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# Macroeconomic Determination of Indonesian Bank Interest Rates

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**ABSTRACT**
The determination of interest rates by Bank Indonesia plays an important role in supporting national economic stability and growth. Although previous studies have highlighted the relationship between interest rates and economic growth and market performance, studies on macroeconomic determinants of interest rate determination are still limited. This study aims to analyze the effect of inflation and exchange rates on Bank Indonesia's interest rates in the period 2004 to 2023, covering both crisis and non-crisis periods. The method used is a quantitative approach with multiple linear regression analysis, as well as classical assumption tests to ensure the validity of the model. The results of the study show that inflation has a positive and significant effect on interest rates, while the exchange rate does not show a significant effect. This finding indicates that inflation is the main factor that Bank Indonesia considers in determining interest rate policy. The policy implications of this study emphasize the importance of controlling inflation in order to maintain the effectiveness of monetary policy and long-term economic stability.

## 1. INTRODUCTION

Despite the fact that the benchmark interest rate trend has been rising in the last several years (2021–2022), Bank Indonesia (BI) has been actively lowering the BI rate recently. The BI rate, also known as the BI 7-day Reverse Repo Rate (BI7DRR), peaked in 2021 and remained there for a considerable 18 months, or 3.5% of the total. Even still, this is the lowest level in Indonesian history. BI made this effort to support the expansion of the Indonesian economy. The goal of the central bank's decrease of BI7DRR is to lower credit interest rates. In the end, it will promote investment and consumption to become the nation's economic engines. The banking industry's credit interest rates and savings credit interest rates are not entirely impacted by the central bank's monetary policy, though (Qin et al., 2022). Because of this, 1) the movement of credit interest rates is tighter and slower than that of deposit interest rates, and 2) creditors communicate monetary policy easing—like interest rate cuts—to their counterparts more quickly than monetary policy tightening—like interest rate increases. This last point is particularly noteworthy.

The policy rate is the primary tool used to impact economic activity and attain the targeted inflation rate, according to the Inflation Targeting Framework (ITF) (Juhro & Iyke, 2019). Interest rates on deposits and bank credit will fluctuate in response to changes in interest rates (Warjiyo & Juhro, 2019). Any interest rate adjustment should be symmetrical and brief enough to ensure the smooth operation of monetary policy (Durante et al., 2022). From the standpoint of policy makers, the outcomes of monetary policy on the economy might have varying impacts (Sekandary & Bask, 2023), regardless of whether they use expansionary or restrictive measures.

The short-run research demonstrates that lending and deposit rates are not directly impacted by monetary policy decisions (Nguyen & Honcharenko, 2020). Interest rate fluctuations have less of an impact on retail bank interest rates (J. Yang et al., 2023). More significantly, because the amount of interest rate sensitivity has decreased due to changes in the benchmark interest rate, the effects of monetary policy measures on the economy have been lessened (Chugunov et al., 2021). This need suggests that in order for monetary policy to have a meaningful effect on aggregate demand and, eventually, prices, it will take longer (or require more adjustments to monetary policy tools).

When interest rates are adjusted in response to monetary easing and tightening, the direction and magnitude of deviations from equilibrium are usually symmetric (Handayani &

Kacaribu, 2021). However, working capital and investment credit rates have adjusted more slowly to significant rises in interest rates under the current interest rate regime (Anwar et al., 2023). This indicates that monetary policy easing tends to affect lending rates more than tightening.

The market circumstances might be connected to the asymmetric pass-through (Feng, 2023). First, the consumer credit market has the tightest lending rates, which significantly influences the credit market's average growth (Bouvier, 2016). This might be because consumer credit products have a higher risk than other types of credit (Suwandi, 2022). As a result, compared to other credit market segments, the central bank may not anticipate having as much impact over consumer loan costs. Second, it has been shown that working capital and investment loans (Sun et al., 2023), which are less hazardous and have moderate maturities, are upwardly sticky. This means that lenders are hesitant to boost lending rates noticeably quickly, which is advantageous to lenders. Creditors will be more affected by monetary policy easing than by monetary policy contraction (Simpson & Grossmann, 2024). Monetary policy relaxation eventually results in lower interest rates(Y. Yang et al., 2023), which in turn lower credit interest rates, increasing the buying power of creditors. Growth in the economy and manufacturing capacity may result from this.

