibility, institutional independence, and effective interest rate management to stabilize inflation expectations and exchange rate volatility. The government should also strengthen foreign exchange reserve management and reduce dependence on imported energy and industrial raw materials. Furthermore, integrating machine learning systems into macroeconomic forecasting may improve policy responsiveness and economic risk mitigation.

5.4 Limitations of the Study

This study is limited by its reliance on articles indexed only in the Scopus database and the relatively small number of selected studies. Differences in methodologies, variables, and observation periods across reviewed studies may also affect the comparability of findings. In addition, the study focuses specifically on Indonesia, which may limit the generalizability of the findings to other emerging economies.

5.5 Directions for Future Research

Future studies are encouraged to integrate machine learning approaches with traditional econometric models to improve forecasting accuracy and structural analysis. Further research should also examine multilateral exchange rate dynamics involving multiple currencies simultaneously. In addition, studies focusing on post-pandemic economic recovery may provide deeper insights into structural changes in exchange rate-inflation relationships in Indonesia and other emerging economies.

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