



Analysis of the Impact of High Inflation on Present Value Calculation in Investment in Indonesia

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Abstract

Inflation is a crucial economic indicator that significantly impacts investment decisions. In Indonesia, inflation has shown substantial fluctuations due to factors such as global commodity prices, monetary policy, and domestic demand. This study aims to analyze the impact of high inflation on present value (PV) calculations in investment contexts, particularly in long-term projects. Present value, a method for assessing future cash flows based on their current value, is influenced by the discount rate, which tends to rise with inflation. Using data from 2015–2023, this research compares two inflation scenarios (1.56% and 6.38%) and calculates the PV of an investment with a future value of IDR 1,000,000 over 5 years. The results show a significant decrease in PV under high inflation, from IDR 925,497 to IDR 733,999, indicating that inflation erodes the purchasing power of future cash flows. Furthermore, the analysis highlights the more significant impact of inflation on sectors with higher cash flow projections, such as infrastructure. The study underscores the need for investors to consider inflation when making investment decisions to manage risks and maximize returns.

Keywords: Inflation, Investment, Present Value, Present Value Calculation

1. Introduction

Inflation is one of the most crucial economic indicators and often becomes the main focus in analyzing a country's economy. In Indonesia, inflation has shown significant fluctuations in recent years, influenced by various factors such as changes in global commodity prices, monetary policy, and domestic demand dynamics. High inflation can have a wide-ranging impact on the purchasing power of the public, economic stability, and investment decisions made by individuals and companies (Andersson et al. 2020; Bernanke, 2022).

In the context of investment, the calculation of present value is one of the methods used to assess the value of future cash flows based on the current value of money (Gaspars-Wieloch, 2019; Weber, 2021). This concept is very important in investment decision-making, where investors need to consider the expected risks and returns. However, when inflation rises, its impact on the discount rate used in present value calculations becomes increasingly significant. High inflation tends to raise expectations regarding the discount rate, which can reduce the present value of future cash flows. This has the potential to affect the attractiveness of long-term investments as well as the investment decisions made by market participants. Investors may become hesitant to invest in long-term projects if they feel their investment value will be eroded by inflation.

With the dynamic economic development in Indonesia, it is important to understand the relationship between high inflation and present value calculations. Therefore, this research aims to analyze the impact of high inflation on present value calculations in the context of investment in Indonesia. With a deeper understanding of this relationship, it is hoped that investors, policymakers, and academics can take more appropriate steps in managing inflation risk and maximizing investment potential in the future.

2. Literature Review

2.1. Inflation

Inflation can be defined as a continuous increase in price levels. The definition of the theory of inflation according to Achúcarro et al. (2022) is that inflation is an event that describes a situation and condition where the prices of goods increase and the value of the currency weakens, and if this occurs continuously, it will lead to a deterioration of the overall economic condition and can shake the political stability of a country. High inflation will cause the real income of the people to continue to decline, thereby lowering the standard of living of the community and ultimately making everyone, especially the poor, poorer.

2.2. Investment

According to Gourier et al. (2022), investment is a commitment of a certain amount of funds or other resources made at the present time, with the aim of obtaining profits in the future. The following are some reasons why someone invests according to Hastings & Mitchell, (2020), among others:

- a. To achieve a better quality of life in the future.
- b. Reducing inflationary pressure.
- c. Making efforts to save on taxes.

2.3. Present Value of Investment

Present Value is the current value of the projected future net cash inflow. The future net cash inflow is the projected return on investment. Present value is also called "discount". The discount rate (capitalization rate) is the interest rate used to convert future value into present value. The higher the interest rate, the smaller the present value of money in the plan to receive money in the future.

An investment decision requires substantial funds to be invested in the project. The investment funds will return through receipts in the form of profits in the future. To assess whether or not an investment decision is feasible, the investment funds must be covered by net income that has been in present value. The difference between the present value of revenue and the present value of investment is referred to as Net Present Value.

3. Materials and Methods

3.1. Materials

3.1.1. Economic Data

- Inflation Data: Using monthly and annual inflation data from the Central Bureau of Statistics (BPS) and Bank Indonesia for the period 2015-2023.
- Discount Rate: Data on the discount rate set by Bank Indonesia which reflects market expectations of inflation.
- Investment Data: Information on expected future cash flows from investment projects in key sectors in Indonesia, such as infrastructure and energy.

3.1.2. Analysis Tools

Spreadsheet: Microsoft Excel or Google Sheets were used for manual calculations and data visualization.

3.2. Methods

3.2.1. Research Method

- This research uses a quantitative approach with descriptive and inferential analysis to understand the relationship between inflation and present value.

3.2.2. Data Collection

Data was collected from secondary sources, including official publications from Bank Indonesia, BPS, and

previous research reports. Data collection was done systematically to ensure accuracy and relevance.

3.2.3. Present Value Calculation

Present value equation/formula:

$$PV = \frac{FV}{(1 + r)^n} \quad (3)$$

FV : Future Value (Cash flow in the future)

r : Discount rate or inflation rate

- Two inflation scenarios will be tested:

Low inflation: 1.56% (average 2021 inflation)

High inflation: 6.38% (average inflation in 20160)

Calculations are performed for various future cash flows.

Assume an investment with a future value (FV) of IDR 1,000,000 in 5 years. Then the present value (PV) will be calculated using the formula above for both scenarios.

- Low Inflation Scenario ($r = 1.56\%$, $FV = 1,000,000$, $n = 5$)

$$PV = \frac{FV}{(1 + r)^n} = \frac{1,000,000}{(1 + 0.0156)^5} = \frac{1,000,000}{1.0805} \approx 925,497.455$$

Thus, the present value (PV) of IDR 1,000,000 in 5 years, with 1.56% inflation, is approximately IDR 925,497.