In terms of interest rate setting, Bank Indonesia (BI) may choose to modify rates in response to shifts in the rupiah's value and inflation. This suggests that there is a connection between the interest rates offered by Indonesian banks, the pace of inflation, and the exchange rate. One of the main issues with economic expansion is inflation (Valogo et al., 2023). The main cause of the Indonesian crisis of 1997 was high inflation, which resulted in a decline in the value of the currency and an increase in prices generally, which reduced people's purchasing power. Inflation was a catastrophe for society; it made the impoverished increasingly poorer and even produced new impoverished individuals.

In the long run, zero percent inflation is unachievable in economics (Blanco, 2021). It makes perfect sense to approach problems with the assumption that inflation will never stop. Because the monetary authority has only used interest control (discount rate) and other speculative measures on paper to combat inflation thus far.

According to the quantity theory, inflation is an excess of the amount of money in circulation (Gaffard, 2020), which raises the overall level of price value. On the other hand, inflation is described as a symptom of an excess in the general price level based on the impact it

causes. Inappropriate monetary policy may also lead to inflation (Bergholt et al., 2023), even if demand-pull (demand full inflation) and cost push inflation are the two main causes of inflation naturally. If the monetary system in place produces new money without concurrently increasing the quantity of goods and services available on the market, how can inflation be combated?

The currency rate is another potential effect on Indonesian banks' interest rates (Nurmasari & Nur'aidawati, 2021). The amount of local currency that has to be exchanged for one unit of the reserve or benchmark currency is, conceptually, the exchange rate in every foreign transaction (Çitçi & Kaya, 2023). The benchmark currency is usually the US dollar or the British pound since it is widely accepted worldwide and is used to calculate local prices for customers from other countries.

Importers can save money while making purchases in foreign currencies by holding off on paying until a favorable exchange rate between the target currency and the importer's home currency cross currency occurs. In truth, exchange rate parity—a concept—can occasionally be utilized in conjunction with flexible exchange rates to predict inflation (Khalid, 2021). The price of one country's currency relative to another is known as the foreign exchange rate, or exchange rate. Because there are two currencies involved, supply and demand dictate where the exchange rate settles.

The conceptual explanation demonstrates that value and inflation are significant facets of the national economy and are connected to Bank Indonesia's interest rates. Thus, the purpose of this study is to investigate how macroeconomic factors affect interest rates. There has been very little research done on this topic; despite looking through several scientific publication channels, no particular study has looked into the variables influencing Bank Indonesia's interest rates.

In contrast to most prior research that predominantly investigates the effects of interest rates on the real sector or financial markets, this study shifts the focus toward identifying the macroeconomic factors that influence interest rate determination, particularly inflation and exchange rates. The extended research period spanning from 2004 to 2023, which includes both crisis and recovery phases, offers a more comprehensive and contextually relevant analysis. Therefore, this study aims to contribute both empirically and practically to a deeper understanding of how Bank Indonesia formulates monetary policy in response to evolving macroeconomic conditions.

## 2. LITERATURE REVIEW

The determination of interest rates by central banks, including Bank Indonesia, is influenced by various macroeconomic indicators, especially inflation and exchange rates. This study bases its approach on established monetary theories, which explain the relationship between these variables and interest rate policy.

**Inflation and Interest Rates**

In the Inflation Targeting Framework (ITF), inflation is the main target of monetary authorities in setting policy interest rates (Juhro & Iyke, 2019; Warjiyo & Juhro, 2019). This theory states that interest rates will be adjusted to stabilize inflation expectations and control general price increases. Rising inflation will encourage the central bank to raise interest rates as a monetary tightening measure.

In Indonesia, the implementation of the ITF policy explicitly makes inflation a key variable in determining the BI Rate. Past experience, such as the 1997 monetary crisis, shows that uncontrolled inflation has a negative impact on economic stability (Valogo et al., 2023). Therefore, theoretically, inflation is expected to have a positive and significant effect on Bank Indonesia's interest rates.

