http://dx.doi.org/10.18623/rvd.v23.6299

THE INFLUENCE OF FOREIGN INVESTMENT AND MARKET SENTIMENT ON INDONESIA GOVERNMENT BOND YIELD, WITH EXCHANGE RATE AS A MODERATING VARIABLE

A INFLUÊNCIA DO INVESTIMENTO ESTRANGEIRO E DO SENTIMENTO DO MERCADO NA RENDIBILIDADE DOS TÍTULOS PÚBLICOS DA INDONÉSIA, COM A TAXA DE CÂMBIO COMO VARIÁVEL MODERADORA

Article received on: 1/23/2026
Article accepted on: 4/24/2026

Helen Novi Yanto*
***Faculty of Economics and Business, Universitas Pelita Harapan, Banten, Indonesia
01619240014@student.uph.edu

Stefanny Claudia*
***Faculty of Economics and Business, Universitas Pelita Harapan, Banten, Indonesia
01619240034@student.uph.edu

Lina*
***Faculty of Economics and Business, Universitas Pelita Harapan, Banten, Indonesia
Orcid: https://orcid.org/0000-0003-0801-0468
lina.fe@uph.edu

The authors declare that there is no conflict of interest

Abstract

This study investigates how foreign investment and market sentiment influence the yield of Indonesian government bond, with the exchange rate serving as a moderating variable. The research seeks to explain the behavioral and macro-financial channels through which sentiment and capital flows affect sovereign yield dynamics in an emerging market context. Using monthly panel data from August 2018 to July 2025 across four benchmark tenors (5, 10, 15, and 20 years). The study applies the Fixed Effects model with Driscoll–Kraay robust standard errors (FE–DK) as the main estimation approach. Model selection and diagnostic tests ensure the model's reliability. Robustness verification is conducted using Random Effects (RE–Clustered) and wild cluster bootstrap-t procedures. The results show that domestic market sentiment, proxied by the Consumer Confidence Index (SENT), has a positive and significant impact on government bond yields. Foreign investment flows exhibit a positive but less consistent relationship, becoming significant under robust inference. The exchange rate plays a strong moderating role, amplifying the effects of both foreign flows and sentiment on yield movements. This study contributes to the literature by integrating Capital Flow Theory, Behavioral Finance, and Exchange Rate Risk Premium perspectives to explain sovereign yield

Resumo

Este estudo investiga como o investimento estrangeiro e o sentimento do mercado influenciam a taxa de rendimento dos títulos públicos indonésios, tendo a taxa de câmbio como variável moderadora. A pesquisa busca explicar os canais comportamentais e macrofinanceiros através dos quais o sentimento e os fluxos de capital afetam a dinâmica das taxas de rendimento soberanas no contexto de um mercado emergente. Utiliza-se dados de painel mensais de agosto de 2018 a julho de 2025, abrangendo quatro prazos de referência (5, 10, 15 e 20 anos). O estudo aplica o modelo de Efeitos Fixos com erros-padrão robustos de Driscoll–Kraay (FE–DK) como principal abordagem de estimativa. A seleção do modelo e os testes diagnósticos garantem a confiabilidade do modelo. A verificação de robustez é realizada utilizando Efeitos Aleatórios (RE–Clustered) e procedimentos de bootstrap-t com agrupamento aleatório. Os resultados mostram que o sentimento do mercado doméstico, representado pelo Índice de Confiança do Consumidor (SENT), tem um impacto positivo e significativo sobre os rendimentos dos títulos públicos. Os fluxos de investimento estrangeiro exibem uma relação positiva, mas menos consistente, tornando-se significativa sob inferência robusta. A taxa de câmbio desempenha um forte papel moderador, behavior in an emerging economy. The findings highlight the policy importance of maintaining exchange-rate stability and transparent communication to sustain investor confidence and bond-market resilience in Indonesia.

Keywords: Foreign Investment. Market Sentiment. Exchange Rate. Government Bond Yield. Indonesia.

amplificando os efeitos tanto dos fluxos estrangeiros quanto do sentimento sobre os movimentos dos rendimentos. Este estudo contribui para a literatura ao integrar as perspectivas da Teoria dos Fluxos de Capital, das Finanças Comportamentais e do Prêmio de Risco da Taxa de Câmbio para explicar o comportamento dos rendimentos soberanos em uma economia emergente. As conclusões destacam a importância política de manter a estabilidade cambial e uma comunicação transparente para sustentar a confiança dos investidores e a resiliência do mercado de títulos na Indonésia.

Palavras-chave: *Investimento Estrangeiro. Sentimento do Mercado. Taxa de Câmbio. Rendimento dos Títulos Públicos. Indonésia.*

1 INTRODUCTION

Indonesia’s financial markets have undergone significant transformation over the past decade, driven by increasing investor participation, expanding financial instruments, and deeper integration with global capital flows. Among these developments, government bonds (Surat Berharga Negara – SBN) have played a pivotal role in financing fiscal deficits and maintaining macroeconomic stability. According to the Indonesian Central Securities Depository (KSEI, 2025), the number of investors has continued to rise steadily since 2021, supported by growing financial literacy and digital access. The issuance of retail government bonds such as ORI027 in January 2025 reached IDR 37.36 trillion with more than 86,000 investors, 29% of whom were new entrants (DJPPR, 2025), illustrating the increasing domestic appetite for fixed-income investment.

Government bonds are considered one of the safest investment instruments in the Indonesian market due to their sovereign guarantee and relatively stable returns. However, their yields are influenced by multiple macro-financial factors, including global liquidity, capital flows, market sentiment, and exchange rate dynamics. The interaction between these factors determines the pricing, demand, and yield of government bonds, especially in emerging economies where foreign investment and currency volatility play critical roles. As Bank Indonesia (2009) and subsequent research have shown, fluctuations in risk sentiment and foreign flows have substantial implications for domestic bond yields and exchange-rate stability.

