Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

Impact of Interest Rate Hike on Financing Debt, Indonesian Government Toll Road Project

Azhar Eka Septiana [1*] Neyla Mutiara Sabrina [2] Silvia Ananda Putri [3] Kayla Ardi Putri [4] Muhammad Fauzan Akbar Rafsanjani [5] Galuh Boga Guswara [6]

[1*, 2, 3, 4, 5, 6] Universitas Kebangsaan Republik Indonesia, Bandung, Indonesia
Email: azharmustopa25@gmail.com, neyla056@gmail.com, silviaanandaputri2607@gmail.com, kaylaardiputri11885@gmail.com, fauzanakbarr275@gmail.com

ARTICLE HISTORY

Submitted	:	May 13, 2026
Reviewed	:	May 16, 2026
Revised	:	June 12, 2026
Accepted	:	June 13, 2026
Published	:	June 14, 2026

Conflict of Interest Statement:
The author(s) declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

ABSTRACT

Purpose: This study analyzes the impact of rising interest rates on the sustainability of debt financing in Indonesian government toll road projects, using the Cisumdawu Toll Road project as a case study.

Research Method: The study employed a quantitative case study approach, using financial feasibility analysis and scenario-based sensitivity analysis. Secondary data were obtained from Bank Indonesia benchmark interest rates (BI 7-Day Reverse Repo Rate), project financing structures, and toll road investment assumptions. Financial indicators used in the analysis included Cost of Debt, Weighted Average Cost of Capital (WACC), Debt Service Coverage Ratio (DSCR), Net Present Value (NPV), and Internal Rate of Return (IRR).

Results and Discussion: The findings indicate that rising interest rates significantly increase borrowing costs and debt-servicing obligations, thereby reducing project cash-flow resilience and investment feasibility. Higher interest rates also weaken DSCR performance, increase WACC, and reduce NPV and IRR values.

Implications: The study highlights the importance of stable monetary policy, effective governance of infrastructure financing, and government support mechanisms in maintaining the resilience of long-term infrastructure investment.

Originality: Integrating interest rate sensitivity analysis with debt financing sustainability in the context of the Cisumdawu Toll Road project, which has rarely been discussed comprehensively in previous infrastructure financing studies in Indonesia

Keywords: interest rate; debt financing; toll road project; financial feasibility; infrastructure financing.

1. Introduction

Infrastructure development, particularly toll roads, is a crucial driver of economic growth by improving connectivity and distribution efficiency, although high logistics costs remain a challenge. Toll road projects are characterized by high capital intensity, long concession periods, substantial traffic uncertainty, and extended payback horizons, making financial sustainability a major concern for investors and lenders (Bakulina *et al.,* 2025). Under these conditions, the financing structure of toll road projects becomes a critical factor in determining project feasibility and the long-term sustainability of investment. Project financing generally uses a debt-dominated SPV project financing scheme, making

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

borrowing costs a critical factor in project sustainability. In debt-based infrastructure financing schemes, interest rates directly influence the cost of debt, debt service obligations, and investment feasibility indicators such as Net Present Value (NPV) and Internal Rate of Return (IRR), thereby affecting overall project bankability. Consequently, increases in benchmark interest rates may significantly weaken project feasibility by increasing financing costs, reducing projected returns, and elevating refinancing and default risks during the concession period (Bibrautu *et al.,* 2022). This issue becomes increasingly important in infrastructure projects that rely heavily on long-term debt financing, as fluctuations in interest rates can substantially affect project cash flows and repayment capacity.

Beyond operational and construction risks, toll road project financing also faces various risks that can impact overall project performance. These risks stem not only from financial aspects but also from technical, social, and external factors. In the case study of the Cisumdawu Toll Road project, financing structure, borrowing costs, and project cost overruns became critical determinants influencing project continuity and financial performance (Aqsha, 2025). The Cisumdawu Toll Road project represents an important empirical case because it experienced financing challenges and strategic adjustments during implementation, particularly regarding investment costs and the sustainability of project funding. Therefore, the project provides a relevant context for analyzing how changes in interest rates may affect debt-financing performance in large-scale infrastructure projects.

Furthermore, interest rate dynamics in Indonesia have exhibited significant fluctuations in recent years. Changes in Bank Indonesia's benchmark interest rate, namely the BI 7-Day Reverse Repo Rate, reflect monetary policy adjustments that directly influence lending rates, infrastructure financing costs, and capital market conditions in debt-intensive sectors (Bank Indonesia, 2026). Under these conditions, fluctuations in interest rates become an important external variable because they may alter debt servicing capacity, financing structures, and long-term infrastructure investment decisions. The increase in benchmark interest rates in recent years has raised concerns about the sustainability of infrastructure projects financed at high debt levels, particularly those requiring long concession periods and stable cash flow projections.

