An Empirical Analysis of the Effects of Interest Rates and Exchange Rates on Stock Prices: Evidence from Astra International Plc

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Abstract

This study examines the effect of interest rates and exchange rates on the stock prices of PT Astra International Tbk during the 2015–2024 period. Using a quantitative approach, the research applies multiple linear regression to secondary time-series data from Bank Indonesia and Investing.com. Classical assumption tests were conducted to ensure model reliability. The results indicate that interest rates have no significant partial effect on Astra's stock price, whereas the exchange rate has a negative and significant influence. Simultaneously, interest rates and exchange rates do not significantly affect stock prices. The coefficient of determination indicates that 54.4 percent of stock price variation is explained by the two macroeconomic variables. These findings imply that exchange rate movements play a more important role than interest rates in shaping Astra's stock performance and provide insights for investors in the Indonesian capital market.

Keywords : Interest Rate; Exchange Rate; Stock Price; Macroeconomic Factors; Indonesian Capital Market

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Introduction

The capital market plays a strategic role in a country's economy by serving as a source of long-term financing for companies and as an investment vehicle for the public. In Indonesia, the capital market has experienced significant structural and cyclical changes over the last decade, particularly during the 2015–2024 period. This period was marked by monetary policy normalization, the COVID-19 economic shock, post-pandemic recovery, and renewed global financial tightening. These developments have intensified the sensitivity of stock prices to macroeconomic variables, especially interest rates and exchange rates.

From an industry perspective, Indonesia's capital market faced notable volatility following shifts in Bank Indonesia's policy rate. After a prolonged accommodative stance in the mid-2010s, interest rates were adjusted downward during the pandemic to stimulate economic recovery, before entering a tightening cycle in response to rising global inflation and external monetary pressures. These fluctuations affected corporate borrowing costs, investment decisions, and investor portfolio allocations, thereby influencing stock price dynamics. Empirical studies, however, report mixed evidence regarding the magnitude and direction of interest rate effects on stock prices in Indonesia (Octovian & Mardiati, 2021; Paryudi et al., 2021; Iradiliah & Tanjung, 2022).

In parallel, exchange rate conditions during the same period were characterized by episodes of rupiah depreciation driven by global uncertainty, capital outflows, and external shocks. Exchange rate volatility has been particularly relevant for Indonesian listed firms with exposure to imported inputs, foreign-denominated debt, and international transactions. Several studies indicate that exchange rate depreciation tends to exert downward pressure on stock prices by increasing costs and financial risk (Ikhsan et al., 2022; Fellicia & Widjaja, 2023). Nevertheless, other empirical findings suggest that the exchange rate–stock price relationship is not uniform across firms or periods, highlighting its context-dependent nature (Putri et al., 2023; Nurmansyah, 2023).

Within this industrial and macroeconomic environment, large diversified firms play a critical role in reflecting broader market responses to economic fluctuations. **Astra International Plc** represents one of Indonesia's largest publicly listed conglomerates, with business operations spanning automotive manufacturing and distribution, financial services, heavy equipment, agribusiness, and infrastructure. The company's operational structure implies substantial exposure to interest rate movements through financing activities and to exchange rate fluctuations through imported components and foreign-currency transactions. Consequently, Astra International Plc provides a relevant and representative case for examining how macroeconomic variables are transmitted into stock price movements at the firm level.

Despite the relevance of these industry conditions, prior empirical studies remain fragmented. Most research focuses on sectoral indices, aggregate market indicators, or short observation periods, leading to inconsistent conclusions regarding the effects of interest rates and exchange rates on stock prices (Octovian & Mardiati, 2021; Jessica et al., 2021; Paryudi et al., 2021). Moreover, firm-specific studies on large, diversified companies over extended periods are still limited, creating both **research gaps and empirical gaps**. Studies on stock price formation further suggest that investor responses to risk and uncertainty amplify these inconsistencies (Lubis & Maulidiyah, 2022).

Accordingly, this study addresses the following research questions: (1) do interest rates affect the stock prices of Astra International Plc? (2) do exchange rates affect the stock prices of Astra International Plc? and (3) do interest rates and exchange rates simultaneously affect the stock prices of Astra International Plc? The objective of this study is to empirically examine the partial and simultaneous effects of interest rates and exchange rates on the stock prices of Astra International Plc, thereby providing firm-level evidence that contributes to the literature on macroeconomic influences in the Indonesian capital market.

