

Analysis Of The Impact Of Interest Rate Changes And Inflation On The Valuation Value Of Early Start-Ups In Indonesia

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Abstract

This study aims to analyze the effect of the benchmark interest rate (BI Rate) and inflation on startup investment in Indonesia. Using secondary data for the period 2015–2025, a linear regression analysis was conducted to test the relationship between variables. The results showed that the BI Rate has a negative relationship with startup investment (regression coefficient -1.051; $p = 0.337$), but is not statistically significant. Conversely, inflation shows a positive relationship (regression coefficient 1.343; $p = 0.276$), but is also not significant. These findings indicate that macroeconomic factors such as interest rates and inflation have not become the main determinants in startup investment decisions. Other factors such as government policies, access to funding, and technological innovation are thought to have a more dominant influence.

Keywords: Startup Investment, BI Rate, Inflation, Linear Regression

INTRODUCTION

In the last decade, Indonesia has experienced significant growth in the start-up ecosystem. Regulatory support from the government, the development of digital technology, and the increasing number of internet users have become the main catalysts for the development of start-ups in various sectors, ranging from fintech, edutech, agritech, to healthtech. This phenomenon not only shows the potential of the national digital economy, but also attracts the interest of local and global investors to invest their capital in the form of early-stage funding, either through angel investment, seed funding, or early-stage venture capital. However, although this sector shows positive dynamics, the valuation of early-stage

start-ups remains very vulnerable to macroeconomic conditions, especially to changes in benchmark interest rates and inflation rates.(Mudji Utami & Mudjilah Rahayu, 2023).

Early-stage start-ups, also known as early-stage start-ups, usually do not yet have positive cash flow and are highly dependent on external funding to survive and grow. In this situation, the cost of capital becomes very crucial. When the Bank Indonesia benchmark interest rate (BI Rate) increases, the cost of capital in general will also increase. This happens because investors will prefer investment instruments that provide certain and relatively safe returns, such as government bonds or time deposits, rather than investing their funds in start-ups that have high risks and high uncertainty. As a result, start-up valuations tend to fall because investor expectations of returns become more conservative.(Permaysinta & Sawitri, 2021).

Interest rates are one of the monetary policy instruments that have a direct influence on the cost of capital and investment decisions, including in assessing the growth prospects of start-ups. Increasing interest rates can increase borrowing costs and lower growth expectations, which can ultimately depress company valuations. On the other hand, high inflation can also disrupt economic stability and people's purchasing power, potentially reducing demand for start-up products or services, and increasing uncertainty about long-term financial projections. In the context of Indonesia, significant fluctuations in interest rates and inflation rates in recent years have posed challenges for investors and start-up players in determining realistic and sustainable valuations. Therefore, it is important to understand the extent to which changes in interest rates and inflation can affect the valuation of early-stage start-ups in Indonesia.

Conversely, when interest rates fall, the cost of capital becomes cheaper, and investors are more encouraged to take risks in high-potential sectors such as start-ups. However, these interest rate fluctuations do not only affect investors. For start-up founders, interest rates also affect their ability to access loans, both from conventional and alternative financial institutions. In many cases, falling interest rates are directly proportional to the increase in investment in start-ups. This is in line with findings in previous studies that show that liquidity and low interest rates provide greater room for the expansion of non-traditional sectors, including emerging digital technology companies.(Sulastri & Suselo, 2022).

In addition to interest rates, inflation is also a macroeconomic variable that affects start-up valuations. High inflation can erode people's purchasing power, which directly impacts potential revenue from products or services offered by start-ups. For start-ups operating in the consumer sector, this can mean a decrease in demand, which in turn lowers revenue projections and reduces their attractiveness to investors. On the other hand,

inflation also affects the operational cost structure of start-ups, especially those that are still in the product development stage and have not yet reached economies of scale. Increases in raw material prices, labor wages, and logistics costs can increase working capital requirements, which if not balanced by increased revenue will lead to a decrease in valuation.(Maronrong & Nugrhoho, 2019).