Several previous studies have examined the relationship among financing structures, interest rates, and the feasibility of infrastructure projects. Yafril & Priyambodho (2023) found that loan interest sensitivity had a negative effect on the Internal Rate of Return in a toll road project case study in North Tangerang, indicating that financing costs significantly influence project profitability. Similarly, Alfiansyah *et al.,* (2021) demonstrated that conventional financing schemes resulted in higher financing costs and weaker feasibility indicators, including NPV, IRR, and Return on Investment (ROI), compared with Islamic financing alternatives. Fauzan *et al.,* (2023) also identified interest rate risk as a critical success factor affecting the sustainability of toll road financing. Meanwhile, Gunawan & Amalia (2022) reported that increases in the Weighted Average Cost of Capital (WACC) contributed to higher initial toll tariffs and greater dependence on government support mechanisms.

In a broader macroeconomic context, several studies have also examined the relationship between interest rates and government financing performance. Dinul & Kurniawan (2024) found that Indonesia's foreign debt responded positively to changes in interest rates, using a Vector Autoregression (VAR) approach covering the 1970–2021 period. Likewise, Fatmawatie *et al.,* (2024) demonstrated that Indonesian interest rates significantly affected the yields of long-term government bonds, particularly 10-year and 15-year tenor bonds, which are commonly used as financing instruments for public infrastructure projects. In the context of toll road development, Wibowo & Santoso (2024)

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

documented substantial cost overruns across Indonesian toll road projects. However, their study did not specifically analyze the implications of interest rate increases on debt financing structures. Similarly, Hidayat *et al.,* (2024) identified several critical success factors in Public-Private Partnership (PPP) toll road projects. However, they did not explicitly address the impact of rising interest rates on the sustainability of project financing.

Although previous studies have discussed financing risks, project feasibility, and capital structure issues in infrastructure projects, several important limitations remain. Existing studies generally focus on overall financial feasibility assessments, comparisons of financing schemes, or macroeconomic financing relationships, without specifically examining how increases in benchmark interest rates affect debt-servicing burdens, project cash flows, repayment capacity, and investment feasibility indicators within real toll road project financing structures. In addition, empirical studies that integrate interest rate fluctuations into case-based infrastructure financing analysis in Indonesia remain limited. Most previous studies also discuss toll road financing in general terms rather than analyzing the financial implications of interest rate increases for a specific infrastructure project.

Moreover, despite the strategic importance of the Cisumdawu Toll Road project as national infrastructure supporting connectivity to Kertajati International Airport and regional economic integration in West Java, previous discussions have primarily focused on construction progress, technical implementation, and general financing challenges. Studies specifically examining the impact of interest rate increases on the sustainability of debt financing, repayment capacity, and investment feasibility in the Cisumdawu Toll Road project remain very limited. As a result, the implications of rising borrowing costs for the project's long-term financial sustainability have not been comprehensively explored in prior literature.

Based on these gaps, this study aims to analyze the impact of interest rate increases on debt financing structures, financing costs, and the feasibility of investment in the Cisumdawu Toll Road project. Furthermore, this study evaluates how changes in borrowing costs influence project sustainability, repayment capacity, and financial feasibility indicators within the context of long-term infrastructure financing. The novelty of this study lies in its emphasis on a case-based financial analysis that explicitly integrates interest rate dynamics into the evaluation of the sustainability of toll road debt financing in Indonesia. Unlike previous studies that generally discuss toll road financing at a conceptual level, this study examines the interaction among interest rate fluctuations, debt financing structures, and investment feasibility indicators in a real infrastructure project context.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 presents the research method and design. Section 4 provides the results and discussion. Section 5 is Concluding Remarks and Recommendations.

2. Literature Review and Hypothesis Development

2.1 Monetary Policy Theory and Interest Rates in Toll Road Project Financing

Interest rates are one of the primary monetary policy instruments used by central banks to maintain price stability, control inflation, and support sustainable economic growth. In Indonesia, Bank Indonesia implements monetary policy through the BI 7-Day Reverse Repo Rate, which serves as a benchmark interest rate that influences banking liquidity, lending rates, and financing costs in the real sector. According to Monetary Transmission Theory, changes in benchmark interest rates are transmitted

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

through financial institutions and ultimately affect investment decisions, borrowing costs, and capital allocation across sectors, including infrastructure financing. Handayani & Kacaribu (2021) explained that monetary policy transmission in Indonesia significantly affects lending rates in the banking sector, indicating that changes in Bank Indonesia's policy rate can directly influence financing conditions in debt-intensive industries. Similarly, Jamar & Yunus (2025) demonstrated that Indonesia's interest rate transmission mechanism affects the real sector through changes in credit costs and inflation expectations, particularly during periods of macroeconomic uncertainty.