This study differs from most existing empirical research in three important ways. First, it adopts a firm-level perspective by focusing on Astra International Plc, a large and diversified conglomerate, rather than using sectoral indices or market-wide indicators. Second, the study covers a long observation period (2015–2024) that spans multiple macroeconomic regimes, including monetary easing, the COVID-19 crisis, and post-pandemic monetary tightening. Third, by examining both partial and simultaneous effects of interest rates and exchange rates, this research provides more nuanced evidence on how macroeconomic variables are transmitted into stock prices at the firm level in an emerging market context.

Literature Review

Interest Rates and Stock Prices

Interest rates are widely recognized as a key macroeconomic variable influencing stock price movements through their impact on the cost of capital, corporate investment decisions, and investor portfolio allocation. According to classical financial theory, higher interest rates increase borrowing costs, reduce corporate profitability, and encourage investors to shift funds toward fixed-income instruments, thereby exerting downward pressure on stock prices. Conversely, lower interest rates tend to stimulate economic activity and enhance the attractiveness of equity investments.

Empirical evidence in the Indonesian capital market, however, presents mixed results. Several studies document a significant relationship between interest rates and stock prices, suggesting that monetary policy adjustments play an important role in shaping market valuation (Paryudi et al., 2021; Iradiliah & Tanjung, 2022). In contrast, other studies find that interest rates do not significantly affect stock prices, particularly in firms or sectors with stable cash flows and strong financial fundamentals (Octovian & Mardiati, 2021; Jessica et al., 2021). These inconsistencies indicate that the effect of interest rates on stock prices may depend on firm-specific characteristics and the broader economic environment. Therefore, the following hypothesis is proposed:

H1: Interest rates have a significant effect on the stock prices of Astra International Plc.

Exchange Rates and Stock Prices

Exchange rates influence stock prices through several transmission channels, including import costs, export competitiveness, foreign currency liabilities, and overall financial risk. Depreciation of the domestic currency may increase production costs and debt servicing burdens for firms with foreign currency exposure, thereby negatively affecting stock prices. Empirical studies in Indonesia generally report a negative and significant relationship between exchange rate depreciation and stock prices (Ikhsan et al., 2022; Fellicia & Widjaja, 2023).

Nevertheless, the exchange rate and stock price relationships are not universally consistent. Some studies suggest that exchange rate movements do not always have a statistically significant impact on stock prices, particularly when firms are able to hedge currency risk or operate predominantly in domestic markets (Putri et al., 2023; Nurmansyah, 2023). These findings highlight the importance of firm-level exposure and adaptive strategies in shaping the response of stock prices to exchange rate fluctuations. Based on this discussion, the second hypothesis is formulated as follows:

H2: Exchange rates have a significant effect on the stock prices of Astra International Plc.

Combined Effects of Interest Rates and Exchange Rates

Beyond their individual effects, interest rates and exchange rates are often examined simultaneously to capture their combined influence on stock price dynamics. Some studies find that these variables jointly explain stock price variations, while others report insignificant simultaneous effects, reflecting the complexity of macroeconomic transmission mechanisms in emerging markets (Paryudi et al., 2021; Ikhsan et al., 2022).

From an asset pricing perspective, stock price movements are also shaped by investor perceptions of risk and uncertainty. Lubis and Maulidiyah (2022) emphasize that downside risk plays a significant role in asset pricing in Indonesia, suggesting that macroeconomic shocks may influence stock prices indirectly by altering investor risk assessments. This perspective reinforces the need to examine the joint effects of interest rates and exchange rates on stock prices. Accordingly, the following hypothesis is proposed:

H3: Interest rates and exchange rates simultaneously have a significant effect on the stock prices of Astra International Plc.

Conceptual Frameworks

Based on interest rate theory, exchange rate exposure theory, and asset pricing theory, this study proposes a conceptual framework in which interest rates and exchange rates influence stock prices through both cost-of-capital and risk perception channels. Interest rate changes affect borrowing costs and discount rates, while exchange rate fluctuations alter operational costs, foreign currency liabilities, and perceived external risk. These macroeconomic factors jointly shape investor expectations and stock price movements.

