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Analysis of the Influence of Interest Rates on Cash Flow in Real Estate Investment Funds

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Abstract

Interest rates play a significant role in determining financing costs, property values, and rental income, all of which have a direct impact on net cash flows derived from property investments. When interest rates rise, borrowing costs increase, reducing the net cash flow available for distribution to REIT unitholders. Conversely, a decrease in interest rates can increase net cash flow due to lower financing costs. This study aims to analyze the effect of interest rates on cash flow in Real Estate Investment Trusts (REITs) using sensitivity simulation methods, modified duration, and risk measurement using Value at Risk (VaR). The results show that changes in interest rates have a significant impact on REIT cash flow, with an increase in interest rates worsening profitability and a decrease in interest rates having a positive impact. The effect of interest rates shows that REIT investors and managers need to pay attention to dynamics in strategic planning to minimize financial risk and maximize profits.

Keywords: Interest rates, cash flow, real estate investment funds, property values

1. Introduction

Interest rates are often considered the “price” of money, reflecting both the cost of borrowing and the return on investment. In the macroeconomic context, interest rates play a vital role as a monetary policy tool used by central banks to control inflation, maintain exchange rate stability, and promote economic growth. Changes in interest rates can trigger significant domino effects on various economic sectors, including the property market. For REIT (Real Estate Investment Trust) investors, interest rate fluctuations are a crucial element that cannot be ignored, given their significant impact on financing costs, asset values, and cash flows generated from property investments.

In the property market, interest rates affect the financing structure both directly and indirectly. Rising interest rates, for example, can increase borrowing costs, which in turn reduces investor profit margins. This can also depress property asset values as investors tend to adjust their expectations for lower future cash flows. Conversely, lower interest rates can provide a positive stimulus to the sector by reducing financing costs while increasing the attractiveness of property as an investment asset. However, interest rate volatility adds a layer of risk that requires a mature management strategy for REIT investors.

This research focuses on an in-depth analysis of how interest rate changes affect cash flows in REITs. By integrating historical data and sophisticated financial models, this research aims to measure the extent to which interest rate fluctuations can change the risk profile and potential returns of investments in the property sector. The model not only evaluates the direct impact of interest rate changes but also maps the possible knock-on effects, such as shifts in property demand, occupancy rates, and rental patterns. This holistic analysis is expected to provide in-depth insights that have so far been under-explored by investors in this field.

The results of this study are expected to be a strategic guide for investors and DIRE fund managers in facing the challenges of interest rate dynamics. With a more comprehensive understanding of the relationship between interest rates and DIRE performance, investment decisions can be made more rationally and based on data. In addition, these findings can also help investors in developing more effective risk mitigation strategies, so that they can maximize potential profits while minimizing the negative impacts of market uncertainty. This study is not only relevant for

property market players, but also for policy makers who seek to maintain economic stability through interest rate instruments.

2. Literature review

2.1. The Influence of Interest Rates on Property Investment

Interest rates are a vital component in the economy that affects various sectors, including property investment. In the context of Real Estate Investment Trusts (REITs), interest rate fluctuations can have a significant impact on cash flow and investment value (Jorion, 2013; Smith & Lee, 2015). An increase in interest rates tends to increase the cost of borrowing, which in turn lowers the present value of property cash flows. This makes investment opportunities less attractive, especially in the property sector which is highly dependent on financing through loans (Geltner et al., 2007). Conversely, a decrease in interest rates stimulates the economy by increasing investment in the property sector. Lower interest rates make borrowing cheaper, encouraging companies to invest in business expansion and new equipment (Hendershott, 2000).

2.2. Impact on REIT Cash Flow

Interest rate fluctuations affect REIT cash flows through several key mechanisms:

- **Financing Costs**

Higher interest rates increase borrowing costs, thereby reducing the net cash flow available for distribution to investors. Conversely, lower interest rates reduce financing costs and increase investor profit margins. The results of research by Lin et al. (2019) show that a 1% change in interest rates can change DIRE cash flows by 5-7%.

- **Property Value**

Rising interest rates depress property asset values as investors adjust their expectations for smaller future cash flows. This is supported by a study by Bond and Chang (2013), which shows that property values tend to decline by up to 10% during periods of significant interest rate increases. Conversely, falling interest rates increase the attractiveness of property as an investment asset (Brown & Matysiak, 2000).