In infrastructure financing, particularly under Public-Private Partnership (PPP) schemes, interest rates become a strategic financial variable because toll road projects are generally characterized by high capital intensity, long concession periods, and substantial dependence on debt financing. Under project finance structures, project cash flows serve as the primary source of debt repayment, making toll road projects highly sensitive to fluctuations in borrowing costs and lending rates. Fauzan *et al.,* (2023) stated that financing costs and interest rate risk are among the critical success factors influencing the sustainability of toll road infrastructure financing in Indonesia. An increase in benchmark interest rates may raise debt servicing obligations, reduce projected cash flows, and weaken investment feasibility indicators such as Net Present Value (NPV) and Internal Rate of Return (IRR). Therefore, interest rate volatility may significantly affect the bankability of projects, repayment capacity, and the long-term sustainability of debt-financed toll road projects.

Furthermore, macroeconomic instability and inflation-targeting policies also influence infrastructure financing performance through adjustments in monetary policy. Shahzad *et al.,* (2024) explained that interest rate adjustments implemented by central banks to manage inflation expectations can increase the cost of capital and financing risks in investment sectors. In Indonesia, Kuncoro *et al.,* (2024) found that fluctuations in monetary policy and inflation-targeting regimes contribute to growth volatility and uncertainty in long-term investment planning. These conditions are particularly relevant for toll road infrastructure projects because changes in interest rates may affect the Weighted Average Cost of Capital (WACC), Debt Service Coverage Ratio (DSCR), and other financial feasibility indicators used in project evaluation. Therefore, in the context of toll road project financing, interest rates should be viewed not only as macroeconomic indicators but also as strategic determinants of debt financing sustainability, investment feasibility, and infrastructure project resilience over the long term.

2.2 Debt Financing Theory in Public-Private Partnership Schemes

Debt financing is one of the primary external funding mechanisms used in infrastructure development projects, particularly under Public-Private Partnership (PPP) schemes. In PPP-based toll road projects, financing structures generally combine equity and long-term debt because infrastructure projects require substantial initial capital investment and extended concession periods. According to Project Finance Theory, infrastructure projects are commonly financed through Special Purpose Vehicles (SPVs), in which project cash flows serve as the primary source of debt repayment rather than corporate assets or shareholder guarantees. This financing structure allows governments to involve private sector participation in infrastructure provision while distributing financial risks among project stakeholders. Casady *et al.,* (2024) explained that PPP financing structures are designed to support the sustainability of long-term infrastructure investment by combining private-sector capital participation with risk-sharing mechanisms. Similarly, Fauzan *et al.,* (2023) stated that debt financing dominates toll road

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

infrastructure projects in Indonesia due to the high investment requirements and long-term funding characteristics of toll road development.

Under debt-based project finance structures, the sustainability of infrastructure financing depends heavily on the project's ability to generate stable cash flows and maintain repayment capacity throughout the concession period. PPP financing schemes involve multiple stakeholders, including financial institutions, project companies, investors, and guarantee institutions, making project sustainability highly dependent on the coordination of financing and the allocation of risks. According to Sunandar *et al.,* (2024), financing risk in PPP infrastructure projects is closely associated with debt exposure, macroeconomic volatility, and project funding structures. Consequently, toll road projects are highly sensitive to changes in interest rates, uncertainty in traffic revenue, construction delays, and cost overruns. Akomea-Frimpong *et al.,* (2024) further explained that financial risk mitigation in PPP infrastructure projects requires strong project finance management, as debt financing structures are vulnerable to refinancing risk, liquidity risk, and increases in borrowing costs. In addition, Gifford *et al.,* (2024) emphasized that macroeconomic shocks and financing instability often increase the risk of renegotiation in highway PPP projects, particularly when project revenues fall short of financial projections.

Debt financing risks in toll road infrastructure projects include rising interest rates, construction delays, cost overruns, and failure to achieve projected traffic volumes. These risks may significantly affect financial feasibility indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), Debt Service Coverage Ratio (DSCR), and Weighted Average Cost of Capital (WACC), which are commonly used to evaluate the sustainability and repayment capability of infrastructure projects. In the context of the Cisumdawu Toll Road project, external factors such as market conditions, legal and regulatory policies, and macroeconomic instability also play important roles in shaping the sustainability of financing. Therefore, debt financing in PPP toll road projects should be viewed not only as a funding mechanism but also as a strategic financial structure that determines project feasibility, repayment resilience, and the sustainability of long-term infrastructure investment under changing macroeconomic conditions.