**Hypothesis 1 (H1): Inflation has a positive and significant effect on Bank Indonesia's interest rate.**

**Exchange Rate and Interest Rate**

The Interest Rate Parity (IRP) theory and the asset demand model state that exchange rate fluctuations can affect domestic interest rates, especially in open economies that rely on international capital flows. Exchange rate depreciation usually increases inflationary pressures through import prices, which can encourage the central bank to raise interest rates to control inflation (Çitçi & Kaya, 2023).

However, in countries with a managed floating exchange rate system such as Indonesia, the response of interest rate policy to the exchange rate is not always direct. Bank Indonesia tends to consider the impact of the exchange rate on inflation before adjusting interest rates. Therefore, the effect of the exchange rate on interest rates can be weak or insignificant, especially in the long run.

**Hypothesis 2 (H2): The exchange rate does not have a significant effect on Bank Indonesia's interest rate.**

This theoretical framework forms the basis for the empirical model tested in the study, using time series data from 2003 to 2024, which reflects the dynamics of the economy and monetary policy in Indonesia over the past two decades.

## 3. METHODOLOGY

The research objectives involve collecting specific data with varying scores, measures, or values. This study uses data on inflation, interest rates, and currency rates from 2003 until 2024 as its research objects. This study employed saturated sampling, which suggests that all members of the population are included. In order to ascertain the impact of inflation and exchange rates on interest rates, saturated samples are used to increase the comprehensiveness of the data.

The gathering and evaluation of data are crucial components of every research endeavor. Research is a scientific process that gathers data to identify, validate, and expand on information that may be applied to comprehend, anticipate, and solve Indonesia's macroeconomic problems. Because it relies on human senses, the processes used in this research are transparent to outside observers, making it an empirical study.

Owing to the substantial quantity of variables and the requirement to offer a logical, accurate, and factual account of how these factors interact, the study's author used the associative descriptive approach. An example of descriptive research is examining the existence of independent variables, either separately or in combination, without conducting a comparison between them (Turyandi, 2019). The independent variable is never a stand-alone variable; rather, it is always combined with the dependent variable.

Constructs with modifiable values are known as variables. Symbols or symbols that hold values or numbers are called variables. Operational variables are required to guarantee the categorization, indicators, and scales of research variables. The goal is to evaluate theories using appropriately implemented statistical methods. Thus, in order to gather information that contradicts the stated research hypothesis, precise measurement of the study variables is required.

The variables of this study include independent variables and dependent variables, namely the existence of independent variables does not depend on the existence of other variables. The independent variables of this investigation include: 1) Inflation as a variable (X1) and 2) Exchange rates as a variable (X2). Independent variables are variables that can be changed without affecting the dependent variable in any way. Researchers rely on the dependent variable to be studied, namely the Interest Rate as a variable (Y).

**Table 1. Operational Definition of Variables**

| Variable | Variable Concept | Scale |
|---|---|---|
| Inflation | Individuals, businesses, and governments are all affected by the continued rise in general prices | Ratio |
| Exchange Rate | The value of a currency compared to other countries | Ratio |
| Interest Rate | In the form of value, level and price, returns to investors resulting from company performance | Ratio |

The methods for gathering data that are employed include documentation and literature review. Scholars undertake a literature review to study theories from books, journals, and research in order to have a better understanding of the literature around their issue. Research data is also derived from a variety of state economic studies that were released between 2004-2023.

Reducing vast volumes of information to the most fundamental categories, patterns, and descriptive units is necessary for data analysis. The normality, heteroscedasticity, autocorrelation, multicollinearity, and linearity tests are examples of the traditional assumption tests used in this research. Next, to ascertain the simultaneous and partial impacts of study variables, multiple regression tests are conducted using f tests and t tests.

## 4. RESULT AND DISCUSSIONS

Indonesia is rated fourth in the world for having the highest benchmark interest rate, according to World Bank data on interest rates. A high inflation rate typically follows a high benchmark interest rate, or BI rate. These circumstances suggest that the data from the BI Rate and the rate of inflation have a favorable relationship (Tripathi et al., 2015). Conventional economic theory states that people's propensity to save (PTS), or interest in saving, will decline

when inflation is high. They abandon their aim to save because they fear that the value of their savings would decline over time, even when they use their income and funds promptly.