Furthermore, investors usually use the discounted cash flow (DCF) projection approach in determining the valuation of a start-up, which is very sensitive to changes in the discount rate. The discount rate itself is determined by market risk and the risk-free rate, which are influenced by inflation and monetary policy. Therefore, in an unstable or uncertain economic environment—such as when there is a spike in inflation or aggressive monetary tightening by the central bank—start-up valuations tend to adjust downward. This shows that the relationship between macroeconomic variables and start-up valuations is not only linear, but also complex and influenced by risk perceptions and future expectations.(Susanto, 2018).

This situation becomes even more relevant in the context of post-pandemic Indonesia, where many start-ups are struggling to secure further funding due to tightening global liquidity and high interest rate policies implemented by many central banks to curb inflation. Although Indonesia has recorded fairly stable economic growth, global inflationary pressures and exchange rate fluctuations continue to force Bank Indonesia to maintain interest rates at a certain level for macro stability. In this condition, early-stage start-ups are the ones most affected because they operate in a cash burn condition and have not yet generated profits.(Sari, 2019).

Based on this background, this study is designed to answer three main questions. First, how do changes in interest rates affect the valuation of early-stage start-ups in Indonesia? Second, how does inflation affect the valuation of early-stage start-ups in Indonesia? And third, is there a simultaneous relationship between interest rates and inflation on start-up valuation? Through these three questions, the study is expected to provide a deeper understanding of the sensitivity of start-up valuation to national macroeconomic dynamics.

The purpose of this study is to empirically analyze how changes in interest rates and inflation affect the valuation of early-stage start-ups in Indonesia. This study also aims to provide evidence-based policy recommendations to stakeholders, including the government, investors, and start-up players, in designing strategies that are adaptive to macroeconomic dynamics. In a broader framework, the results of this study are expected to enrich the literature on the relationship between macroeconomics and digital

entrepreneurship, as well as become a reference for policy makers in developing a start-up ecosystem that is resilient to economic turmoil.

Furthermore, this study contributes to the development of theories in finance and entrepreneurship by highlighting external factors that influence valuation, especially in the early stages of a company's development. This is important because much of the previous literature places more emphasis on internal factors, such as business models, founding teams, and market potential. In reality, macroeconomic factors such as interest rates and inflation cannot be ignored in investment decisions, especially in the context of developing countries like Indonesia that still have high economic volatility.

Using a quantitative approach and time-series data, this study attempts to identify patterns and statistical influences of interest rates and inflation on start-up valuations. The data used include early-stage start-up valuations obtained from industry reports, investment platforms, and macroeconomic data from Bank Indonesia and the Central Bureau of Statistics. It is hoped that this study can provide a strong empirical picture and can be used as a basis for formulating investment strategies as well as fiscal and monetary policies that support the development of the digital economy sector in Indonesia.

LITERATURE REVIEW

Early Stage Start-up Valuation

Early-stage startup valuation is the process of determining the economic value of a startup that does not yet have a stable financial track record. Traditional valuation methods such as Discounted Cash Flow (DCF) are often less effective for early-stage startups due to the uncertainty of future cash flows and the high risk of failure. Alternatively, approaches such as the Berkus Method, Scorecard Valuation, and Venture Capital Method are more commonly used because they consider qualitative factors such as market potential, the quality of the founding team, and the superiority of the product or service.

In recent years, there has been a growing trend in the use of convertible debt instruments in early-stage startup funding. These instruments allow companies to access funds without having to set a valuation right away, which can be advantageous in uncertain market conditions. However, the use of convertible debt also carries its own risks, such as the potential for significant ownership dilution if financial targets are not met or profit margins decline. In 2023, convertible debt volume reached a record \$2.5 billion, up from \$1.7 billion the previous year, reflecting the increasing complexity in startup funding structures.

The Impact of Interest Rates on Start-up Valuation

Interest rates are one of the monetary policy instruments that have a significant impact on the cost of capital and investment decisions. Interest rate increases by central banks are usually intended to control inflation, but they can also increase borrowing costs and lower growth expectations, which can ultimately depress company valuations, including early-stage start-ups. In the 2022–2024 period, rising interest rates globally have led to reduced market liquidity and reduced investor interest in high-risk assets such as start-ups. This has had an impact on declining valuations and funding activity in the technology sector. For example, in the United States, venture capital investment has declined significantly, and many start-ups are facing challenges in obtaining new funding. In Indonesia, a similar trend is also occurring. Data shows that funding for technology start-ups has declined drastically, with total funding reaching only \$323 million in 2024, down 75% compared to the previous year. This condition reflects the impact of high interest rates on investor interest and start-up valuations in Indonesia.