International empirical studies also document mixed evidence regarding the effects of interest rates and exchange rates on stock prices. Fama (1981) and Chen et al. (1986) emphasize the role of macroeconomic factors in asset pricing, while Dornbusch and Fischer (1980) highlight exchange rate transmission mechanisms. More recent studies in emerging markets show that exchange rate risk tends to exert a stronger influence on firm value than interest rates, particularly for firms with high foreign exposure (Bahmani-Oskooee & Saha, 2016; Phan et al., 2018). These findings support the relevance of examining macroeconomic effects at the firm level in developing economies.

Research Methods

Research Design

This study employs a quantitative research design with an explanatory approach to examine the effects of interest rates and exchange rates on stock prices. The analysis focuses on identifying causal relationships between macroeconomic variables and stock price movements using statistical techniques.

Data and Sources

The study uses secondary time-series data covering the period 2015–2024. Stock price data of Astra International Plc were obtained from Investing.com and the Indonesia Stock Exchange (IDX), while interest rate data were sourced from Bank Indonesia. Exchange rate data represent the rupiah–US dollar exchange rate and were obtained from Bank Indonesia. All data are measured on an annual basis to ensure consistency across variables.

Methodological Limitation

This study employs annual data with a relatively limited number of observations (10 years), which may reduce statistical power and limit generalizability. However, the use of a long firm-specific time horizon and classical assumption testing ensures internal validity and reliability of the estimated model. Future research is encouraged to use higher-frequency data (quarterly or monthly) to enhance robustness.

Variables and Measurement

The dependent variable in this study is **stock price**, proxied by the annual closing price of Astra International Plc. The independent variables consist of **interest rates**, measured by Bank Indonesia's policy rate, and **exchange rates**, measured by the annual average rupiah–US dollar exchange rate.

Table 1 The measurement of Operational Variables

No	Variable	Variable Type	Definition	Indicator / Measurement	Data Source	Scale
1	Stock Price (SP)	Dependent Variable	Market value of Astra International Plc shares reflecting investor valuation at a specific period	Annual closing stock price of Astra International Plc	Indonesia Stock Exchange (IDX); Investing.com	Ratio
2	Interest Rate (IR)	Independent Variable	Policy interest rate set by the central bank that reflects the cost of borrowing and monetary policy stance	Bank Indonesia policy rate (BI Rate / BI 7-Day Reverse Repo Rate)	Bank Indonesia	Ratio
3	Exchange Rate (ER)	Independent Variable	Value of the Indonesian rupiah against the US dollar reflecting currency strength and external economic conditions	Average annual IDR/USD exchange rate	Bank Indonesia	Ratio

Model Specification

To test the proposed hypotheses, this study applies a **multiple linear regression model**, specified as follows:

$$\boldsymbol{SP_t = \alpha + \beta_1 IR_t + \beta_2 ER_t + \varepsilon_t}$$

where $\boldsymbol{SP_t}$denotes stock prices, $\boldsymbol{IR_t}$represents interest rates, $\boldsymbol{ER_t}$represents exchange rates, $\boldsymbol{\alpha}$is the intercept, $\boldsymbol{\beta_1}$and $\boldsymbol{\beta_2}$are regression coefficients, and $\boldsymbol{\varepsilon_t}$is the error term.

Data Analysis Techniques

Data analysis was conducted using EViews software. Prior to hypothesis testing, classical assumption tests were performed to ensure the reliability of the regression results. These tests include the normality test, multicollinearity test, heteroskedasticity test, and autocorrelation test. Hypothesis testing was carried out using the t-test to examine the partial effects of each independent variable and the F-test to assess their simultaneous effects. The coefficient of determination (R^2) was used to evaluate the explanatory power of the model.

Ethical Considerations

This study relies exclusively on publicly available secondary data and does not involve human subjects. Therefore, no ethical approval was required.

Results and Discussions

Results

Prior to conducting regression analysis, descriptive statistics are presented to provide an overview of the characteristics and distribution of the variables used in this study. Descriptive statistics summarize the central tendency and variability of the data, enabling a preliminary understanding of the patterns and fluctuations in interest rates, exchange rates, and stock prices of Astra International Plc during the observation period. This initial analysis is important to assess data suitability and to contextualize subsequent empirical findings. Table 2 reports the descriptive statistics of all variables employed in the regression model.