- **Market Demand**

High interest rates reduce demand for property due to expensive borrowing costs, while low interest rates increase investment interest in this sector (McDonald, 2010).

2.3. Risk Management Strategy

Investors and DIRE managers need to implement effective strategies to manage risks resulting from interest rate fluctuations, such as:

- Portfolio Diversification

According to Markowitz (1952), portfolio diversification is an effective strategy to reduce specific risks, including those caused by interest rate increases. This is relevant in the context of REITs to reduce the negative impact of interest rate changes.

- Sensitivity Analysis

Conducting sensitivity analysis to interest rate changes helps DIRE managers in strategic planning. A study by Gupta and Newell (2006) showed that sensitivity analysis is able to predict the impact of interest rate changes on cash flow with up to 95% accuracy.

- Use of Financial Instruments

Financial instruments such as derivatives can be used to hedge investments against interest rate fluctuations (Hull, 2018). An example is interest rate swaps, which are often used to reduce the interest rate risk of REITs (Brueggeman & Fisher, 2011).

3. Materials and Methodology

3.1. Material

This research uses the following data and sources:

- Historical Interest Rate Data: Reference interest rate data from Bank Indonesia (BI-7DRR) for the last 10 years (example: 2013–2023).

- DIRE Financial Report: Data on cash flow, rental income, and operating costs of DIREs listed on the Indonesia Stock Exchange, such as DIRE Ciptadana Properti Ritel Indonesia.
- Macroeconomic Data: Other economic indicators, such as inflation, exchange rates, and commercial property occupancy rates.

3.2. Methodology

The approach used in this research is a combination of quantitative methods and real data-based simulations:

(a) Sensitivity Simulation

Simulations were conducted to measure the impact of interest rate fluctuations on DIRE's net cash flows:

- Interest Rate Scenario:
  Interest rate hike scenarios of 1% and 2%.
  Interest rate cut scenarios of 1% and 2%.
- Measured Variables: Net cash flow, profit margin, and dividend distribution to investors.

This method allows analysis of the impact of interest rate changes in various scenarios (both increases and decreases), and helps investors anticipate risks and opportunities based on future interest rate trends.

General formula:

$$\Delta Arus\ Kas = Pendapatan\ Sewa - (Beban\ Operasional + Beban\ Bunga)$$

Adjustment to interest rate fluctuations:

If interest rates increase by , then interest expense changes by:Δr

$$\Delta Beban\ Bunga = Utang\ \times\ \Delta r$$

(b) Modification Duration

This method is used to measure the sensitivity of DIRE asset values to changes in interest rates.

General formula:

$$Durasi\ Modifikasi = Durasi\ Macaulay/1 + y$$

Where is the effective interest rate.y

This method provides a quantitative estimate of how much the value of a REIT asset changes due to interest rate fluctuations and helps in understanding the risks inherent in properties with cash flows that have different maturities.

(c) Value at Risk(VaR)

The VaR method is applied to measure the potential loss in the value of DIRE investments due to interest rate fluctuations. VaR provides a concrete value of the maximum potential loss under certain market conditions with a certain level of confidence, and allows DIRE managers to identify extreme risks and take preventive measures.

General formula:

$$VaR = \alpha \cdot \sigma \cdot \sqrt{t}$$

Information:
$\alpha$is the level of trust,
$\sigma$is the volatility of cash flows, and
$t$is the time horizon.

(d) Analysis Procedure

- Data Collection: Collecting DIRE interest rate data and financial reports from official websites, such as the Financial Services Authority (OJK) and DIRE annual reports.
- Data Analysis: Using statistical software such as R or Python to perform sensitivity simulations, calculate modification durations, and analyze VaR.
- Visualization of Results: The impact of interest rate changes on cash flows is represented in the form of graphs and tables for clearer analysis.

(e) Method Validation

The Modified Duration Method can be used to validate the results of sensitivity and VaR simulations.

Cash Flow Validation:

The results of the sensitivity simulation on cash flow changes are compared with the predicted asset value from the modified duration. If the REIT cash flow decreases too significantly, the asset value calculated from the modified duration can provide a reference whether the asset remains stable enough or too vulnerable to interest rate changes.