2.3 Theory of Government Toll Road Projects from the Perspective of Risk and Financial Feasibility

Toll road projects are part of national strategic infrastructure programs designed to improve connectivity, logistics efficiency, and regional economic growth. In Indonesia, the government widely adopts Public-Private Partnership (PPP) schemes as a financing solution to address fiscal limitations in infrastructure provision. Under PPP arrangements, private-sector participation is essential for sharing financing responsibilities and project risks associated with large-scale infrastructure development. Toll road projects are generally characterized by high capital requirements, long concession periods, and strong dependence on tariff-based revenue mechanisms, making financial feasibility analysis an essential component of project evaluation. Muliawan (2024) explained that toll road financial feasibility studies commonly utilize indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), Discounted Payback Period (DPP), Profitability Index (PI), and Weighted Average Cost of Capital (WACC) to evaluate investment sustainability and project viability. In addition, toll road feasibility assessments involve traffic projection analysis, operational expenditure (OPEX), capital expenditure (CAPEX), and debt-equity financing structures, as infrastructure investment sustainability depends heavily on long-term cash flow performance.

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

From a financial risk perspective, toll road projects are highly vulnerable to macroeconomic uncertainty, financing instability, and operational risks. Under debt-based financing structures, project sustainability depends on toll road operators' ability to maintain stable revenue streams and meet debt repayment obligations throughout the concession period. Maulana & Pria (2024), in the case study of the Manado–Bitung Toll Road project, demonstrated that debt repayment capacity and project feasibility are highly sensitive to changes in borrowing costs, operational efficiency, and traffic volume realization. Similarly, Yafril & Priyambodho (2023) found that loan interest sensitivity, traffic projection risks, and the stability of the financing structure significantly influence the feasibility of toll road investment. These findings indicate that increases in borrowing costs and deviations in projected traffic volume may substantially reduce financial feasibility indicators such as Financial Internal Rate of Return (FIRR), NPV, and Payback Period. Consequently, toll road projects financed through debt mechanisms become highly exposed to refinancing risk, liquidity pressure, and financing sustainability challenges during periods of macroeconomic volatility.

In addition to financial risks, toll road infrastructure projects are also exposed to external risks related to market conditions, government policies, legal uncertainty, and investment climate dynamics. Suwandairi *et al.,* (2025) explained that financing risk, interest rate fluctuations, and investment uncertainty are among the critical risk factors affecting the feasibility of PPP toll road projects. Furthermore, Kazhimi & Anas (2022) emphasized that infrastructure project sustainability requires comprehensive feasibility-scenario analysis because changes in macroeconomic conditions and financing assumptions may significantly alter project viability. In the context of the Cisumdawu Toll Road project, external risks such as changes in market conditions, financing costs, and regulatory policies may affect the project's cash flow stability and long-term repayment capacity. Therefore, government toll road projects should be viewed not only as infrastructure development initiatives but also as complex financial investments that require integrated risk management, financial feasibility optimization, and sustainable financing strategies to maintain long-term project resilience amid changing economic conditions.

2.4 Integration of Interest Rate Variables, Debt Financing, and Toll Road Projects

The literature indicates a strong causal relationship between interest rates, debt financing structures, and the financial sustainability of toll road infrastructure projects. In Public-Private Partnership (PPP)-based infrastructure financing, interest rates serve as a macroeconomic variable that directly influences borrowing costs, debt-servicing obligations, and the feasibility of long-term investment. Under debt-dominated financing schemes, increases in benchmark interest rates may substantially increase the cost of capital and reduce project cash flows available for debt repayment. Rohman (2021) explained that toll road PPP financing structures in Indonesia generally entail high debt exposure because infrastructure projects require large upfront investment and long concession periods. Consequently, financing sustainability depends heavily on the project's ability to maintain stable revenue streams and repayment capacity throughout the operational phase. In this context, debt financing serves as a transmission mechanism by which changes in monetary policy and lending rates affect the sustainability of infrastructure investment.

In toll road infrastructure projects, the interaction between interest rates and debt financing significantly affects financial feasibility indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), Debt Service Coverage Ratio (DSCR), and Weighted Average Cost of Capital (WACC).

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

Suwandairi *et al.,* (2025) explained that increases in interest rates and investment costs may significantly affect project feasibility and the sustainability of financing in PPP toll road projects. Similarly, Aziz (2024) stated that rising interest rates create additional pressure on debt repayment obligations, particularly when toll road projects experience deviations in traffic volume projections and operational revenue realization. These conditions indicate that macroeconomic instability may weaken project feasibility by increasing refinancing risk, liquidity pressure, and financing uncertainty. In addition, Anbumozhi *et al.,* (2023) emphasized that toll road infrastructure financing in Indonesia requires comprehensive risk allocation mechanisms, as the sustainability of financing is closely linked to debt structure, investment costs, and long-term concession performance. Therefore, toll road infrastructure projects are highly sensitive to interest rate fluctuations because debt financing structures depend heavily on long-term projected cash flows and operational stability.