- High Inflation Scenario ($r = 6.38\%$, $FV = 1,000,000$, $n = 5$)

$$PV = \frac{FV}{(1 + r)^n} = \frac{1,000,000}{(1 + 0.0638)^5} = \frac{1,000,000}{1.3624} \approx 733,998.826$$

Thus, the present value (PV) of IDR 1,000,000 in 5 years, with 6.38% inflation, is approximately IDR 733,999.

3.2.4. Data Analysis

After calculating the Present Value (PV) with two different inflation scenarios, the next step is to analyze the results to understand the impact of inflation on the value of the investment.

Analysis of the Impact of Inflation on Present Value

The PV calculations for both inflation scenarios show significant differences. In the low inflation scenario (1.56%), the present value of IDR 1,000,000 in the future is higher (IDR 925,497), compared to the high inflation scenario (6.38%) which results in a lower present value (IDR 733,999). This indicates that higher inflation reduces the purchasing power of money and, in turn, decreases the expected future cash flow value.

Comparison of Inflation Impact on Various Investment Sectors

This study also considers several key investment sectors in Indonesia, such as infrastructure, energy, and real estate, using estimated future cash flow data. These sectors typically require long-term investments, so the impact of inflation on the present value is very significant.

To analyze the impact of inflation on these sectors, we compared the PV calculations for infrastructure and energy investment projects, each with different projected annual cash flows. For example, the infrastructure project generates an annual cash flow of IDR 2,000,000, while the energy project generates IDR 1,500,000 per year over the same period. (5 years).

1) Infrastructure Project:

- Low Inflation Scenario (1.56%):

$$PV = \frac{2,000,000}{(1 + 0.0156)^5} = \frac{2,000,000}{1.0805} = 1,850,994.91 \approx 1,850,995$$

- High Inflation Scenario (6.38%):

$$PV = \frac{2,000,000}{(1 + 0.0638)^5} = \frac{2,000,000}{1.3624} = 1,467,997.65 \approx 1,467,998$$

- Difference: IDR 382,997 (Significant decrease in investment value due to high inflation)

2) Energi Project:

- Low Inflation Scenario (1.56%):

$$PV = \frac{1,500,000}{(1 + 0.0156)^5} = \frac{1,500,000}{1.0805} = 1,388,246.18 \approx 1,388,246$$

- High Inflation Scenario (6.38%):

$$PV = \frac{1,500,000}{(1 + 0.0638)^5} = \frac{1,500,000}{1.3624} = 1,100,998.24 \approx 1,100,998$$

- Difference: IDR 287,248 (Significant decrease in investment value due to high inflation)

From the calculations above, it can be seen that high inflation has a greater impact on sectors that generate higher cash flows, such as the infrastructure sector. This indicates that inflation can be more detrimental to sectors with higher cash flow projections, which often take longer to recoup their investments.

Hypothesis Testing and Significance of the Relationship Between Inflation and Present Value

To determine whether the relationship between inflation and present value has statistical significance, hypothesis testing is conducted using simple linear regression analysis. The independent variable used in this analysis is the inflation rate (r), while the dependent variable is the present value (PV) calculated for future cash flows. The hypothesis being tested is:

- Null Hypothesis (H_0): There is no significant relationship between inflation and present value ($r = 0$).
- Alternative Hypothesis (H_1): There is a significant relationship between inflation and present value ($r \neq 0$).

Using inflation data and PV calculation results, the linear regression analysis shows significant results with a p-value < 0.05 , which means we can reject the null hypothesis. This indicates that there is a significant relationship between the inflation rate and the present value of the investment.

3.2.5. Tables

Table 1. Inflation data 2015 – 2023.

| Year | Average Inflation |
|------|-------------------|
| 2023 | 3.69% |
| 2022 | 4.21% |
| 2021 | 1.56% |
| 2020 | 2.04% |
| 2019 | 3.03% |
| 2018 | 3.20% |
| 2017 | 3.81% |
| 2016 | 6.38% |
| 2015 | 6.38% |

4. Results and Discussion

The results of these calculations clearly show how inflation affects the present value of future cash flows. When inflation is low (1.56%), the present value of IDR 1,000,000 in 5 years remains quite high, at IDR 925,497. However, when inflation is high (6.38%), the present value decreases significantly to IDR 733,999. This shows the detrimental impact of inflation on investments, as high inflation will reduce the purchasing power of future cash flows, making their present value lower.

This study suggests that investors need to consider inflation in the investment decision-making process, especially in long-term investments. High inflation will increase the required discount rate, thereby reducing the present value of future cash flows. Understanding this relationship allows investors to make more accurate decisions and better manage inflation risk.

5. Conclusion

This study shows that high inflation has a significant impact on the present value calculation of investments in Indonesia. As inflation increases, the discount rate also rises, which leads to a decrease in the value of future cash flows when discounted to present value. In the tested scenario, the increase in inflation from 1.56% to 6.38% caused the present value of IDR 1,000,000 to decrease from approximately IDR 925,497 to IDR 733,999 over a period of 5 years.

The findings of this study underscore the importance of incorporating inflation expectations into investment analysis. Investors must adjust their expectations regarding future cash flows and consider the inflation rate when making investment decisions to ensure that the investment retains its value over time. Further research can examine how other economic factors, such as interest rates and exchange rates, also affect the present value of investments in various sectors.

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With this expression of gratitude, we conclude that understanding the relationship between inflation and present value is crucial in making smart investment decisions in Indonesia's fluctuating economic environment.

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