Foreign investment represents a key channel through which global financial conditions influence Indonesia's bond market. In line with Capital Flow Theory (Calvo, Leiderman, & Reinhart, 1996), capital mobility is driven by global "push factors" such as interest rate differentials and liquidity, as well as domestic "pull factors" including policy credibility and economic stability. While foreign investors contribute positively by providing liquidity and depth to the bond market, they also introduce vulnerability to external shocks, as sudden capital reversals can lead to bond sell-offs and higher yields. Studies in international contexts (Hosono *et al*., 2023; Randl *et al*., 2025) confirm that foreign investment shapes yield dynamics through its effects on demand and liquidity, though the magnitude and persistence vary across economies.

At the same time, market sentiment, defined as the collective mood and expectations of investors, has become an increasingly important determinant of bond yield movements. Behavioral-finance perspectives argue that investor decisions are often influenced by heuristics and emotional responses rather than rational assessments (Kahneman & Tversky, 1979; Shefrin & Statman, 1994). When sentiment turns pessimistic due to political, social, or global uncertainties, investors demand higher risk premiums, leading to rising bond yields. Empirical studies support this behavioral component: Fang *et al*. (2018) show that investor sentiment alters the correlation between stock and bond markets, while Piñeiro-Chousa *et al*. (2022) demonstrate that sentiment indices derived from social media significantly affect bond-market dynamics.

However, the magnitude and direction of these effects remain inconsistent across countries, particularly in emerging markets. Andabai (2024) found that foreign portfolio investment has a limited impact on market capitalization in Nigeria, while Xie (2023) reported that sentiment had no significant effect on China's CSI300 Index. One potential explanation lies in the role of exchange-rate volatility. In open emerging economies like Indonesia, exchange-rate fluctuations serve as a transmission mechanism linking global risk sentiment and capital flows to domestic financial assets. Volatile exchange rates may amplify investor uncertainty, reduce foreign participation, and increase the required yield on government bonds (Katusiime, 2025; Klaassen & Mavromatis, 2024).

Although numerous studies examine determinants of sovereign bond yields in emerging markets, most focus on macroeconomic fundamentals or global risk factors (e.g., Peiris, 2010; Hosono *et al*., 2023), while overlooking the joint influence of investor behavior and exchange-rate interactions. In Indonesia, existing research typically analyzes capital flows or monetary variables separately (Setiawan & Subiyantoro, 2021; Wibowo, 2022) without incorporating behavioral sentiment or modeling the moderating role of currency dynamics on yield sensitivity. Moreover, evidence regarding foreign inflows remains mixed, with some studies finding yield-compressing effects, while others suggest yield-chasing behavior driven by risk premiums, yet this inconsistency is rarely tested within a unified empirical framework.

Despite the growing body of literature, few studies have examined the combined effects of foreign investment and market sentiment on government bond yields in Indonesia, particularly when considering the moderating influence of the exchange rate. Addressing this gap is essential for understanding Indonesia's bond-market dynamics in an era of increasing global integration. Therefore, this study aims to empirically investigate the impact of foreign investment and market sentiment on the yield of Indonesian government bonds, with the exchange rate serving as a moderating variable. The findings are expected to contribute both theoretically and practically. Theoretically, this study extends the Capital Flow Theory, Behavioral CAPM, and Exchange Rate Risk Premium frameworks by integrating them within the Indonesian sovereign-bond market context. Practically, the results provide insights for policymakers such as Bank Indonesia and the Ministry of Finance on how to manage yield volatility and capital-flow risks, and offer guidance to investors on portfolio allocation and hedging strategies amid global uncertainty.

2 RESEARCH METHODOLOGY

This research adopts a descriptive quantitative design using statistical descriptive analysis to examine the effects of foreign investment flow and market sentiment on Indonesian government bond yields, while considering the moderating role of exchange-rate dynamics. The methodology integrates established economic and behavioral theories with econometric techniques to provide a comprehensive understanding of how global and domestic financial factors jointly influence bond yields.

2.1 Theoretical basis for variable relationships

The theoretical foundation draws from multiple frameworks:

1. *Capital Flow Theory* and *Interest Rate Parity (IRP)* to explain how international capital movements affect bond yields.
2. *Behavioral Finance* and *Behavioral Macroeconomics* to capture how market sentiment drives investor decision-making.
3. *Exchange Rate Risk Premium* and *Uncovered Interest Parity (UIP)* to explain how exchange-rate fluctuations amplify these relationships.

Each subsection presents the relevant theory followed by the derived hypothesis.

2.1.1 Foreign investment and government bond yields

The relationship between foreign investment and sovereign bond yields is rooted in Capital Flow Theory (Calvo, Leiderman, & Reinhart, 1996) and the Interest Rate Parity Model (Mundell & Fleming, 1963). Capital flows are influenced by *push factors* (e.g., global liquidity, interest-rate differentials) and *pull factors* (domestic macroeconomic stability and yield attractiveness). Increased foreign inflows expand demand for sovereign bonds, elevate prices, and thus lower yields (Fratzscher, 2012).

The Portfolio Balance Approach (Tobin, 1969) complements this by emphasizing the liquidity and diversification effects of international portfolio allocations. When foreign holdings rise, risk-sharing increases and liquidity premia decline, compressing yields (Froot, O'Connell, & Seasholes, 2001). Empirical evidence confirms this inverse relationship. Peiris (2010) and Hosono *et al.* (2023) find that foreign participation in emerging-market bonds enhances market liquidity and reduces yields but also introduces vulnerability to global risk aversion.

Foreign investment (FOR) is defined as the monthly percentage change in foreign ownership of Indonesian government bonds, representing foreign flow rather than percentage of ownership to the total bond outstanding in the market. This flow-based measure captures the marginal impact of buying and selling dynamic more accurately than ownership level, consistent with Froot and Ramadorai (2008). With hypothesis:

H1: Foreign investment negatively affects Indonesian government bond yields.

(Expected sign: $\beta_1 < 0$)

Mechanism: Increased foreign inflows enhance liquidity and reduce yield.