Furthermore, the integration of interest-rate variables, debt-financing structures, and toll road project sustainability reflects the complexity of infrastructure investment management amid changing macroeconomic conditions. Septiani (2025) explained that PPP toll road financing sustainability depends not only on financing efficiency but also on the resilience of project funding structures to macroeconomic shocks and financing volatility. In the context of Indonesian government toll road projects, changes in benchmark interest rates may influence borrowing costs, the risk of financing renegotiation, and the overall sustainability of project cash flows. These conditions are particularly relevant for debt-financed toll road projects because increases in financing costs may reduce project profitability and weaken long-term repayment capacity. Therefore, the relationship among interest rates, debt financing, and toll road infrastructure projects provides an important conceptual foundation for analyzing how macroeconomic fluctuations affect project feasibility, financing resilience, and the sustainability of infrastructure investment in Indonesia.

3. Research Method

This study uses a quantitative method to analyze the impact of interest rate increases on debt financing for the Cisumdawu Toll Road project. This study employs a quantitative case study approach, using financial feasibility modeling and scenario-based sensitivity analysis, to evaluate the impact of interest rate increases on the sustainability of debt financing in the Cisumdawu Toll Road project. The quantitative method was chosen because it provides an objective and measurable picture through numerical data processing and statistical analysis relevant to the research objectives.

The quantitative approach in this study focuses on analyzing the relationship between changes in benchmark interest rates and project debt-financing performance using several financial feasibility indicators, including borrowing costs, debt-repayment capability, project cash-flow sustainability, and investment feasibility. The data used consist of Bank Indonesia benchmark interest rate data (BI 7-Day Reverse Repo Rate), toll road financing structures, projected debt compositions, concession assumptions, projected traffic revenues, operational expenditure, capital expenditure, and financial feasibility parameters derived from toll road investment reports, government publications, and previous infrastructure financing studies.

For measuring the impact of interest rate increases on debt financing, this study uses several financial feasibility indicators, including Cost of Debt, Interest Expense, Weighted Average Cost of Capital (WACC), and Debt Service Coverage Ratio (DSCR). These indicators are used to evaluate the

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

impact of interest rate fluctuations on borrowing costs, repayment capacity, and the feasibility of investment in toll road infrastructure projects.

- *Cost of debt*
  The cost of debt is calculated using the equation:
  $$k_d = i$$
  Where:
  k_d = Cost of Debt
  i =Interest rate
  This equation indicates that changes in interest rates directly affect project borrowing costs and financing obligations.

- *Interest Expense*
  $$\boldsymbol{Interest = D \times i}$$
  Amount of debt:
  D = Amount of debt
  i =Interest rate
  This formula is used to estimate the interest expense payable as a result of changes in interest rates within the project financing structure.

- *Weighted Average Cost of Capital (WACC)*
  $$\boldsymbol{WACC = \left(\frac{E}{V} \times k_e\right) + \left(\frac{D}{V} \times k_d\right)}$$
  Where:
  E =Equity
  D =Debt
  $V = E + D$
  k_e =Cost of equity
  k_d =Cost of debt
  The Weighted Average Cost of Capital (WACC) is used as the discount rate to evaluate project feasibility across different interest-rate scenarios, because changes in borrowing costs directly affect the overall project financing structure.

- *Debt Service Coverage Ratio (DSCR)*
  $$\boldsymbol{DSCR = \frac{CF}{Debt\ Service}}$$
  Where:
  CF = Project cash flow
  Debt Service =Total payment debt and interest
  The Debt Service Coverage Ratio (DSCR) measures a project's ability to meet debt repayment obligations under varying financing cost scenarios.

To strengthen the analytical framework, this study employs scenario-based sensitivity analysis by simulating various interest-rate scenarios and evaluating their effects on project financing indicators. The analysis compares baseline financing conditions with higher-interest-rate scenarios to identify

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

changes in borrowing costs, project cash flows, WACC, and DSCR. In addition, the financial modeling assumptions include debt-equity financing composition, estimated borrowing costs, concession period assumptions, projected traffic revenue, operational expenditure, capital expenditure, and debt repayment structures.

4. Results and Discussion

4.1 Analysis Results

Based on the financial feasibility analysis of the Cisumdawu Toll Road project, the results indicate that increases in interest rates significantly affect project financing sustainability, repayment capacity, and investment feasibility. Bank Indonesia benchmark interest rates experienced substantial fluctuations during the observation period, reaching approximately 6.25% in 2024 before declining to around 4.75% in 2026. These fluctuations directly influenced borrowing costs and financing structures in debt-intensive infrastructure projects such as the Cisumdawu Toll Road project. The changes in benchmark interest rates reflect monetary policy adjustments aimed at responding to inflationary pressures, exchange rate volatility, and macroeconomic uncertainty. In infrastructure projects that rely heavily on long-term debt financing, changes in benchmark interest rates become highly important because they directly affect financing costs, debt repayment obligations, and overall project sustainability.

