

# The Effect of Inflation and Exchange Rates on Interest Rates 2013-2022

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## Keywords:

Inflation,  
Exchange Rate,  
Interest Rate

## Abstract

Inflation affects the real income of individuals who have a fixed income, which in turn impacts the wealth stored in banks. Various factors, such as interest rates, inflation, and government economic policies, can influence the exchange rate. These three variables are closely interrelated, and changes in one can significantly affect the others. This research aims to analyze the effect of inflation and exchange rates on interest rates. The results of this study are expected to provide valuable information and input for the central bank in determining effective interest rate policies to stabilize the economy. The research method employed is a quantitative approach utilizing time series data. This type of data is essential for analyzing trends and applying simple regression techniques to observe relationships between variables. Data used in this study were collected from Bank Indonesia for the period 2013-2022. The analysis reveals varying regression coefficients: a negative regression coefficient indicates a negative relationship between variable X and Y, meaning that an increase in one variable leads to a decrease in the other. Conversely, a positive regression coefficient signifies a positive relationship, where an increase in one variable results in an increase in the other. By understanding these relationships, policymakers and stakeholders can make informed decisions regarding monetary policy and economic strategies. This research contributes to a deeper understanding of how inflation, exchange rates, and interest rates interact, helping to ensure a stable financial environment that benefits individuals and institutions alike.

## 1. Introduction

Inflation, defined as a general and continuous increase in prices, is an economic phenomenon commonly experienced by both developed and developing countries. The impact of inflation is not only felt at the individual and societal levels but also affects a nation's overall economic stability (Sadano Sukirno, 2012). Inflation influences individuals' real income, especially those with fixed incomes, as well as the value of wealth stored in banks. In response, people often shift their wealth to assets such as land, gold, or stock investments.

Inflation is closely linked to other macroeconomic components, such as interest rates and exchange rates. Interest rates, which represent the cost of borrowing money, can be influenced by inflation and exchange rate fluctuations. Exchange rates, which indicate the price of one country's currency relative to another's, are also affected by factors such as inflation, interest rates, and government economic policies. The relationship between inflation, exchange rates, and interest rates

demonstrates a complex and interdependent interaction.

High inflation can lead to a depreciation of the currency's value due to increased production costs, prompting companies to raise product prices. This, in turn, can boost demand for imported goods and services, leading to an appreciation of foreign currencies relative to the domestic currency. Reduced purchasing power caused by inflation may lower domestic demand, subsequently affecting money demand and interest rates. In response, central banks often raise interest rates to control inflation, although such measures can negatively impact the real sector's growth and increase unemployment rates.

Exchange rates also influence interest rates through inflation. A depreciated exchange rate can drive inflation higher as imported goods and services become more expensive, increasing domestic money demand and interest rates. Conversely, a low exchange rate can reduce foreign investment, further affecting interest rate stability.

This study aims to analyze the effect of inflation and exchange rates on interest rates, focusing on their relevance to monetary policy. The findings are expected to provide valuable

insights and recommendations for central banks in formulating effective interest rate policies to maintain economic stability.

**Table 1.1**  
**Data on Inflation, Exchange Rates, and Interest Rates**  
**(2013–2022)**

| Year | Exchange Rate | Interest Rate | Inflation |
|------|---------------|---------------|-----------|
| 2013 | Rp12,270      | 7.00%         | 7.36%     |
| 2014 | Rp12,292      | 7.25%         | 8.38%     |
| 2015 | Rp13,300      | 7.75%         | 3.51%     |
| 2016 | Rp13,392      | 7.25%         | 3.61%     |
| 2017 | Rp13,563      | 4.75%         | 3.38%     |
| 2018 | Rp14,272      | 5.25%         | 3.50%     |
| 2019 | Rp14,250      | 5.75%         | 2.94%     |
| 2020 | Rp14,375      | 4.25%         | -1.02%    |
| 2021 | Rp14,375      | 3.50%         | 1.88%     |
| 2022 | Rp15,000      | 3.75%         | 4.30%     |

*Source: Bank Indonesia (2013–2023)*

## 2. Literature Review

### 2.1 Inflation

Inflation refers to the tendency of general prices to rise continuously. An increase in the price of one or two goods is not considered inflation unless the increase spreads to most other goods, resulting in a significant overall price rise (26%) (Boediono, 1999). This price increase can be measured using price indices. Commonly used indices to measure inflation include the Cost of Living Index/Consumer Price Index, the Wholesale Price Index, and the Gross National Product Deflator (Sadono Sukirno, 2002).