2.1.2 Market sentiment and bond yield dynamics

Investor sentiment, as defined by Baker and Wurgler (2007), refers to the overall optimism or pessimism influencing investment decisions. Behavioral finance models, particularly the Behavioral CAPM (Shefrin & Statman, 1994) and Prospect Theory (Kahneman & Tversky, 1979) argue that investors deviate from rational expectations, overreacting to negative signals and underreacting to positive ones. At the macroeconomic level, Behavioral Macroeconomics (Akerlof & Shiller, 2009) posits that *animal spirits,* captured through consumer confidence, affect financial market outcomes.

Market sentiment (SENT) is proxied by the Consumer Confidence Index (SENT). The Consumer Confidence Index (SENT) published by Bank Indonesia reflects households ’expectations about income, employment, and economic conditions. SENT is measured on a score ranging from 0 to 200, where SENT score above 100 indicates optimism, reduced risk aversion, and a lower required risk premium on bonds. With hypothesis:

H2: Market sentiment positively affects government bond yields.

(Expected sign: $\beta_2 > 0$)

Mechanism: Higher confidence leads to lower perceived macroeconomic risk and lower yields.

2.1.3 Exchange rate as a moderating variable

The exchange rate moderates the relationship between capital flows, sentiment, and bond yields through the Exchange Rate Risk Premium Theory (Engel, 2016) and Uncovered Interest Parity (UIP) (Dornbusch, 1976). The *UIP condition* states that interest-rate differentials between two countries equal expected exchange-rate changes.

Deviations occur when investors demand a risk premium for holding assets in volatile currencies (Fama, 1984). Currency depreciation increases risk perception and amplifies the yield response to capital movements and sentiment changes.

When the Rupiah depreciates ($\Delta \log FX > 0$), foreign investors demand a higher risk premium, and domestic investors become more cautious. This amplifies the sensitivity of bond yields to both foreign flows and sentiment shifts (Katusiime, 2025). Thus, depreciation enhances the magnitude of relationships, where foreign inflows indicating positive sentiment exert a stronger yield-compressing effect, while foreign outflows indicating negative sentiment induce sharper yield increases. Exchange-rate changes are measured as the monthly log difference of the IDR/USD midpoint rate, capturing relative (percentage) movements while maintaining variance stability. With hypothesis:

H3: Exchange-rate changes strengthen the relationship between foreign investment and government bond yields.

(Expected sign: $\beta_4 < 0$)

H4: Exchange-rate changes strengthen the relationship between market sentiment and government bond yields.

(Expected sign: $\beta_5 < 0$)

Mechanism: Depreciation strengthens the yield response to capital-flow and sentiment shocks.

2.1.4 Control variables

Control variables are introduced to account for macroeconomic and global financial influences on Indonesian bond yields. These variables capture domestic monetary policy, inflationary trends, global interest-rate spillovers, and sovereign credit risk.

Table 1

Control Variables

Variable	Operational Definition	Data Unit	Data Source
BI7DRRR	Bank Indonesia's 7-day Reverse Repo Rate, representing the central bank's primary monetary policy instrument.	Monthly (%)	Bank Indonesia
Inflation (CPI)	Year-on-year percentage change in the Consumer Price Index (CPI), indicating average price increases of goods and services.	Monthly YoY (%)	Bank Indonesia
UST10Y	10-year U.S. Treasury yield, representing the global risk-free benchmark and a proxy for safe-haven demand.	Monthly average	Investing.com
CDS5Y	Indonesia's 5-year Credit Default Swap spread, measuring perceived sovereign credit risk.	Monthly average	Investing.com

Source(s): Authors' own work

2.2 Empirical model specification

A single integrated model captures the effects of all variables simultaneously, including the moderating role of the exchange rate and the control variables:

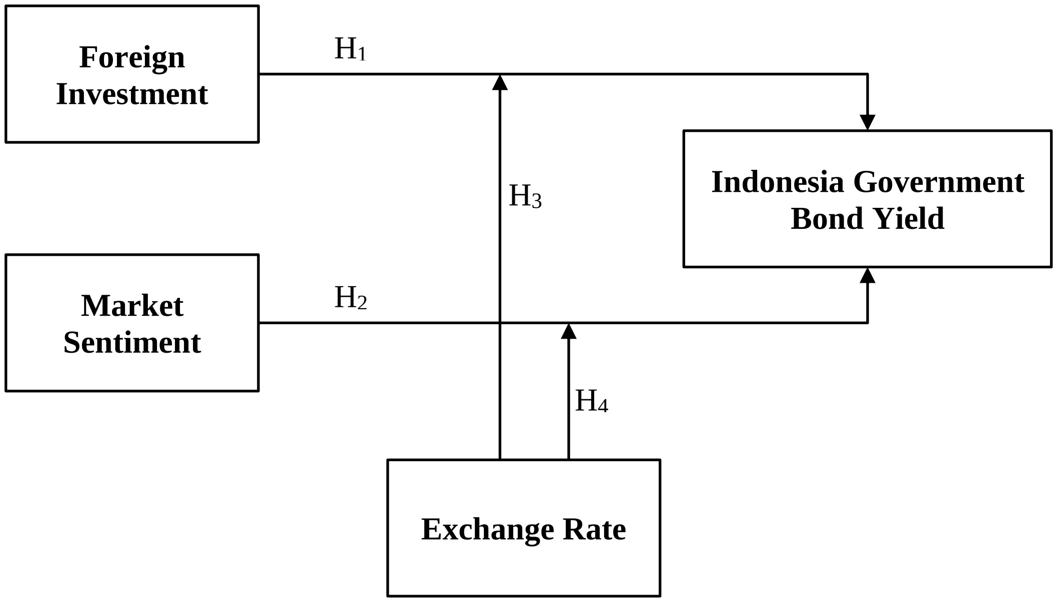
$$YTM_{it} = \beta_0 + \beta_1 FOR_t + \beta_2 SENT_t + \beta_3 \Delta lnFX_t + \beta_4 (FOR_t \times \Delta lnFX_t) + \beta_5 (SENT_t \times \Delta \ln FX_t) + \beta_6 BI7DRRR_t + \beta_7 CPI_t + \beta_8 UST10Y_t + \beta_9 CDS5Y_t + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where:

- $i \in \{5Y, 10Y, 15Y, 20Y\}$ denotes tenor.
- t denotes month.
- μ_i and λ_t are tenor and time fixed effects, respectively.