To assess the impact on debt financing, a simulation was conducted under different interest-rate scenarios. The simulation assumed project debt financing of approximately Rp 1 trillion under varying borrowing-cost scenarios.

Table 1. Simulation of Interest Expense Under Different Interest Rate Scenarios

Interest Rate Scenario	Estimated Interest Expense
6.25%	Rp 62.5 billion
4.75%	Rp 47.5 billion

The simulation results indicate that a 1.5% increase in interest rates may increase annual interest expenses by approximately Rp 15 billion, demonstrating the high sensitivity of debt financing costs to changes in benchmark interest rates. This condition indicates that even relatively moderate changes in interest rates can significantly increase the financing burden on toll road projects that rely heavily on debt-based financing structures. Rising interest rates directly increase the cost of debt borne by project operators, resulting in higher financing obligations and increased pressure on project cash flow sustainability. As borrowing costs increase, project cash flows previously allocated for operational activities and debt repayment become more constrained, thereby increasing financing risk exposure. Consequently, project managers may face greater difficulty in maintaining liquidity stability and operational efficiency, particularly during the early years of project operation when traffic revenues may not yet reach projected levels.

In addition, increases in interest rates also affect the project's ability to fulfill debt repayment obligations, particularly under debt-dominated financing structures. To evaluate the impact on repayment capacity, a Debt Service Coverage Ratio (DSCR) simulation was conducted under different financing scenarios.

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

Table 2. DSCR Simulation Under Different Interest Rate Scenarios

Scenario	Cash Flow	Debt Service	DSCR
Baseline Scenario	Rp 120 billion	Rp 100 billion	1.20
Higher Interest Rate Scenario	Rp 120 billion	Rp 110 billion	1.09

The decline in the DSCR indicates that the project's ability to meet debt repayment obligations becomes more limited as financing costs rise. Although the DSCR remains above 1.00, the decline from 1.20 to 1.09 indicates weaker financial resilience, as a larger proportion of project cash flow must be allocated to debt-servicing obligations. Under these conditions, the project becomes more vulnerable to financial stress if unexpected risks arise, such as lower-than-expected traffic volumes, operational inefficiencies, construction delays, or increases in operating expenses. These findings indicate that toll road projects that rely heavily on debt financing structures are more vulnerable to macroeconomic changes, particularly interest rate fluctuations and financing instability.

From a financing-structure perspective, rising interest rates encourage adjustments to project capital composition. Project managers tend to reduce reliance on debt and consider increasing the equity portion to mitigate financial risk. However, increasing equity also has consequences, as it can affect investor returns. A larger equity proportion may reduce debt exposure and repayment pressure, but it can also reduce return on equity because investors must provide larger upfront capital contributions. Therefore, project financing decisions must balance debt efficiency, financing risk, and long-term investment sustainability. In toll road infrastructure projects, financing structures that are excessively dependent on debt may create substantial financial vulnerability when macroeconomic conditions become unstable.

Furthermore, the analysis shows that rising interest rates negatively affect investment feasibility indicators, such as Net Present Value (NPV) and Internal Rate of Return (IRR). This decrease results from the higher discount rate used to calculate the present value of a project's cash flows. Consequently, the expected return decreases, making the project less attractive to investors. Higher interest rates increase the Weighted Average Cost of Capital (WACC), thereby reducing the present value of projected project cash flows. Under these conditions, project profitability declines, making the investment less attractive to investors and lenders. In project financing analysis, higher WACC values indicate an increased overall cost of capital, thereby reducing investment efficiency and weakening long-term project feasibility. This condition may also delay financial close processes because lenders and investors tend to become more cautious in providing financing under high-interest-rate conditions.

The findings of this study also indicate that the sustainability of toll road infrastructure projects is strongly influenced by macroeconomic stability and financing management strategies. Infrastructure projects financed through Public-Private Partnership (PPP) schemes generally depend on long-term projected revenues derived from toll tariffs and traffic volumes. Consequently, increases in financing costs due to rising interest rates may substantially alter the project's projected financial performance. Under unstable macroeconomic conditions, refinancing risks and liquidity pressures may increase, particularly for projects with high debt exposure and limited operational flexibility. Therefore, toll road infrastructure financing requires comprehensive financial planning, effective risk mitigation strategies, and careful optimization of financing structures to maintain long-term project sustainability.

These findings are consistent with project finance theory, which holds that interest rates are among the primary determinants of borrowing costs, capital structure efficiency, and the feasibility of

Advances: Jurnal Ekonomi & Bisnis
Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

infrastructure investment. In the context of toll road projects in Indonesia, most of which utilize project financing schemes with a high proportion of debt, interest rate fluctuations are a significant risk factor. Therefore, effective interest rate risk management becomes essential through financing diversification, hedging strategies, refinancing optimization, and balanced debt-equity structures to maintain long-term project sustainability. In addition, government support mechanisms, regulatory certainty, and stable monetary policy play important roles in bolstering infrastructure financing resilience because toll road projects require long investment horizons and substantial capital commitments.