According to traditional economics, interest is the money that the owner of the asset receives as payment for giving up the right to use it for a while in order to allow another party to use it (Sadchenko & Robul, 2020). Therefore, interest is the same as when someone leases out his home to a third party, according to monetarists.

According to the theory of time value of money, also known as positive time preference in economics, a commodity's value now is greater than its value tomorrow. It is clear from the time value of money notion that the purpose of interest in conventional monetary instruments is to keep the price of currency today equal to the future value of commodities and services.

Practical and flexible monetary policy is very necessary in a particular economic situation. In relation to this, according to the provisions of Article 7 paragraph (1) of Law Number 3 of 2004 concerning Amendments to Law Number 23 of 1999 concerning Bank Indonesia, it is explained that the existence of Bank Indonesia has the aim of maintaining the stability of the rupiah's value.

Bank Indonesia has the power to set monetary objectives by taking inflation targets into account in order to decide on and carry out monetary policy. Additionally, Bank Indonesia has the power to enact several monetary policies in order to maintain monetary control. Open market activities in the money market, minimum reserve requirements, discount rate setting, and credit and financing regulation are a few of them. As regulated in Article 10 paragraph (1) points a and b of Law Number 3 of 2004.

One crucial element of the Keynesian framework is the notion of interest rates. Keynes argues that the interest rate determines the amount of employment. This has an impact on the money supply and, in turn, the economy's investment process. When interest rates are determined by the government or other powerful bodies, they have the ability to significantly impact economic activity.

Based on Keynesian interest rate theory, the money supply is "regulated" at any given time by the interest rate. Keynes argued that the supply and demand for money determine the market interest rate (Oka, 2021). The market price of a currency that pleases both buyers and sellers is known as the interest rate. "The provision of liquidity that must be repaid at a given time" is the definition of interest rate. Keynes demonstrated that the incentive to save is balanced when the interest rate is seen as a price (Kavaliou, 2021).

At the macro level, the cost of utilizing money for a specific amount of time is the fundamental idea behind interest rate theory (Guembe et al., 2023). Thus, the price of credit is interest. The significance of time in economic activity is reflected in the interest rate. The need for instant money is what drives interest rates. Interest is the market and investment price as, in accordance with classical theory, interest is the cost of loan money (investment funds).

The study looks at how inflation and exchange rates affect interest rates quantitatively. In order to assess the multiple regression model, tests for normality, autocorrelation, heteroscedasticity, multicollinearity, and linearity must be performed first.

**Table 2. Multicollinearity Test**

| Variable | Coefficient Variance | Uncentered VIF | Centered VIF |
|---|---|---|---|
| C | 2.025134 | 69.97677 | NA |
| exchange_rate | 8.99E-09 | 44.01054 | 1.664157 |
| inflation | 0.005807 | 7.848255 | 1.664157 |

This multicollinearity test may be used to determine whether the independent variables in the regression model have a strong or perfect correlation. The Middle VIF data table displays the multicollinearity test findings. The VIF value of every variable is less than or equal to ten. There is no multicollinearity amongst the independent variables as none of their VIF values are more than 10. The conventional assumption of OLS linear regression is that multicollinearity does not exist in a workable linear regression model.