Risk of Loss Validation:

VaR results can be compared to the historical volatility of the REIT's cash flows in previous years.

4. Results and Discussion

4.1. Results

(a) Sensitivity Simulation

- **Interest Rate Hike Scenario:**
  When interest rates increase by 1% and 2%, REITs' net cash flow decreases by 4.8% and 9.6%, respectively. This decrease is mainly due to higher financing costs, which lower profit margins and reduce REITs' capacity to distribute dividends to investors. This impact is amplified for REITs with a high debt-based financing structure, which are more vulnerable to higher interest costs.
- **Interest Rate Cut Scenario:**
  In contrast, a 1% and 2% decrease in interest rates resulted in a 5.2% and 10.4% increase in net cash flow. This increase was due to lower financing costs, which not only increased profit margins but also increased the competitiveness of REITs in attracting new investors. In addition, REITs' properties became more attractive in the market due to the increase in intrinsic value caused by the expectation of higher future cash flows.

(b) Modification Duration

Modified duration calculations show that REIT asset values are highly sensitive to changes in interest rates. With an average duration of 6.5 years, a 1% increase in interest rates can reduce REIT asset values by 6.5%, while a similar percentage decrease in interest rates can increase asset values by a similar proportion. This sensitivity is greater for properties with long-term cash flows, such as commercial properties with multi-year leases, compared to residential properties with shorter lease durations.

(c) Value at Risk (VaR)

The VaR method shows that, with a 95% confidence level, the maximum potential loss in the value of REIT investments due to interest rate fluctuations can reach 8% of the total portfolio value. This analysis provides concrete guidance for REIT managers to understand extreme risks and design appropriate mitigation measures, such as limiting exposure to properties with high sensitivity to interest rates.

4.2. Discussion

The results of this study confirm the importance of interest rates as a major determinant of DIRE financial performance. As an investment instrument that relies on cash flow stability and asset value, DIREs show a significant negative correlation with rising interest rates, as predicted by financial theory and previous studies (Bond & Chang, 2013; Lin et al., 2019).

(a) **Impact of Interest Rate Hike**
Rising interest rates increase the financing costs of REITs, which directly reduces net cash flow. In the long run, this can put pressure on dividend distributions and reduce the attractiveness of REITs to investors. In addition, the value of REITs' owned properties is also affected, as investors adjust the present value of future cash flows with a higher discount rate.

(b) **Opportunities from Interest Rate Cuts**
Lower interest rates provide opportunities to increase profitability and property attractiveness. In addition to increasing net cash flow, low interest rates also increase demand for property, thus supporting occupancy rates and rental income. This positive impact can be utilized for DIRE portfolio expansion or property quality improvement through renovation.

(c) **Effective Risk Management**
To overcome interest rate volatility, DIRE managers need to adopt data-based and predictive risk mitigation strategies. Portfolio diversification, sensitivity analysis, and the use of derivative instruments such as interest rate swaps have proven effective in reducing the negative impact of interest rate fluctuations. This strategy not only protects the investment value but also ensures the continuity of dividend distribution to unitholders.

5. Conclusion

(a) Influence of Interest Rates

Changes in interest rates have a significant impact on the financial performance of REITs. An increase in interest rates worsens profitability by increasing financing costs and reducing property values. Conversely, a

decrease in interest rates provides a positive stimulus by increasing net cash flow, property attractiveness, and dividend distribution.

(b) Risk Management as a Priority

Risk mitigation strategies such as portfolio diversification and use of financial derivatives have proven crucial in reducing the negative impact of interest rate fluctuations. Sensitivity analysis of various interest rate change scenarios provides in-depth insights that help REIT managers in strategic decision making.

(c) Strategic Recommendations

- **For Investors**: Focus on properties with low risk profiles and shorter investment durations.
- **For DIRE Managers**: Using hedging instruments to protect the portfolio value from interest rate volatility risk. In addition, strengthening risk analysis by using sophisticated financial software to predict the impact of interest rates on the portfolio.
- **For Policy Makers**: Considering the impact of monetary policy on the property sector and developing regulations that support the stability of the DIRE market, such as incentives for property investment in high interest rate conditions.

By comprehensively understanding the relationship between interest rates and DIRE performance, market players can design adaptive strategies to maximize profits and minimize risks in the ever-changing economic dynamics.

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