### 2.2 Exchange Rates

The exchange rate of the Rupiah represents the price of Rupiah in relation to other currencies (Saputra, 2019). Thus, the exchange rate reflects the conversion value of Rupiah into foreign currencies (Adiningsih et al., 1998). Exchange rates serve as indicators affecting stock and money market activities, as investors tend to exercise caution with their portfolios. Depreciation of a currency, particularly the Rupiah against the US Dollar, negatively impacts the economy and capital markets (Sintak & Kurniasari, 2003).

### 2.3 Interest Rates

According to Kasmir (2014), interest can be defined as a monetary reward provided by banks to third parties as a form of appreciation for entrusting their wealth to be managed by the bank, categorized as deposit interest. Meanwhile, interest paid by third parties or customers to the bank as compensation for credit facilities provided by the bank is categorized as loan interest. Interest rates represent the profit derived from lending money to others, calculated based on time and economic value. The profitability depends on the level of the interest rate (Yehosua et al., 2019). Interest rates are essentially the cost of using investable funds. The interest rate level is a crucial indicator in determining whether an individual will choose to invest or save (Boediono, 2014).

## 3. Research Methodology

This study employs an associative method and formulates associative hypotheses to analyze the relationship between independent and dependent variables. Regression analysis is utilized to predict the

influence of independent variables (inflation rates and exchange rates) on the dependent variable (interest rates), as outlined by Sugiyono (2014). The chosen research methodology is a quantitative approach using time-series data.

The data used in this study consists of secondary data, specifically inflation rates, exchange rates, and interest rates, sourced directly from Bank Indonesia through their official publications and databases. Supporting data and insights are also obtained from previous studies to strengthen the theoretical framework.

### 3.1 Data Collection and Processing

- **Data Source:** Secondary data was collected from Bank Indonesia's official records spanning the years 2013 to 2022. Additional data and references were obtained from peer-reviewed journals and reliable economic research publications.
- **Data Collection Procedure:** Data was accessed through Bank Indonesia's statistical database and verified for completeness and consistency. Relevant studies were reviewed to provide context and comparison.
- **Data Cleaning:** Prior to analysis, data was examined for outliers, missing values, and inconsistencies to ensure quality and reliability.

### 3.2 Data Analysis Techniques

- **Regression Analysis:** Multiple regression analysis was applied to determine the relationship between inflation rates, exchange rates, and interest rates. This technique evaluates how variations in the independent variables explain changes in the dependent variable.
- **Decomposition Method:** A decomposition method was employed to break down time-series data into its core components, including trend, seasonality, and irregularities. This step aids in isolating patterns and enhancing the robustness of the analysis.

- **Assumptions Testing:** Prior to regression analysis, key assumptions were tested, including linearity, multicollinearity, heteroscedasticity, and normality of residuals, to ensure the validity of the regression model.

### 3.3 Tools and Software

The analysis was conducted using statistical software (e.g., SPSS, EViews, or R) to ensure accuracy and efficiency. These tools facilitated data visualization, trend analysis, and hypothesis testing.

### 3.4 Validity and Reliability

To ensure the credibility of the findings:

- Data consistency was verified by cross-referencing values from multiple sources.
- Statistical tests, including the Durbin-Watson test and Variance Inflation Factor (VIF), were performed to assess the reliability of the regression model.

This comprehensive approach aims to provide a rigorous analysis of the relationship between inflation rates, exchange rates, and interest rates, contributing to the development of effective monetary policies. The results of this study are expected to offer practical recommendations for central banks in maintaining economic stability.

## 4. Results and Discussion

Inflation and exchange rates can influence interest rates through various mechanisms. High inflation may prompt central banks to raise interest rates to control inflation. Increased interest rates make borrowing more expensive, which can reduce aggregate demand and curb inflation. Moorcy (2021) found that inflation, interest rates, and exchange rates collectively influence stock prices, with inflation and interest rates having a significant positive impact. Similarly, Nasution (2021) demonstrated that inflation, interest rates, and foreign exchange rates have partial effects on stock prices, with inflation and interest rates being significantly influential. The following

sections discuss the impact of inflation on interest rates and the influence of exchange rates on interest rates.