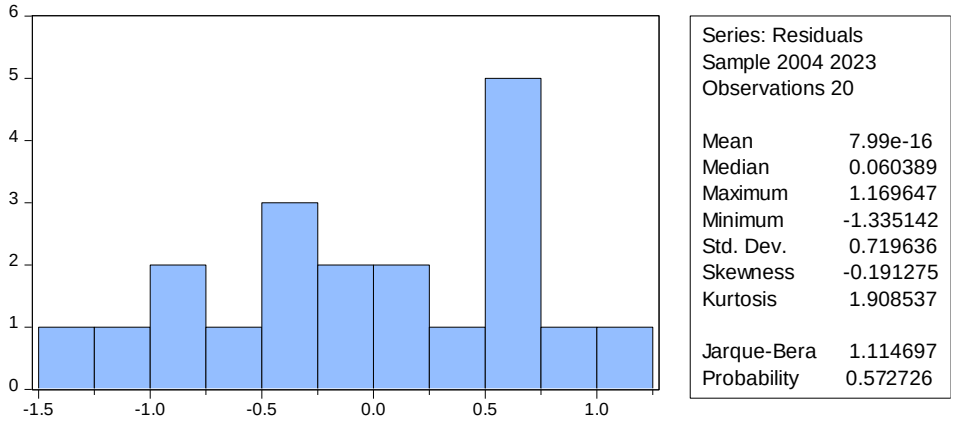


**Figure 1. Normality Test**

The purpose of the normality test is to determine if the residuals or confounding variables in the regression model have a normal distribution. A Prob value of higher than 0.05 in the normality test findings indicates that the data is normally distributed.

**Table 3. Autocorrelation Test**

| | | | |
|---|---|---|---|
| F-statistic | 0.694706 | Prob. F(2,15) | 0.5146 |
| Obs*R-squared | 1.695500 | Prob. Chi-Square(2) | 0.4284 |

In a linear regression model, the autocorrelation test searches for a link between potential period t and confounding error t-1 (prior). An issue with autocorrelation is indicated by the existence of correlation. As there is no autocorrelation and the probability F(2.15) value is higher than the alpha threshold of 0.05 (5%), the null hypothesis H0 is accepted.

**Table 4. Heteroscedasticity Test**

| | | | |
|---|---|---|---|
| F-statistic | 0.851681 | Prob. F(2,17) | 0.4441 |
| Obs*R-squared | 1.821450 | Prob. Chi-Square(2) | 0.4022 |
| Scaled explained SS | 1.016372 | Prob. Chi-Square(2) | 0.6016 |

Finding out if an observation's residual in the regression model differs noticeably from the residuals of other observations is the goal of the heteroscedasticity test. The F value (F count) of the Prob statistic can be used to assess the linear regression model's heteroscedasticity. Heteroscedasticity is absent if the Prob. F count exceeds the significance level of 0.05 (5%); H0 is rejected if the Prob. F count falls below the 0.05 (5%) threshold. According to the hypothesis test, there is no heteroscedasticity since the Prob F value derived from the study data is larger than the alpha criterion of 0.05 (5%). This means that H0 is accepted.

**Table 5. Linearity Test**

| | **Value** | **Df** | **Probability** |
|---|---|---|---|
| t-statistic | 0.040324 | 16 | 0.9683 |
| F-statistic | 0.001626 | (1, 16) | 0.9683 |
| Likelihood ratio | 0.002032 | 1 | 0.9640 |
| F-test summary: | | | |
| | **Sum of Sq.** | **Df** | **Mean Squares** |
| Test SSR | 0.001000 | 1 | 0.001000 |
| Restricted SSR | 9.839630 | 17 | 0.578802 |
| Unrestricted SSR | 9.838630 | 16 | 0.614914 |
| LR test summary: | | | |
| | **Value** | | |
| Restricted LogL | -21.28563 | | |
| Unrestricted LogL | -21.28461 | | |

Verifying if there is a linear connection between the dependent variable and all testable independent variables is the goal of the linearity test. A linear regression model cannot be used to a model that does not satisfy the linearity condition. If the Problem. F count is higher than the alpha threshold of 0.05 (5%), the regression model satisfies the linearity requirement. If the F count in the problem is less than the significance level of 0.05, the model's linearity assumption is broken. The probability column's F-statistic row contains a list of all the Prob F Values. Given that the research test indicates that the probability of P in the research data is larger than 0.05, it may be concluded that the regression model satisfies the linearity requirement.