Figure 1

Conceptual Framework of the Research Model



Source(s): Authors' own work

2.3 Research design and philosophical approach

The study applies a descriptive–quantitative approach, employing econometric techniques to describe and interpret relationships among variables based on observed data patterns. A positivist philosophy underpins this research, assuming that financial phenomena such as capital flows, sentiment, and yield movements can be objectively analyzed using measurable indicators (Bryman, 2016).

A panel data model is chosen because it captures both cross-sectional (bond tenors) and time-series (monthly) variations, allowing the analysis to account for unobservable heterogeneity and dynamic adjustments (Wooldridge, 2010). The panel structure covers four benchmark Indonesian government bonds: 5-year, 10-year, 15-year, and 20-year tenors—from August 2018 to July 2025, a period that encompasses pre-pandemic, pandemic, and post-pandemic macro-financial transitions.

Panel data estimation enhances the precision of coefficient estimates and permits examination of the term structure of interest rates. As noted by Nelson and Siegel (1987), variations in short-, medium-, and long-term yields reflect investors 'expectations about inflation, monetary policy, and macroeconomic risks. The model thus captures both temporal and maturity-related yield dynamics.

2.4 Panel data regression

Panel data regression provides a framework for analyzing data that vary across both time and cross-sectional units. In this research, the cross-sections represent different government bond tenors (5Y, 10Y, 15Y, and 20Y), while the time dimension covers monthly data from August 2018 to July 2025. The theoretical foundation of panel regression rests on the ability to control for unobserved heterogeneity characteristics that differ across entities (bond maturities) but are constant over time. Ignoring these effects can lead to biased or inconsistent estimates (Baltagi, 2005; Wooldridge, 2010).

The exchange rate moderates the relationship between capital flows, sentiment, and bond yields through the Exchange Rate Risk Premium Theory (Engel, 2016) and Uncovered Interest Parity (UIP) (Dornbusch, 1976). The *UIP condition* states that interest-rate differentials between two countries equal expected exchange-rate changes; deviations occur when investors demand a risk premium for holding assets in volatile currencies (Fama, 1984). Currency depreciation increases risk perception and amplifies the yield response to capital movements and sentiment changes. Panel models can generally take three forms, Common Effect Model (CEM), Fixed Effect (FEM), or Random Effect (REM).

2.4.1 Common effect model

The Common Effect Model, also known as the Pooled Ordinary Least Squares or Pooled OLS, assumes that all cross-sectional units are identical and that neither entity-specific nor time specific effect exist. The model specification is:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \qquad (2)$$

where:

- Y_{it} = dependent variable (government bond yield)
- α = common intercept across all tenors
- X_{it} = vector of independent variables (foreign flows, sentiment, exchange rate and controls)
- ε_{it} = random error term

Under this framework, it is assumed that all government bond maturities respond identically to macro financial factors, implying perfect homogeneity in their structural characteristics. With assumptions:

- No significant unobserved heterogeneity among entities.
- Constant slope coefficients and intercepts.
- Classical linear regression assumptions which no autocorrelation, homoskedasticity, zero mean residuals hold.

The CEM is only realistic in highly homogeneous markets where all bonds are priced under identical expectations, liquidity conditions, and risk profiles conditions rarely observed in real world markets. For the Indonesian bond market, maturities have distinct duration, risk, and liquidity profiles. Hence, assuming uniform behavior across all tenors likely leads to omitted variable bias. The CEM serves as a baseline model for comparison, but its simplicity limits interpretative power in markets with structured heterogeneity.

2.4.2 Fixed effect model

The Fixed Effect Model accounts for unobservable entity-specific characteristics that may influence the dependent variable. These effects are fixed or constant within each entity over time but different across entities. The model is expressed as:

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \qquad (3)$$

where

αi represents the individual (tenor-specific) intercept capturing unique but time-invariant effects such as liquidity, maturity risk, or issuance volume.

The model assumes correlation between the unobserved effects (αi) and the regressors (Xit), meaning that these latent characteristics are systematically related to the explanatory variables. The FEM estimator uses the within transformation (demeaning method) to eliminate these unobserved effects:

$$(Y_{it} - Y_i^{-}) = \beta(X_{it} - X_i^{-}) + (\varepsilon_{it} - \varepsilon_i^{-}) \qquad (4)$$

With assumptions:

1. Entity-specific effects are correlated with the regressors.
2. Time-invariant characteristics differ across entities but are constant.
3. No perfect multicollinearity among regressors.
4. Error terms satisfy the Gauss-Markov assumptions.

The Chow Test can be used as a statistical testing to determine whether the FEM is preferable to the CEM.

- H_0: Common intercept (no fixed effects) → CEM is appropriate.
- H_1: Different intercepts (entity-specific effects exist) → FEM is appropriate.

If the *p-value* < *0.05*, H_0 is rejected, implying that differences among entities are statistically significant and the FEM should be used.

In the context of government bonds, different maturities have distinct structural risk characteristics (e.g., duration, sensitivity to policy rate, and investor base). The FEM captures these structural nuances by allowing each tenor to have its own intercept. For example, long-term bonds (20Y) might react more strongly to inflation expectations, whereas short-term bonds (5Y) may be more sensitive to BI policy rates. Thus, FEM recognizes that “one model does not fit all,” aligning with Term Structure Theory and Portfolio Balance Theory, which assert that risk-return trade-offs vary by maturity.

2.4.3 Random effect model

The Random Effect Model proposed by Swamy and Arora (1972), assumes that the entity-specific effects are randomly distributed across entities and uncorrelated with the explanatory variables. The model is expressed as:

$$Y_{it} = \alpha + \beta X_{it} + \mu_i + \varepsilon_{it} \qquad (5)$$

where:

- α = overall intercept
- ui = random individual effect with mean zero and variance
- εit = idiosyncratic error term.