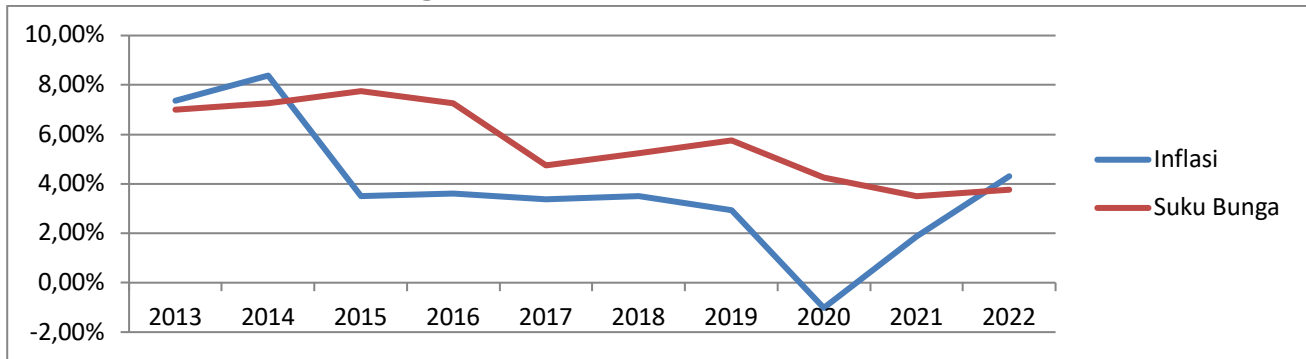
**4.1 The Impact of Inflation on Interest Rates**

Rising inflation tends to increase nominal interest rates. Although real interest rates remain constant, the inflation premium also rises. Research conducted by Fitriyah and Abidin (2020) revealed that inflation levels significantly affect Bank Indonesia's interest rates. Specifically, inflation contributed approximately 0.737% to Bank Indonesia's interest rate changes from 2005 to 2015. As inflation rises, nominal interest rates are likely to increase, subsequently impacting real interest rates. Current economic developments indicate increasing prices for both primary and

secondary needs due to various factors, such as rising fuel prices, which elevate production costs. Meanwhile, household income remains stagnant. This economic situation creates a financial strain on society, leading to two possible actions: reducing expenditures or applying for loans from banks. However, banks must carefully decide whether to adjust interest rates based on the prevailing economic conditions, as there is a risk of non-performing loans.

This theory is supported by data on inflation and interest rates in Indonesia, illustrating the fluctuations in interest rates corresponding to inflation changes. The data provides insights into the relationship between inflation levels and interest rate trends.

**Figure 1.1 Inflation and Interest Rates**



Source: Bank Indonesia

**Regression**

**Model Summary**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .060 <sup>a</sup> | .004     | -.121             | 284.85198                  |

a. Predictors: (Constant), Inflasi

The table explains the magnitude of the correlation/relationship value (R), which is 0.060. From this output, a coefficient of determination (R Square) of 0.004 is obtained,

which explains that the influence of the independent variable (Inflation) on the dependent variable (Interest Rate) is 4%.

**ANOVA<sup>a</sup>**

| Model        | Sum of Squares | df | Mean Square | F    | Sig.              |
|--------------|----------------|----|-------------|------|-------------------|
| 1 Regression | 2332.389       | 1  | 2332.389    | .029 | .870 <sup>b</sup> |
| 1 Residual   | 649125.211     | 8  | 81140.651   |      |                   |
| Total        | 651457.600     | 9  |             |      |                   |

a. Dependent Variable: Interest Rate

b. Predictors: (Constant), Inflasi

From this output, it can be seen that the calculated F value = 0.029 with a significance level of  $0.870 > 0.05$ , so the regression model

cannot be used to predict the participation variable or in other words there is no influence of the Inflation variable (X) on the variable (Y).

#### Coefficients<sup>a</sup>

| Model        | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig. |
|--------------|-----------------------------|------------|---------------------------|-------|------|
|              | B                           | Std. Error | Beta                      |       |      |
| 1 (Constant) | 447.528                     | 133.354    |                           | 3.356 | .010 |
| Inflasi      | .054                        | .319       | .060                      | .170  | .870 |

a. Dependent Variable: Interest Rate

In this output, it is known that the Constant value (a) is 447.528, while the exchange rate (b/regression coefficient) is 0.054, so the regression equation can be written:

$$Y = a + bX$$

$$Y = 447.528 + 0.054X$$

This equation can be interpreted as:

The constant is 447,528, meaning that the consistent value of the Interest Rate variable is 447,528. The regression coefficient The regression coefficient has a positive value, so it can be said that the direction of influence of variable X on Y is positive.

#### 4.2 The Effect of Exchange Rates on Interest Rates

Several previous studies have discussed the relationship between exchange rates and interest rates, such as Witjaksono (2010) found that the middle exchange rate and reference interest rates have a negative impact on stock returns. This shows that investors can withdraw their funds from the stock market if the exchange rate weakens and interest rates increase. In addition, BI interest rates can influence the Rupiah exchange rate against the

US Dollar in the current year positively and significantly. This shows that a weakening exchange rate can cause the central bank to increase interest rates (Salsa, 2020). And also according to Irfan (2021) found that the rupiah exchange rate has a negative influence on inflation. This shows that a weakening exchange rate can cause inflation to rise.