Impact of Inflation on Start-up Valuation

High inflation can cause economic uncertainty, reduced consumer purchasing power, and increased company operating costs. In the context of valuation, inflation affects future earnings projections and the discount rate used in DCF analysis. Inflation can also affect investors' risk perceptions, potentially lowering company valuations, especially in sectors that are highly dependent on consumption. In Indonesia, rising inflation in the 2022–2024 period has had an impact on declining start-up revenues and profitability, forcing many companies to implement cost efficiencies and delay expansion. According to data from the Financial Services Authority (OJK), investment in Indonesian start-ups fell by 87% in the first half of 2023 compared to the same period the previous year, reflecting investor caution amid inflationary pressures and high interest rates.<https://indonesiabusinesspost.com/>

Dynamics of the Indonesian Start-up Ecosystem (2021–2024)

Indonesia's startup ecosystem experienced rapid growth until 2021, with total funding reaching its peak. However, since 2022, there has been a significant decline in startup funding and valuations, in line with rising global interest rates and inflation. In 2023, startup funding in Indonesia fell by 54% compared to the previous year, and in 2024, the decline reached 75%, with total funding of only \$323 million. This decline impacted all stages of funding, including the early stage. Early stage funding decreased by 32.18% in 2024, reflecting the challenges faced by startups in obtaining capital for growth.

Furthermore, no Indonesian startups achieved unicorn status in 2024, indicating a significant slowdown in the national startup ecosystem.

Recent Research on Start-up Valuation and Macroeconomic Factors

Research on the influence of macroeconomic factors on startup valuations has shown that interest rates and inflation have a significant impact on investment decisions and company valuations. A study by DealStreetAsia shows that startup funding in Southeast Asia is set to decline by 53% by 2023, with Indonesia experiencing the sharpest decline. In Indonesia, reports from Tracxn and OJK confirm the downward trend in startup funding and valuations, especially in the early stages. This shows the need for adaptive strategies for startups and investors to deal with changing macroeconomic dynamics.

RESEARCH METHODS

This study uses an explanatory quantitative approach to examine the influence of macroeconomic variables on early-stage start-up valuations in Indonesia. This approach was chosen because it allows researchers to test the causal relationship between independent variables—namely the benchmark interest rate (BI Rate) and the inflation rate—on the dependent variable, namely early-stage start-up valuations. Thus, this study is not only descriptive in nature, but also aims to explain the pattern of relationships and impacts between variables statistically and econometrically.(Pratama & Hayati, 2023).

The type of data used in this study is secondary data that is time series, covering the period 2015 to early 2025. The main source of reference interest rate data is obtained from the official publication of Bank Indonesia (BI), while inflation data is collected from the monthly and annual reports of the Central Statistics Agency (BPS). For the early-stage start-up valuation variable, data is obtained from the aggregation of international database platforms such as Crunchbase and Dealroom, as well as annual reports from several large investors active in Indonesia such as East Ventures, Alpha JWC Ventures, and Monk's Hill Ventures. Valuation data is selected based on the early-stage funding category which includes pre-seed, seed, to series A, taking into account start-ups operating or based in Indonesia.(Sebo & Nafi, 2021).

Data analysis was carried out in several stages. First, a stationarity test was carried out using the Augmented Dickey-Fuller (ADF Test) to ensure that the data did not contain long-term trends or fluctuations that could interfere with the validity of the regression model. If there are non-stationary variables, data transformation or alternative econometric model approaches such as ARDL will be used. Second, a cointegration test was carried out to assess whether there is a stable long-term relationship between variables. This test is

important in the context of time series data because long-term relationships can indicate structural relationships between economic variables.