This model can be estimated using Generalized Least Squares (GLS), which accounts for both within and between entity variances. With assumptions:

- ui is random and uncorrelated with all regressors
- No autocorrelation or heteroskedasticity across entities.
- Error components ui and εit are normally distributed and independent.

Using The Lagrange Multiplier Test by Breusch and Pagan test as statistical testing, test whether random effects are significant relative to the pooled model (CEM).

- H_0: Variance of random effects = 0 → CEM is appropriate
- H_1: Variance of random effect ≠ 0 → REM is appropriate.

If the p-value < 0.05, reject H_0 indicating the presence of random effects and the appropriateness of REM.

In emerging markets, bond yields may be influenced by unobservable global or structural shocks such as changes in global liquidity, geopolitical risk, or investor sentiment that vary randomly across maturities but are not correlated with domestic explanatory variables. The REM treats these differences as random disturbances, assuming they represent unobservable stochastic effects rather than systematic structural ones. Hence, REM reflects conditions where maturity-specific variations are random rather than structural, aligning with the Efficient Market Hypothesis, which posits that deviations from fundamentals are primarily stochastic.

2.5 Estimation method and model validation

The model estimation employs panel data regression using three approaches: Common Effect Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM). The selection of the appropriate model and validation of classical assumptions rely on established econometric theories.

2.5.1 Model selection tests

1. Chow Test (1960) to tests whether slope coefficients are identical across entities. Based on the *structural stability* concept, a significant result implies unobserved heterogeneity across bond maturities, favoring FEM (Greene, 2018). With hypotheses:

- H_0: There are no individual (fixed) effects, all entities share a common intercept → *Common Effect Model (CEM) is appropriate.*
- H_1: There are individual (fixed) effects, each entity has its own intercept → *Fixed Effect Model (FEM) is appropriate.*
- When reject H_0 if p-value < 0.05, implying significant heterogeneity among entities (bond tenors). If H_0 is rejected, it means each bond tenor exhibits unique structural behavior, consistent with the Term Structure of Interest Rates.

2. Breusch–Pagan Lagrange Multiplier (LM) Test (1980): tests the necessity of random effects. If significant, unobserved random shocks affect the dependent variable, favoring REM (Baltagi, 2005). With hypotheses:

- H_0: Variance of random effects (σ^2_u) = 0 → *Common Effect Model (CEM) is appropriate.*
- H_1: Variance of random effects (σ^2_u) ≠ 0 → *Random Effect Model (REM) is appropriate.*

- Reject H_0 if p-value < 0.05, indicating that the Random Effect Model is preferred. If H_0 is rejected, it means there are random variations across bond maturities due to unobservable global or market-specific factors that cannot be captured by CEM.

3. Hausman Test (1978) to compare FEM and REM under the *consistency-efficiency trade-off*. If unobserved effects correlate with regressors, FEM is consistent, otherwise, REM is efficient (Wooldridge, 2010). In Indonesia's bond market, macro-financial variables such as foreign inflows, sentiment, and exchange-rate volatility are closely linked to policy credibility and investor perception factors likely embedded in each bond tenor's structural attributes. The test compares the consistency of FEM and REM estimators.

- H_0: Random effects are uncorrelated with regressors → REM is appropriate (efficient and consistent).
- H_1: Random effects are correlated with regressors → FEM is appropriate (consistent but less efficient).
- Reject H_0 if *p-value < 0.05*, implying that FEM is more consistent than REM. Rejecting H_0 suggests that bond-specific characteristics (e.g., maturity, liquidity) are systematically related to macroeconomic factors such as foreign inflows or inflation.

2.5.2 Diagnostic tests

1. Heteroskedasticity Test (Breusch–Pagan, 1979; White, 1980) to assesses variance constancy of residuals. Violations imply that volatility differs across time or tenors. With hypothesis:

- H_0: Error terms have constant variance (homoskedasticity).
- H_1: Error terms have non-constant variance (heteroskedasticity).
- Reject H_0 if *p-value < 0.05*, indicating heteroskedasticity is present. Rejecting H_0 implies that volatility in yields is not constant across time or tenors. For example, yields may fluctuate more during global financial stress.

2. Autocorrelation Test (Wooldridge, 2002) to tests for serial correlation in residuals. Persistence in errors violates Gauss–Markov assumptions. With hypothesis:

- H_0: No first-order autocorrelation (errors are independent over time).

- H_1: Presence of first-order autocorrelation (errors are correlated across time).
- Reject H_0 if *p-value < 0.05*, indicating autocorrelation. Rejecting H_0 means yield changes are persistent over time, a previous shock in the bond market influences subsequent yield behavior (common in financial data).

3. Multicollinearity to evaluates intercorrelations among regressors. High collinearity inflates variance and undermines coefficient significance. With hypothesis:

- H_0: No multicollinearity exists among explanatory variables.
- H_1: Multicollinearity exists among explanatory variables.
- If VIF > 10 (or tolerance < 0.1), it indicates multicollinearity. Rejecting H_0 (presence of multicollinearity) implies that some explanatory variables (e.g., BI7DRRR and CPI) move closely together, potentially reducing the precision of coefficient estimates.

4. Cross-Sectional Dependence (Pesaran CD, 2004) to tests whether residuals are correlated across entities. With hypotheses:

- H_0: Residuals are independent across entities (no cross-sectional dependence).
- H_1: Residuals are correlated across entities (cross-sectional dependence exists).
- Reject H_0 if *p-value < 0.05*, indicating that shocks in one cross-section affect others. Rejecting H_0 means that common shocks — such as global interest-rate changes or exchange-rate volatility — simultaneously affect all bond maturities, consistent with the *Financial Contagion* or *Market Integration* hypothesis.

3 RESEARCH RESULTS

This section presents the empirical findings derived from the panel data analysis conducted to examine the influence of foreign investment and market sentiment on the yield of Indonesian government bonds, with the exchange rate serving as a moderating variable. The analysis begins with a discussion of descriptive statistics to provide an overview of the data characteristics across different bond tenors, followed by a series of diagnostic and model selection tests as explained in the previous section to determine the most appropriate estimation model. The subsequent subsections present the regression outcomes, interpret the statistical and economic significance of the key variables, and discuss their broader implications for policy and market stability within Indonesia's sovereign bond market.