5. Concluding Remarks and Recommendation

This study analyzed the impact of rising interest rates on the sustainability of debt financing for government toll road infrastructure projects, using the Cisumdawu Toll Road project as a case study. The study employed a quantitative case study approach, using financial feasibility analysis and scenario-based sensitivity analysis to evaluate the relationship between fluctuations in benchmark interest rates and debt financing performance. The analysis focused on several financial feasibility indicators, including Cost of Debt, Weighted Average Cost of Capital (WACC), Debt Service Coverage Ratio (DSCR), Net Present Value (NPV), and Internal Rate of Return (IRR). The results indicate that increases in interest rates significantly affect project financing sustainability by raising borrowing costs, increasing debt-servicing obligations, reducing repayment capacity, and weakening investment feasibility indicators. The findings also demonstrate that toll road infrastructure projects that rely heavily on debt financing are highly vulnerable to macroeconomic instability, particularly fluctuations in benchmark interest rates. Furthermore, the study confirms that increases in financing costs may reduce project profitability and increase financing risk exposure, thereby affecting the long-term sustainability of toll road infrastructure investment projects.

This study provides several important contributions from theoretical, practical, and policy perspectives. From a theoretical perspective, the study advances understanding of project finance by demonstrating the relationships among interest rate fluctuations, debt financing structures, and the feasibility of infrastructure investment in Public-Private Partnership (PPP) schemes. The study also contributes to the literature on infrastructure financing by integrating macroeconomic risk variables with financial feasibility analysis in toll road projects. From a practical perspective, the findings provide insights for project managers, investors, and financial institutions on the importance of optimizing financing structures, maintaining a debt-equity balance, refining refinancing strategies, and managing interest rate risk to sustain projects. In terms of policy implications, the study highlights the importance of stable monetary policy, effective governance of infrastructure financing, and government support mechanisms in maintaining the resilience of long-term infrastructure investment. The originality of this study lies in its focus on integrating interest rate sensitivity analysis with debt financing sustainability in the context of the Cisumdawu Toll Road project. This topic has rarely been discussed comprehensively in previous infrastructure financing studies in Indonesia.

Despite its contributions, this study has several limitations. First, the analysis relied primarily on secondary financial data and scenario-based simulations, meaning that the findings are limited to projected financing assumptions rather than actual long-term operational performance data. Second, the study focused mainly on interest rate risk and debt financing structures without incorporating broader macroeconomic variables such as inflation volatility, exchange rate movements, traffic demand

Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

uncertainty, or political and regulatory risks that may also influence project sustainability. Third, the financial feasibility simulations were conducted within a limited-financing scenario framework and did not include more advanced financial modeling approaches, such as stochastic simulation or econometric forecasting models. Therefore, future studies are recommended to develop more comprehensive infrastructure financing models by incorporating multiple macroeconomic variables, dynamic traffic forecasting, probabilistic risk analysis, and comparative studies across multiple toll road infrastructure projects in Indonesia. Future research may also explore the effectiveness of hedging strategies, refinancing mechanisms, and alternative financing instruments in reducing exposure to financing risk and strengthening the long-term sustainability of Public-Private Partnership infrastructure projects.

Statement of Use of Generative AI

During the preparation of this work, the author used generative artificial intelligence tools to support the scientific writing process. Grammarly was used to check grammar, refine writing style, and improve clarity in scientific writing. All interpretations, analyses, and conclusions presented in this study are the sole responsibility of the author.

References

Akomea-Frimpong, I., Jin, X., & Osei-Kyei, R. (2024). Mitigating financial risks in sustainable public–private partnership infrastructure projects: A quantitative analysis. *Systems*, *12*(7), 239. https://doi.org/10.3390/systems12070239

Alfiansyah, A. D., Karsaman, R. H., & Al-Rasyid, H. (2021). Kajian Investasi Pembangunan Jalan Tol Menggunakan Dana Haji (Studi Kasus: Jalan Tol Gempol–Pandaan). *Jurnal Teknik Sipil*, *28*(1), 63–72. https://doi.org/10.5614/jts.2021.28.1.7

Anbumozhi, V., Riefky, T., Hariyanto, E., & Alamsyah, H. (2023). Innovative financing for strategic infrastructure development. *Infrastructure for Inclusive Economic Development*, *1*, 82–107.