The main method used is multiple linear regression, with the following model:

$$Y = \beta_0 + \beta_1(\text{Interest Rate}) + \beta_2(\text{Inflation}) + \varepsilon$$

where Y is the early stage startup valuation, β_0 is the intercept, β_1 and β_2 are the regression coefficients for each independent variable, and ε is the error term. This model is used to identify the partial effects of interest rates and inflation on startup valuation separately and simultaneously. The coefficient significance test is carried out through the t and F tests, with a confidence level of 95% ($\alpha = 0.05$).

Next, to test the causal relationship between macroeconomic variables and start-up valuation, a Granger Causality Test is conducted. This test allows researchers to see whether changes in interest rates and inflation can affect changes in start-up valuations over a certain period of time. If the results show that interest rates and/or inflation “Granger-causes” start-up valuations, then it can be concluded that there is a relevant statistical causal relationship. If the test results show that there is a lag dynamic or reaction delay between macroeconomic variables and start-up valuation, then the ARDL (Autoregressive Distributed Lag) model will be used as an additional approach. The ARDL model allows for the analysis of short-term and long-term relationships simultaneously, especially when the variables in the model have different levels of integration, namely I(0) and I(1).

The entire analysis process will be conducted with the help of statistical software such as EViews or Stata to ensure the accuracy and precision of the results. Through this approach, the study is expected to provide a strong empirical picture of the extent to which macroeconomic dynamics affect the sustainability and growth of early-stage start-up valuations in Indonesia, as well as provide data-based recommendations for investors and policymakers.

RESULTS AND DISCUSSION

This study aims to analyze the influence of macroeconomic variables, such as the benchmark interest rate (BI Rate) and inflation rate, on investment in the startup sector in Indonesia in the period 2015 to 2025. The data used in this analysis includes three main variables: BI Rate, inflation, and startup investment (in billions). The following is an explanation of the results of descriptive analysis and multiple linear regression conducted to understand the relationship between these variables.

Descriptive Results

The descriptive table shows basic statistics of the data used in the analysis, including the number of data (N), minimum value, maximum value, mean, and standard deviation for each variable.

Table.1 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Year	11	2015	2025	2020.00	3.317
BI Rate	11	3.50	7.52	5.2912	1.15331
Inflation	11	-.76	3.19	.8982	1.03261
Startup Investment (billion)	11	.00	11.00	2.0636	3.56378
Valid N (listwise)	11				

The data used in the analysis covers 11 years, from 2015 to 2025. The average year in this dataset is 2020, which means that this data includes relatively recent information, with a sufficient time span to see the dynamics of the Indonesian economy in the last decade. The standard deviation for this year is 3.317, which indicates a fairly small variation in the distribution of years in this data.

The benchmark interest rate (BI Rate) has a minimum value of 3.50% and a maximum value of 7.52%, with an average of 5.29% and a standard deviation of 1.15%. The fluctuation of the BI Rate reflects Bank Indonesia's monetary policy during the period, which can be influenced by domestic and global economic conditions. A lower BI Rate is usually associated with looser monetary policy to encourage economic growth, while a higher BI Rate can indicate efforts to suppress inflation or stabilize the economy.

The inflation rate showed significant fluctuations during the analyzed period, with a minimum value of -0.76% and a maximum value of 3.19%. The average inflation during this period was 0.8982%, with a standard deviation of 1.03%. Negative inflation that occurred in several years (for example in 2015) indicated deflation, while positive inflation reflected an increase in the prices of goods and services in the market.

Data on startup investment shows a minimum value of 0 billion and a maximum value of 11 billion, with an average investment of 2.06 billion and a standard deviation of 3.56 billion. This shows an unevenness in the amount of investment received by startups, which is likely influenced by various external factors such as economic conditions, investment risk levels, and investor confidence in the startup sector in Indonesia.

Multiple Linear Regression Results

After conducting multiple linear regression analysis to identify the influence of BI Rate and inflation on startup investment, relevant results were obtained which can be explained as follows:

Table 2 Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Inflation, BI Rate ^b	.	Enter

a. Dependent Variable: Startup Investment (billion)

b. All requested variables entered.