3.1 Descriptive statistics

Table 2

Descriptive Statistics of Research Variables by Tenor

ID		YTM	FOR	SENT	FX	BI7DRRR	CPI	UST10Y	CDS5Y
5Y	Mean	0,0643	0,0016	115,34	0,0014	0,0500	0,0270	0,0277	96,03
	SD	0,0077	0,0254	14,93	0,0205	0,0104	0,0123	0,0131	29,22
	Min	0,0506	-0,1157	77,31	-0,0625	0,0350	-0,0009	0,0062	63,46
	Max	0,0836	0,0652	128,94	0,0980	0,0625	0,0595	0,0479	215,72
10Y	Mean	0,0696	0,0016	115,34	0,0014	0,0500	0,0270	0,0277	96,03
	SD	0,0055	0,0254	14,93	0,0205	0,0104	0,0123	0,0131	29,22
	Min	0,0611	-0,1157	77,31	-0,0625	0,0350	-0,0009	0,0062	63,46
	Max	0,0855	0,0652	128,94	0,0980	0,0625	0,0595	0,0479	215,72
15Y	Mean	0,0715	0,0016	115,34	0,0014	0,0500	0,0270	0,0277	96,03
	SD	0,0063	0,0254	14,93	0,0205	0,0104	0,0123	0,0131	29,22
	Min	0,0625	-0,1157	77,31	-0,0625	0,0350	-0,0009	0,0062	63,46
	Max	0,0874	0,0652	128,94	0,0980	0,0625	0,0595	0,0479	215,72
20Y	Mean	0,0734	0,0016	115,34	0,0014	0,0500	0,0270	0,0277	96,03
	SD	0,0054	0,0254	14,93	0,0205	0,0104	0,0123	0,0131	29,22
	Min	0,0647	-0,1157	77,31	-0,0625	0,0350	-0,0009	0,0062	63,46
	Max	0,0896	0,0652	128,94	0,0980	0,0625	0,0595	0,0479	215,72
Total	Mean	0,0697	0,0016	115,34	0,0014	0,0500	0,0270	0,0277	96,03
	SD	0,0071	0,0253	14,86	0,0204	0,0103	0,0122	0,0130	29,08
	Min	0,0506	-0,1157	77,31	-0,0625	0,0350	-0,0009	0,0062	63,46
	Max	0,0896	0,0652	128,94	0,0980	0,0625	0,0595	0,0479	215,72

Source(s): Authors' own work

The descriptive statistical analysis shows that the average yield of Indonesian government bonds during the research period stood at 6.97% with a standard deviation of 0.71%, indicating a moderate level of yield fluctuation across periods. Examined by tenor, the results display an upward pattern in the average yield from 6.43% for the 5-year tenor to 7.34% for the 20-year tenor. This pattern aligns with the term structure of interest rates theory, where longer-maturity bonds tend to offer higher yields as compensation for greater risk and uncertainty. Such variation reflects market expectations regarding inflation risk and long-term economic uncertainty.

The foreign investment flow variable records an average value of 0.0016 with a relatively large standard deviation of 0.0254, suggesting notable fluctuations in foreign capital inflows and outflows within Indonesia's sovereign bond (SBN) market. Meanwhile, the Consumer Confidence Index (SENT), used as a proxy for market sentiment, averages 115.34 with a standard deviation of 14.93. The average level, which is well above the optimistic threshold of 100, indicates relatively strong confidence among domestic investors in Indonesia's economic conditions throughout the study period. The exchange rate variable, derived from the logarithmic change in USD/IDR, shows an average of 0.0014 with a standard deviation of 0.0205, indicating moderate volatility that may play a moderating role in the relationship between foreign investor activity and bond yields. Overall, the data pattern demonstrates that foreign capital dynamics, market sentiment, and exchange rate fluctuations are closely interrelated in shaping the variations of Indonesia's government bond yields.

3.2 Model selection and estimation method

A series of model specification tests was conducted to identify the most appropriate panel estimator. The results indicate that the pooled OLS model was rejected by both the Chow test and the Breusch–Pagan LM test, while the Hausman test detected no systematic difference between the Fixed Effects (FE) and Random Effects (RE) estimators ($\chi^2 \approx 0$). Therefore, the study employed the Fixed Effects model with Driscoll–Kraay robust standard errors (FE–DK) as the primary specification to address the issues of heteroskedasticity, autocorrelation, and cross-sectional dependence. After estimating the main model using FE–DK, an additional estimation was performed using RE–Clustered to confirm the robustness and consistency of the results. Furthermore, wild cluster bootstrap-t tests were applied to mitigate potential inference bias arising from the small number of clusters.

3.3 Regression results (FE–DK)

Table 3

Fixed Effects Regression Results with Driscoll-Kraay Standard

Variable	Coefficient	Std Error	t	P>|t|	
FOR	0,01410	0,01179	1,20	0,235	Not significant
SENT	0,00017	0,00006	3,05	0,003	Positive significant
FX	0,02480	0,02113	1,17	0,244	Not significant
FOR_FX	0,98673	0,25390	3,89	0,000	Positive significant (strong moderating effect)
SENT_FX	0,00071	0,00090	0,79	0,434	Not significant
BI7DRRR	0,36331	0,06917	5,25	0,000	Positive significant
CPI	-0,07182	0,03906	-1,84	0,070	Marginally negative significant
UST10Y	-0,24721	0,04149	-5,96	0,000	Negative significant
CDS5Y	0,00015	0,00003	5,74	0,000	Positive significant
Cons	0,04602	0,00443	10,39	0,000	-

Estimation Method: Fixed Effects with Driscoll–Kraay robust standard errors (lag = 3)
R^2 within = 0.6964
F-statistic = 24.71 | Prob > F = 0.0000
Source(s): Authors' own work

The FE–DK estimation results show that the model is overall statistically significant, with a within R^2 of approximately 0.6964, indicating that variations in bond yields across tenors are well explained by the combination of independent and control variables. Domestic market sentiment, represented by the Consumer Confidence Index (SENT), shows a positive and significant effect on yields ($p \approx 0.003$). This finding aligns with the mechanism whereby improving consumer sentiment enhances expectations of economic growth and policy normalization, leading to an increase in government bond yields. The foreign investment flow variable carries a positive but statistically insignificant coefficient ($p \approx 0.235$), while the exchange rate also has a positive but insignificant coefficient.