Table 2 Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Interest Rate	10	0.350	0.750	0.52250	0.122162
Exchange Rate	10	13,307	15,846	14,333.60	841.293
Stock Price	10	4,900	8,300	6,570.00	1,270.870

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Valid N (listwise)	**10**				

The descriptive statistics presented in Table 2 provide an initial overview of the behavior of the key macroeconomic variables and stock prices examined in this study. The interest rate variable exhibits a mean value of **0.5225**, with a relatively moderate standard deviation of **0.1222**, indicating limited but meaningful fluctuations in monetary policy during the observation period. According to monetary theory, changes in interest rates influence the cost of capital and investment decisions, which may subsequently affect stock valuations. The observed variation suggests that monetary policy adjustments occurred gradually, potentially leading to a muted or delayed response in stock prices, particularly for firms with strong fundamentals and stable cash flows.

The exchange rate variable demonstrates a higher degree of variability, with an average value of **IDR 14,333.60** per US dollar and a standard deviation of **IDR 841.29**. This level of volatility reflects periods of depreciation and appreciation of the rupiah, which are commonly associated with external shocks, capital flow movements, and global financial uncertainty. From the perspective of exchange rate theory, currency fluctuations affect firm value through changes in import costs, export competitiveness, and foreign currency liabilities. The relatively large dispersion in exchange rate values suggests that exchange rate risk may play a more prominent role in influencing stock price dynamics compared to interest rate movements.

The stock price of Astra International Plc shows substantial variation, ranging from **IDR 4,900** to **IDR 8,300**, with a mean of **IDR 6,570.00** and a standard deviation of **IDR 1,270.87**. According to asset pricing theory, stock prices reflect investors' expectations regarding future cash flows and perceived risk. The observed volatility in stock prices indicates that investor assessments of Astra International Plc were influenced by both firm-specific conditions and changes in the macroeconomic environment. Taken together, the descriptive statistics suggest that while interest rate movements were relatively stable, exchange rate volatility and stock price fluctuations were more pronounced, providing a theoretical basis for further regression analysis to examine their causal relationships.

Table 3 The result of Multiple Regression

Model	Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
1	(Constant)	22,713.718	5,595.691	—	4.059	0.005
	Interest Rate	−1,111.163	2,669.746	−0.107	−0.416	0.690
	Exchange Rate	−1.086	0.388	−0.719	−2.801	0.026

Source : SPSS 27.0

Table 3 presents the results of the multiple regression analysis examining the effects of interest rates and exchange rates on the stock price of Astra International Plc. The regression constant shows a positive and statistically significant value (B = 22,713.718; p = 0.005), indicating that when interest rates and exchange rates are assumed to be constant, the stock price of Astra International Plc remains positively valued. This reflects the firm's strong fundamentals and diversified business structure, which support its stock valuation independently of short-term macroeconomic fluctuations.

The coefficient of **interest rates** is negative (B = −1,111.163) but statistically insignificant (t = −0.416; p = 0.690). This result suggests that changes in interest rates do not have a significant impact on the stock price of Astra International Plc during the observation period. From a theoretical perspective, this finding implies that interest rate movements may not be a primary consideration for investors when valuing shares of large, diversified firms with stable cash flows. This result is consistent with prior empirical studies that find an insignificant relationship between interest rates and stock prices in firms or sectors with strong financial resilience.

In contrast, the **exchange rate** variable exhibits a negative and statistically significant effect on stock prices (B = −1.086; t = −2.801; p = 0.026). This indicates that a depreciation of the rupiah against the US dollar leads to a decline in the stock price of Astra International Plc. The standardized coefficient (Beta = −0.719) further suggests that exchange rates exert a stronger influence on stock price movements compared to interest rates. This finding aligns with exchange rate theory, which posits that currency depreciation increases import costs and foreign currency liabilities, thereby reducing firm value and negatively affecting investor expectations.