Table 3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.651 ^a	.424	.280	3.02454

a. Predictors: (Constant), Inflation, BI Rate

The regression model used has a dependent variable of Startup Investment and two independent variables, namely BI Rate and Inflation. The results of the regression analysis show an R value of 0.651 and an R Square of 0.424, which means that around 42.4% of the variation in startup investment can be explained by the BI Rate and inflation variables in this model. Although this figure shows a fairly strong relationship, there is still a large portion of variability (57.6%) that cannot be explained by the two variables, which may be caused by other factors not included in the model.

Table 4 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	53,823	2	26,911	2,942	.110 ^b
	Residual	73.183	8	9.148		
	Total	127,005	10			

a. Dependent Variable: Startup Investment (billion)

b. Predictors: (Constant), Inflation, BI Rate

ANOVA analysis tests whether the overall regression model is significant. The ANOVA results show an F value of 2.942 with a p value = 0.110, which is greater than the significance level of 0.05. This indicates that statistically, this regression model is not significant overall in explaining the relationship between the independent variables (BI Rate and Inflation) and the dependent variable (Startup Investment). Therefore, although this model shows a relationship, the relationship is not strong enough to make significant conclusions.

Table 5 Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,417	6.177		1,039	.329
	BI Rate	-1.051	1,029	-.340	-1.022	.337
	Inflation	1,343	1.149	.389	1.169	.276

a. Dependent Variable: Startup Investment (billion)

The regression coefficients for each independent variable provide insight into how macroeconomic factors affect startup investment. In the case of the BI Rate, the regression coefficient of -1.051 indicates that every increase in the BI Rate tends to be followed by a decrease in startup investment. However, the p-value of 0.337, which is greater than 0.05, indicates that this relationship is not statistically significant. In other words, despite the negative trend, there is no strong evidence to support the effect of the BI Rate on startup investment.

Meanwhile, inflation shows a regression coefficient of 1.343, which means that an increase in inflation tends to be accompanied by an increase in startup investment. However, despite this positive influence, the p-value for inflation is 0.276, which is also greater than 0.05. This indicates that the relationship between inflation and startup investment is not statistically significant, so it is not reliable enough to draw definite conclusions regarding the effect of inflation on investment in the startup sector.

Overall, although there is an identified relationship between BI Rate and inflation with startup investment, both do not show statistical significance strong enough to be used as a basis for policy decision making. This indicates that these macroeconomic variables may only have a limited influence on startup investment decisions, or other factors are more dominant in influencing the investment.

DISCUSSION

The Influence of BI Rate on Startup Investment

In this regression analysis, the BI Rate (reference interest rate) has a regression coefficient of -1.051, indicating that an increase in the BI Rate tends to reduce investment in the startup sector. This negative coefficient reflects the inverse relationship between the benchmark interest rate and startup investment. In economic theory, this is a natural phenomenon, because higher interest rates usually increase borrowing costs and reduce the attractiveness of investment. When the benchmark interest rate increases, banks and other financial institutions tend to raise their lending rates, making the cost of capital for startup entrepreneurs more expensive. This can influence more cautious investment decisions or even delay capital expenditures to start or develop a business.

However, despite the negative relationship between BI Rate and startup investment, the p-value for BI Rate is 0.337, which is higher than the commonly used significance level of 0.05. This indicates that the relationship is not statistically significant, and therefore, there is insufficient evidence to state that BI Rate consistently affects startup investment over a longer period of time. Although there is a tendency that an increase in BI Rate may decrease investment, this result is not strong enough to provide a reliable basis for making policy decisions or for entrepreneurs to rely on interest rate fluctuations as a primary factor in their investment planning.

There are several factors that can explain why this relationship is not significant. First, there may be other variables that are more dominant in influencing startup investment decisions, such as government policies, market conditions, or access to better technology. Second, although the BI Rate affects borrowing costs, the startup sector often relies on non-traditional funding sources such as venture capital, crowdfunding, or personal funds that may not be very sensitive to changes in the benchmark interest rate. Therefore, although the BI Rate is an important factor in the macro economy, its impact on the startup sector may not be as large as imagined, especially when compared to other more relevant factors.