Aqsha, E. (2025). The Role of Government and the Private Sector in Implementing the PPP Scheme for the Cisumdawu Toll Road Project from an Infrastructure Sustainability Perspective. *Available at SSRN 5729702*. https://doi.org/10.2139/ssrn.5729702

Aziz, A. (2024). Financial Risks in Toll Road Development in Indonesia: Challenges and Development Strategies for the Probowangi Toll Road. *DIE Учредители: Universitas 17 Agustus 1945 Surabaya*, *15*(2), 242–252.

Bakulina, A., Charaeva, M., Nesterenko, E., Chumachenko, E., & Mamontova, Y. (2025). The specifics of assessing financial risks in the construction of toll roads. *AIP Conference Proceedings*, *3276*(1), 40012. https://doi.org/10.1063/5.0268241

Bank Indonesia. (2024). Penjelasan BI 7-Day Reverse Repo Rate sebagai Suku Bunga Acuan. Jakarta: Bank Indonesia.

Casady, C. B., Cepparulo, A., & Giuriato, L. (2024). Public-private partnerships for low-carbon, climate-resilient infrastructure: Insights from the literature. *Journal of Cleaner Production*, *470*(August), 143338. https://doi.org/10.1016/j.jclepAro.2024.143338

Dinul, A. A., & Kurniawan, M. L. A. (2024). Analisis variabel makroekonomi terhadap utang luar negeri Indonesia: Pendekatan VAR. *Modus*, *36*(2), 266–281. https://doi.org/10.24002/modus.v36i2.8910

Fatmawatie, N., Endri, E., & Husein, D. (2024). Macroeconomic factors and government bond yield in Indonesia. *Public and Municipal Finance*, *13*(1), 95–105. https://doi.org/10.21511/pmf.13(1).2024.08

Fauzan, M., Kuswanto, H., & Utomo, C. (2023). Implementing toll road infrastructure financing in Indonesia: Critical success factors from the perspective of toll road companies. *International Journal of Financial Studies*, *11*(4), 135. https://doi.org/10.3390/ijfs11040135

Gifford, J. L., Bolaños, L. A., Daito, N., & Casady, C. B. (2024). What triggers public-private partnership (PPP)

Volume 4, Issue 3 (2026). 746-758
DOI: https://doi.org/10.60079/ajeb.v4i3.838
OPEN ACCESS
e-ISSN: 2985-9859

renegotiations in the United States? *Public Management Review*, *26*(6), 1583–1609. https://doi.org/10.1080/14719037.2023.2200404

Gunawan, D., & Amalia, D. (2022). Implikasi Batas Kelayakan Finansial Terhadap Tarif Tol dan Dukungan Pemerintah Pada Proyek Prakarsa Badan Usaha Jalan Tol Tuban–Babat–Lamongan–Gresik. *Jurnal HPJI (Himpunan Pengembangan Jalan Indonesia)*, *8*(1), 1–10. https://doi.org/10.26593/jhpji.v8i1.5557.1-10

Handayani, F., & Kacaribu, F. (2021). Asymmetric Transmission of Monetary Policy to Interest Rates: Empirical Evidence From Indonesia. *Buletin Ekonomi Moneter Dan Perbankan*, *24*, 119–150. https://doi.org/10.21098/bemp.v24i1.1201

Hidayat, I., Suhana, A., & Padriani, H. (2024). Approach to weighting the success criteria of toll road project of government cooperation with business entities procurement model. *Journal La Multiapp*, *5*(5), 740–758. https://doi.org/10.37899/journallamultiapp.v5i5.1661

Jamar, N., & Yunus, A. A. M. A. P. (2025). Monetary Policy Transmission Channels Through Interest Rate and Inflation Channels in Indonesia: VECM Analysis 2018-2024. *RIGGS: Journal of Artificial Intelligence and Digital Business*, *4*(3 SE-Articles), 8636–8646. https://doi.org/10.31004/riggs.v4i3.3283

Kazhimi, R., & Anas, E. P. (2022). Feasibility Analysis And Scenario For Infrastructure Projects With Low Return on Investment In Indonesia. *Syntax Literate; Jurnal Ilmiah Indonesia*, *7*(10), 16567–16583. https://doi.org/10.36418/syntax-literate.v7i10.12890

Kuncoro, H., Fafurida, F., & Jamil, I. A. B. A. (2024). Growth volatility in the inflation-targeting regime: Evidence from Indonesia. *Quantitative Finance and Economics*, *8*(2), 235. https://doi.org/10.3934/QFE.2024009

Maulana, A., & Pria, E. (2024). Feasibility and advance scenario analysis of toll road company with low rate of return on investment in Indonesia: case study of the Manado-Bitung toll road. *Jurnal Ekonomi*, *13*(01), 396–412. https://ejournal.seaninstitute.or.id/index.php/Ekonomi/article/view/3639

Corresponding author

Azhar Eka Septiana can be contacted at: azharmustopa25@gmail.com