Overall, the regression results indicate that while interest rates do not significantly influence the stock price of Astra International Plc, exchange rate movements play a decisive role. These findings partially support the proposed hypotheses, confirming the significance of exchange rates (H2) while rejecting the significance of interest rates (H1). The results also highlight the importance of external macroeconomic stability, particularly currency movements, in shaping stock price dynamics in the Indonesian capital market.

Discussion

This study offers several novel contributions to the existing literature on macroeconomic determinants of stock prices, particularly within the context of emerging markets. First, unlike most prior studies that rely on sectoral indices, aggregate market indicators, or cross-sectional samples, this research adopts a firm-level approach by focusing exclusively on Astra International Plc, one of Indonesia's largest and most diversified publicly listed companies. This approach allows for a more precise examination of how macroeconomic variables are transmitted into stock prices at the individual firm level, which remains underexplored in prior empirical research.

Second, this study contributes to the state of the art by employing a long observation period (2015–2024) that encompasses multiple macroeconomic regimes, including monetary easing, pandemic-induced economic shocks, and post-pandemic monetary tightening. Previous studies typically analyze shorter periods or single economic phases, which may partially explain the inconsistent empirical findings reported in the literature. By covering a longer and more heterogeneous period, this study captures structural changes in monetary policy and exchange rate dynamics that are rarely examined simultaneously in firm-specific studies.

Third, the findings provide new empirical evidence on the asymmetric relevance of macroeconomic variables, demonstrating that exchange rates play a more dominant role than interest rates in influencing stock prices for a large, diversified firm. While earlier studies report mixed or inconclusive results regarding the effects of interest rates and exchange rates, this study shows that interest rates become statistically insignificant when firm diversification and financial resilience are taken into account, whereas exchange rate movements remain a significant determinant. This insight refines existing macro-financial theories by highlighting the conditional nature of interest rate effects at the firm level.

The insignificant simultaneous effect of interest rates and exchange rates suggests that investors may evaluate macroeconomic variables selectively rather than jointly. From an asset pricing perspective, this finding implies that market participants prioritize dominant risk signals, such as exchange rate movements, over combined macroeconomic indicators. This behavior is consistent with risk-based asset pricing models, which emphasize asymmetric responses to external shocks rather than uniform reactions to all macroeconomic variables

Finally, this research advances the literature by bridging macroeconomic theory and asset pricing behavior in an emerging market context. The results suggest that investors place greater emphasis on external risk signals, such as currency fluctuations, than on domestic monetary indicators when valuing shares of diversified firms. This perspective extends prior asset pricing studies by providing firm-specific evidence that macroeconomic risks do not affect all firms uniformly, thereby enriching the state of the art in empirical finance.

Conclusion

This study empirically examines the effects of interest rates and exchange rates on the stock prices of Astra International Plc during the 2015–2024 period. Using a multiple linear regression approach, the findings reveal that interest rates do not have a statistically significant effect on stock prices, whereas exchange rates exert a negative and significant influence. These results indicate that currency movements play a more decisive role than monetary policy rates in shaping investor valuation of a large and diversified firm in the Indonesian capital market.

The insignificance of interest rates suggests that Astra International Plc’s diversified business structure and relatively stable cash flows reduce its sensitivity to changes in borrowing costs and monetary policy adjustments. In contrast, the significant negative effect of exchange rates highlights the importance of external macroeconomic stability, as rupiah depreciation increases operational costs and financial risk, which are reflected in stock price movements. This finding underscores the dominant role of exchange rate risk in investor decision-making for firms with substantial exposure to foreign currency transactions.

Overall, this study contributes to the literature by providing firm-level evidence across multiple economic regimes, offering a refined understanding of the asymmetric effects of macroeconomic variables on stock prices. From a practical perspective, the results suggest that investors and corporate managers should place greater emphasis on exchange rate dynamics and currency risk management when evaluating stock performance. Future research may extend this analysis by incorporating additional macroeconomic variables, higher-frequency data, or comparative studies across firms and sectors to further enrich empirical insights.

From a policy perspective, the findings highlight the importance of exchange rate stability in maintaining stock market confidence, particularly for large firms with foreign exposure. For corporate managers, the results underscore the need for effective currency risk management strategies. Investors are advised to closely monitor exchange rate dynamics when evaluating stock performance in emerging markets.

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