Based on the results of these studies, it can be concluded that the exchange rate has a significant influence on interest rates. A weakening exchange rate can cause interest rates to rise, while a strengthening exchange rate can cause interest rates to fall. So it can be concluded from the three studies above that the influence of the exchange rate on interest rates can occur in two directions, namely:

A weakening exchange rate can cause interest rates to rise, making imports more expensive. This will cause inflation. To control inflation, the central bank can raise interest rates. A stronger exchange rate can cause interest rates to fall, making exports cheaper. This will lead to economic growth. To encourage economic growth, the central bank can lower interest rates.

#### Model Summary

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .116 <sup>a</sup> | .013     | -.110             | 283.45173                  |

a. Predictors: (Constant), Exchange Rate

From the table above, you can explain the magnitude of the correlation or relationship value  $R = 0.116$ . From this output, a coefficient of determination (R Square) of 0.013 is

obtained, which explains that the influence of the independent variable (Exchange Rate) on the dependent variable (Interest Rate) is 13%.

ANOVA<sup>a</sup>

| Model        | Sum of Squares | df | Mean Square | F    | Sig.              |
|--------------|----------------|----|-------------|------|-------------------|
| 1 Regression | 8698.523       | 1  | 8698.523    | .108 | .751 <sup>b</sup> |
| Residual     | 642759.077     | 8  | 80344.885   |      |                   |
| Total        | 651457.600     | 9  |             |      |                   |

a. Dependent Variable: Interest Rate

b. Predictors: (Constant), Exchange Rate

From the table above, you can explain the magnitude of the correlation or relationship value  $R = 0.116$ . From this output, a coefficient of determination (R Square) of 0.013 is

obtained, which explains that the influence of the independent variable (Exchange Rate) on the dependent variable (Interest Rate) is 13%.

Coefficients<sup>a</sup>

| Model |             | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig. |
|-------|-------------|-----------------------------|------------|---------------------------|-------|------|
|       |             | B                           | Std. Error | Beta                      |       |      |
| 1     | (Constant)  | 930.103                     | 1418.796   |                           | .656  | .531 |
|       | Nilai Tukar | -.034                       | .103       | -.116                     | -.329 | .751 |

a. Dependent Variable: Suku Bunga

In this output, it is known that the Constant value (a) is 930.103, while the exchange rate (b/regression coefficient) is -.034, so the regression equation can be written:  
 $Y = a + bX$

$$Y = 930.103 + -.034X$$

This equation can be interpreted as:

The constant is 930.103, which means that the consistent value of the Interest Rate variable is 930.103.

The regression coefficient X of -.034 states that for every 1% increase in the exchange rate, the interest rate increases by -.034. The regression coefficient has a negative value, so it can be said that the direction of influence of variable X on Y is negative.

## 5. Closing

### 5.1 Conclusion

The regression analysis reveals significant insights into the relationship

between exchange rates and interest rates. The constant values of 447.528 and 930.103 represent the baseline levels of the dependent variable when the independent variables (interest rate, inflation rate, exchange rate) are zero. Specifically, the positive regression coefficient indicates a positive relationship between the interest rate and the dependent variable (Y), suggesting that as the interest rate increases, the dependent variable also increases. Conversely, the negative coefficient indicates an inverse relationship between the exchange rate and the dependent variable (Y), meaning that as the exchange rate strengthens, the dependent variable decreases.

However, for a more comprehensive interpretation, it is essential to examine the statistical significance of these results (e.g., p-values) and the goodness of fit (R-squared value) to determine the strength and validity of these relationships. These aspects were not

detailed in the initial presentation but are crucial for evaluating the robustness of the regression model.

## 5.2 Suggestions

### a. For the Central Bank of Indonesia:

It is crucial for the central bank to integrate exchange rate factors into its interest rate policy decisions. A weakened exchange rate should prompt the central bank to increase interest rates in order to manage inflationary pressures. Conversely, a stronger exchange rate may warrant a reduction in interest rates to stimulate economic growth. To implement this, the central bank should regularly monitor key indicators such as the real exchange rate, inflation rate, and capital flows to make data-driven decisions.

### b. For the Government of Indonesia:

The government needs to adopt a multifaceted approach to strengthening the rupiah. Specific actions could include promoting export-driven growth by offering incentives to export-oriented industries, reducing trade barriers, and diversifying export markets. Additionally, increasing foreign exchange reserves through improved foreign investment policies and enhancing the country's current account balance will help stabilize the rupiah.

### c. For Investors:

Investors should closely monitor the relationship between exchange rates and interest rates when making investment decisions. If the exchange rate weakens, investors could consider shifting towards government securities (SBN) as interest rates on these instruments are likely to rise. On the other hand, if the exchange rate strengthens, investments in equities could be more attractive due to lower interest rates. These investment strategies should be aligned with the underlying macroeconomic indicators, such as the inflation rate and central bank policies.

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