The most notable finding arises from the interaction terms between the moderating variable and the independent variables. The foreign flow × exchange rate interaction is positive and highly significant ($p < 0.001$), implying that Rupiah appreciation or depreciation against the USD amplifies the sensitivity of yields to foreign capital movements. Conversely, the SENT × exchange rate interaction remains positive but not significant ($p \approx 0.434$). The control variables exhibit signs consistent with emerging bond market behavior:

- The BI 7-Day Reverse Repo Rate (BI7DRRR) is positive and significant, indicating a strong monetary policy transmission effect on yields.
- The Consumer Price Index (CPI) is negative and marginally significant, reflecting inflation expectations that tend to suppress real yields.
- The U.S. 10-Year Treasury Yield (UST10Y) is negative and significant, showing global benchmark effects that reduce domestic yields.
- The 5-Year Credit Default Swap (CDS5Y) is positive and significant, suggesting that higher perceived sovereign risk leads to higher yields.

3.4 Robustness tests

Table 4

Random Effects GLS Regression with Robust Clustered Standard Errors

Variable	Coefficient	Std Error	t	P>|t|	
FOR	0,01410	0,00161	8,79	0,000	Positive significant
SENT	0,00017	7.41e-06	22,77	0,000	Positive significant
FX	0,02480	0,00195	12,69	0,000	Positive significant
FOR_FX	0,98673	0,01931	51,09	0,000	Positive significant (strong moderating effect)
SENT_FX	0,00071	0,00014	5,11	0,000	Marginally positive significant
BI7DRRR	0,36331	0,06213	5,85	0,000	Positive significant
CPI	-0,07182	0,00667	-10,77	0,000	Negative significant
UST10Y	-0,24721	0,06718	-3,68	0,000	Negative significant
CDS5Y	0,00015	0,00001	13,42	0,000	Positive significant
Cons	0,04602	0,00715	6,43	0,000	-

Estimation Method: Random Effects GLS with robust clustered standard errors
R^2 overall = 0,5387
Rho = 0,5503
Source(s): Authors’ own work

To ensure robustness, additional estimations were conducted using alternative inference methods. First, the Random Effects (RE) model with clustering by tenor produced an overall R^2 of approximately 0.5387 and coefficient directions closely aligned with the results of the FE–DK model. The SENT variable remained positive and significant, the foreign flow × exchange rate interaction remained strongly positive, and both foreign flow and SENT × exchange rate interaction retained a positive sign. The only notable difference was that foreign flow and SENT x exchange rate became significant under the RE specification. However, given that clustered standard errors under RE tend to be optimistic when the number of clusters is small, the interpretation of significance remains grounded in a more conservative inference.

Table 5

Wild Cluster Bootstrap-t Results

Variabel	t	P>|t|	95% Confidence Interval	
FOR	8,7859	0,0283	[0,0097 ; 0,0183]	Significant at 5%
SENT	22,7699	0,0050	[0,00015 ; 0,00019]	Significant at 1%
FOR_FX	51,0923	0,0000	[0,9319 ; 1,0370]	Significant at 1% (strong moderating effect)
SENT_FX	5,1079	0,0193	[0,00031 ; 0,00108]	Significant at 5%

Source(s): Authors’ own work

Second, to address potential bias arising from only four clusters, wild cluster bootstrap-t (Webb; 9,999 replications) was applied to the same specification. The results reaffirmed that SENT is positive and significant ($p \approx 0.005$), foreign flow is positive and significant ($p \approx 0.028$), foreign flow × exchange rate remains positive and highly significant ($p < 0.001$), and SENT × exchange rate becomes positive and significant ($p \approx 0.043$). The joint significance test indicates that the block of five key coefficients (foreign flow, SENT, exchange rate, and their two interactions) is jointly significant ($p \approx 0.003$) and remains so after the inclusion of control variables ($p \approx 0.010$). These findings confirm that under the most reliable inference for small clusters, domestic sentiment increases yields, and the exchange rate amplifies the impact of both foreign flows and domestic sentiment.

3.5 Research interpretation

Based on the main regression (FE–DK), comparison model (RE–Clustered), and wild cluster bootstrap-t robustness tests, most of the research hypotheses are empirically supported. Foreign investment flow shows a positive and significant coefficient in the robust and bootstrap models, H1 is not supported. This indicates that higher foreign inflows are associated with rising yields, possibly due to yield-chasing behavior or capital entry during high-risk premium periods. Market sentiment, proxied by the Consumer Confidence Index (SENT), has a strong positive and significant impact on bond yields across all models, thereby supporting H2. Improved optimism among market participants regarding domestic economic prospects tends to raise yields through adjustments in expectations of interest rates and economic growth.

H3 which states that the exchange rate amplifies the relationship between foreign investment and yields is strongly supported. The foreign flow × exchange rate interaction is positive and significant across all specifications, including bootstrap tests ($p < 0.01$), confirming that Rupiah appreciation or depreciation magnifies the influence of foreign capital movements on bond yields. Lastly H4 which states that the exchange rate amplifies the relationship between market sentiment and yields is also supported, even though at a relatively weaker level of significance. While SENT × exchange rate is insignificant under FE–DK, it becomes significant under RE–Clustered and bootstrap estimations ($p \approx 0.019$–0.043), suggesting that exchange rate volatility enhances sentiment to bond yield transmission under market uncertainty.