**Table 6. T and F tests**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 5.177144 | 1.423072 | 3.638005 | 0.0020 |
| exchange_rate | -0.000138 | 9.48E-05 | -1.452442 | 0.1646 |
| Inflation | 0.549266 | 0.076204 | 7.207833 | 0.0000 |
| R-squared | 0.868197 | Mean dependent var | | 6.618500 |
| Adjusted R-squared | 0.852691 | S.D. dependent var | | 1.982214 |
| S.E. of regression | 0.760790 | Akaike info criterion | | 2.428563 |
| Sum squared resid | 9.839630 | Schwarz criterion | | 2.577923 |
| Log likelihood | -21.28563 | Hannan-Quinn criter. | | 2.457720 |
| F-statistic | 55.99035 | Durbin-Watson stat | | 2.207612 |
| Prob(F-statistic) | 0.000000 | | | |

Based on the results of multiple regression tests, the Prob. Exchange rate value of 0.1646 is greater than 0.05, which means that the exchange rate has no effect on interest rates, while the Prob. inflation value of 0.0000 is less than 0.05, which means that the exchange rate has a positive effect on interest rates, meaning that the higher the inflation, the higher the interest rate. This research model contributes 85% in predicting changes in BI interest rates. This value is quite high, because there are only 15% of other variables that contribute to changes in BI interest rates. This result is in line with the findings of Warjiyo & Juhro (2019) which stated that BI's interest rate policy was more influenced by domestic inflationary pressures than the exchange rate. However, it is different from the research of Nurmasari & Nuraidawati (2021) which showed that the exchange rate had a significant effect during the COVID-19 pandemic.

The fact that inflation affects interest rates suggests that inflation circumstances are a key factor taken into consideration when setting interest rates at Bank Indonesia. This is so because inflation is the process of steadily rising general product prices (Baum, 2021). This does not imply

that different items will have price increases of the same proportion. Even when there is a sizable percentage rise in prices, a one-time increase is not considered inflation. While some economists define inflation in terms of its origins, others define it in terms of the effects that result from it (Musarat et al., 2021). According to quantity theory, inflation results from an excess of money in circulation, which raises the overall level of price value (Cieslak & Pflueger, 2023). Inflation is described as a symptom of excess in the overall level of prices, based on the effects it causes.

When there is more money in circulation than what products and services are actually worth, an economic scenario known as inflation arises (Wen, 2015). In light of the tight supply and strong demand for goods and services, the value of the currency declines relative to the skyrocketing cost of these goods and services.

When there is more money in circulation than what products and services are actually worth, an economic scenario known as inflation arises (Valogo et al., 2023). In light of the tight supply and strong demand for goods and services, the value of the currency declines relative to the skyrocketing cost of these goods and services. Since exchange rates represent the cost of a local asset represented in terms of a foreign asset, it is necessary to first comprehend the nature of exchange rates in order to comprehend their short-term behavior (Lal et al., 2023). It makes logical to compute short-term exchange rates using techniques based on asset markets and asset demand theory, as exchange rates are essentially the price of one asset stated in terms of another asset.

Real and nominal exchange rates are the two categories of exchange rates in economics (Manzur, 2018). The nominal exchange rate is the value of one currency relative to another. However, the price at which we can swap one nation's goods for another, or, to put it another way, the cost at which one currency can be exchanged for another, is the actual exchange rate (Ibrahim & Mobarez, 2022). The real exchange rates are the terms of commerce. In a floating exchange rate regime, market forces decide the exchange rate regardless of whether the monetary authority implements stabilizing measures.

## 5. CONCLUSION

This study aims to analyze the influence of macroeconomic variables, especially inflation and exchange rates, on the determination of the benchmark interest rate by Bank Indonesia during the period 2004 to 2023. The results of the regression analysis show that inflation has a

positive and significant effect on interest rates, while the exchange rate does not show a significant effect.

This finding indicates that inflation is the main factor considered by Bank Indonesia in formulating interest rate policy. This means that the higher the inflation rate, the greater the tendency of Bank Indonesia to raise interest rates in order to maintain price stability. Conversely, exchange rate fluctuations do not directly affect the direction of interest rate policy in the long-term context and under normal conditions.

Overall, this research model has a high contribution rate, which is 85%, in explaining interest rate variations, so that only the remaining 15% is influenced by other variables outside the model. Therefore, these results provide empirical evidence that the effectiveness of monetary policy in Indonesia is highly dependent on inflation control.

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