The Impact of Inflation on Startup Investment

Meanwhile, inflation has a regression coefficient of 1.343, indicating that there is a positive relationship between inflation and startup investment. This means that when the inflation rate increases, there tends to be an increase in investment in the startup sector. This positive relationship may seem counter-intuitive at first glance, as inflation is often considered a detrimental factor to the economy, which can cause uncertainty and reduce consumer purchasing power. However, in the context of startup investment, there are several reasons that can explain why inflation can encourage investment.

First, moderate inflation can motivate entrepreneurs to invest earlier in their startup projects to avoid potential losses due to future increases in the price of goods and services. Startups in certain sectors such as technology or consumer products may see inflation as an opportunity to accelerate their product development or market expansion, in the hope of making more profits before raw material or labor prices rise further. Second, inflation often causes a currency to depreciate, which in some cases can encourage entrepreneurs to invest in more stable assets, such as property or shares in fast-growing companies.

Although there is a positive relationship between inflation and investment, the p-value for inflation is 0.276, which is also greater than 0.05, indicating that the relationship is not statistically significant. This means that while there is an indication that inflation may contribute to increased startup investment, the relationship is not strong enough to be relied upon in making investment policy or strategy decisions. This could be explained by other external factors that influence startup investment, such as international market conditions, commodity price fluctuations, or even investor confidence in broader government economic policies. In other words, inflation may not be the main factor in driving investment in the startup sector, although it may contribute under certain conditions.

Comparison with Economic Theory

This regression analysis provides useful insights into understanding how macroeconomic factors such as the BI Rate and inflation affect investment in the startup sector. In economic theory, the benchmark interest rate (BI Rate) is generally considered as one of the main instruments in influencing investment. According to investment theory, an increase in interest rates tends to decrease investment because higher borrowing costs reduce the attractiveness of projects that require external capital. However, in this case, although there is a negative trend, the relationship is not statistically significant, indicating that other factors may be more influential in investment decisions in the startup sector.

On the other hand, inflation is often associated with economic uncertainty, which can reduce investment. However, in this case, the positive relationship between inflation and startup investment suggests that the sector may be more adaptive to inflationary conditions. This could indicate that the startup sector has the flexibility and ability to adapt quickly to changing economic conditions, or that startup entrepreneurs may be more likely to seek opportunities in more challenging situations, as reflected in their decision to invest despite inflation.

However, from the results of this analysis, we can also conclude that the relationship between BI Rate, inflation, and startup investment is highly dependent on specific market conditions and other external factors. The startup sector has different dynamics compared

to the traditional economic sector, so macroeconomic variables such as interest rates and inflation may not have the same strong impact. Other factors such as technological innovation, investor confidence, or government policy support may be more decisive in influencing investment decisions in this sector.

Other Factors Affecting Startup Investment

In addition to the BI Rate and inflation, there are a number of other factors that can affect investment in the startup sector. One of them is access to funding. Many startups rely on venture capital or funds from individual investors (angel investors) who may be less affected by interest rate fluctuations. This type of funding is often more flexible and not tied to short-term financial market conditions, allowing startups to grow despite pressures from macroeconomic factors.

In addition, government policies also play an important role in influencing investment in the startup sector. Supportive policies such as tax incentives, support for business incubators, or easing regulations can provide a big boost for entrepreneurs to develop their businesses. The startup sector is often more affected by government policies and regulations than traditional sectors, as many of them are at an early stage and require external support to survive and grow.

CONCLUSION

Based on the results of linear regression analysis on secondary data for the period 2015–2025, this study concludes that the benchmark interest rate (BI Rate) and inflation do not have a significant effect on startup investment in Indonesia. Although the BI Rate shows a negative relationship and inflation shows a positive relationship to investment, both are not statistically significant. This finding indicates that macroeconomic conditions, especially interest rates and inflation, have not become the main determining factors in investment decisions for early-stage startups.

On the contrary, these results indicate the dominance of other factors such as government policies, ease of access to funding, and the level of innovation and technological readiness in influencing investor decisions. Therefore, the strategy for developing the startup ecosystem in Indonesia should be more focused on strengthening internal factors and policy support, rather than only focusing on macroeconomic indicators.

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