Overall, the combined results from FE–DK, RE, and bootstrap tests form a coherent and complementary empirical narrative. The findings consistently underscore the dominant role of domestic sentiment and exchange rate dynamics in determining Indonesia's government bond yields. Domestic sentiment persistently raises yields, while the exchange rate amplifies the transmission from both foreign investment flow and sentiment toward yield movements. The positive relationship between foreign flow and yield observed under FE–DK and its significance in the bootstrap test indicate possible simultaneity effect, potentially driven by yield-chasing inflows where foreign investors enter the market in response to already attractive yields. Nevertheless, the core conclusion regarding the amplifying role of the exchange rate and the significant relationship between domestic market sentiment and bond yield remains robust across all specifications and inference frameworks.

From a policy standpoint, these findings highlight that aside from the central bank's interest rate policy, exchange rate stabilization is crucial for managing the sensitivity of the yield curve to sentiment and capital flow shocks. Future policy coordination between Bank Indonesia and the Ministry of Finance is essential to ensure alignment between monetary and fiscal strategies. Additionally, effective foreign reserve management can enhance Rupiah stability against the U.S. dollar, mitigating the impact of volatility in sentiment and capital flows on the domestic capital market. Furthermore, strengthening domestic investor trust and confidence through consistent and transparent policy communication is equally vital to improve the resilience of Indonesia's bond market against global economic turbulence.

4 CONCLUSION

This study empirically examined the influence of foreign investment and market sentiment on the yields of Indonesian government bonds, incorporating the exchange rate as a moderating variable. Using monthly panel data from August 2018 to July 2025 across four benchmark tenors (5, 10, 15, and 20 years), the research applied the Fixed Effects model with Driscoll–Kraay robust standard errors (FE–DK) and performed robustness verification using Random Effects (RE–Clustered) and wild cluster bootstrap-t tests. The model selection tests (Chow, Breusch–Pagan LM, and Hausman) confirmed that FE–DK was the most appropriate specification, effectively addressing heteroskedasticity, autocorrelation, and cross-sectional dependence.

The empirical results demonstrate that domestic market sentiment—proxied by the Consumer Confidence Index (SENT)—has a strong positive and significant effect on government bond yields. Improved sentiment reflects greater optimism about economic prospects, which raises expectations of policy normalization and higher yields. Foreign investment flows show a positive but less consistent relationship, becoming significant under bootstrap inference, indicating possible simultaneity effects associated with yield-chasing behavior. The exchange rate emerges as a crucial moderating factor that amplifies the sensitivity of yields to both foreign investment and sentiment fluctuations, confirming its role as a transmission channel for external and behavioral shocks in the Indonesian bond market.

Overall, this study contributes to the growing body of literature on behavioral and macro-financial determinants of sovereign bond yields in emerging markets. Beyond its empirical implications, the findings highlight the structural importance of investor sentiment and exchange rate dynamics in shaping Indonesia's bond market behavior. While short-term policy coordination between monetary and fiscal authorities remains critical to maintaining market stability, the broader implication is the need for a resilient financial ecosystem capable of absorbing global shocks through stronger investor confidence, transparent policy communication, and sound macroeconomic fundamentals. Future research is encouraged to expand the model by incorporating cross-border capital interaction variables and alternative sentiment proxies, enabling a deeper understanding of behavioral transmission channels in emerging economies.

REFERENCES

Akerlof, G. A., & Shiller, R. J. (2009). *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*. Princeton University Press.

Baltagi, B. H. (2005). *Econometric Analysis of Panel Data* (3rd ed.). Wiley.

Bank Indonesia. (2009). *Monetary Policy and Financial Market Stability Report*.

Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, 61(4), 1645–1680.

Bryman, A. (2016). *Social Research Methods* (5th ed.). Oxford University Press.

Calvo, G., Leiderman, L., & Reinhart, C. (1996). Inflows of capital to developing countries in the 1990s. *Journal of Economic Perspectives*, 10(2), 123–139.

Dornbusch, R. (1976). Expectations and exchange rate dynamics. *Journal of Political Economy*, 84(6), 1161–1176.

Engel, C. (2016). Exchange rates, interest rates, and the risk premium. *American Economic Review*, 106(2), 436–474.

Fama, E. F. (1984). Forward and spot exchange rates. *Journal of Monetary Economics*, 14, 319–338.

Fang, L., Peress, J., & Zheng, L. (2018). Investor sentiment and bond returns. *Review of Financial Studies*, 31(9), 3628–3672.

Fratzscher, M. (2012). Capital flows, push versus pull factors and global financial crisis. *Journal of International Economics*, 88(2), 341–356.

Froot, K., O'Connell, P., & Seasholes, M. (2001). The portfolio flows of international investors. *Journal of Financial Economics*, 59, 151–193.

Hosono, K., *et al*. (2023). Foreign inflows and emerging market bond yields. *Journal of International Money and Finance*.

Kahneman, D., & Tversky, A. (1979). Prospect Theory. *Econometrica*, 47(2), 263–292.

Katusiime, L. (2025). Exchange rate volatility and bond market sensitivity in emerging markets. *Emerging Market Review*.

Klaassen, F., & Mavromatis, K. (2024). Currency risk and government bonds. *Journal of Financial Markets*.

Nelson, C., & Siegel, A. (1987). Parsimonious modeling of yield curves. *Journal of Business*, 60(4), 473–489.

Peiris, S. (2010). Foreign participation in emerging markets' local currency bond markets. IMF Working Paper.

Piñeiro-Chousa, J., *et al*. (2022). Social media sentiment and bond market dynamics. *Finance Research Letters*.

Setiawan, R., & Subiyantoro, H. (2021). Capital flows and Indonesian bond yields. *Indonesian Economic Review*.

Shefrin, H., & Statman, M. (1994). Behavioral CAPM. *Journal of Portfolio Management*.

Tobin, J. (1969). Portfolio selection and diversification. *Review of Economic Studies*, 25(1), 65–86.

Wibowo, A. (2022). Monetary variables and Indonesian SBN volatility. *Banking and Finance Journal*.

Wooldridge, J. (2010). *Econometric Analysis of Cross Section and Panel Data*. MIT Press.