

A Study on The Impact of Macroeconomic Variables on The Capital Structure of Startups

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Abstract

This research paper examines how macroeconomic parameters influence the capital structure decisions of startup firms, filling a critical gap in the literature where previous studies have primarily focused on firm-specific variables. While prior research on startup financing has predominantly analyzed firm-specific variables, this study expands the analytical framework by incorporating macroeconomic and company-specific variables to provide a more comprehensive understanding of capital structure decisions. Companies invariably respond to their macroeconomic environment, adjusting strategic decisions based on fluctuations in inflation rates, interest rates, gross domestic product, and unemployment levels, among other economic indicators. Data from three international studies are analyzed to determine the impact of macroeconomic factors on capital structure and assess whether such an influence exists. The main findings of this study elucidate that macroeconomic variables have varying effects on capital structure measurement.

Keywords: macroeconomic, capital structure, interest rates, unemployment, inflation.

Introduction

Startups drive the economy forward by creating jobs, fostering innovation, and accelerating economic growth. Startups have made around 1.5 million jobs annually, reducing unemployment while increasing productivity. Startups drive competition with their entrance into industries and ability to advance industries with innovation. Studies have shown that if startup rates had been constant from 1980 to 2014, there could have been 3.1% higher productivity during that period. The same can be said for unemployment, where if startup rates had been constant from 1987 to 2012, the unemployment rate would decrease by 11.4%.

Debt and equity financing are two common ways of financing a startup. Equity financing is selling shares of the company to raise capital. Debt financing is borrowing money through bank loans or bonds while paying back in interest. Macroeconomic indicators include inflation, the market for loans, interest rates, gross domestic product (GDP), and economic cycles such as recessions. The impact of such macroeconomic variables on choosing the capital structure for a startup has not been studied in detail. Such strategies are essential for avoiding startups facing the risk of death due to poor choice of capital structure.

Few prior works exist on this topic, and this paper aims to survey them. During inflationary periods, purchasing power decreases the value of repaying debt, making debt financing more favorable. On the other hand, the Federal Reserve increases interest rates during inflationary periods, increasing the exact value of debt while decreasing inflation.

Another study by Kaya (2013) used the Aruoba-Diebold-Scott (ADS) index to indicate macroeconomic conditions. It concluded that firms prefer public debt and syndicated loan financing over equity when business conditions are above average. However, firms prefer equity

financing over syndicated loan financing when the economy is improving or in recession.

However, no significant difference in preference was found compared to debt financing.

Finally, a study by Bernardo et al. (2018) focuses on country-specific choices of capital structure, with Latin America as the focus. The conclusion is that firms with higher profitability and liquidity generally have lower leverage as they rely on internal financing. Larger firms, on the other hand, depend on debt financing.

This paper summarizes the influence of macroeconomic trends on the financing strategies of startups. An understanding is developed of the factors that lead startups to prefer equity over debt, or alternative financing options. In the process, the analysis investigates whether systematic patterns exist in startups' capital structure decisions. This study distinguishes itself from prior research, which primarily focuses on industry-specific or firm-specific factors—such as firm size, age, and internal funds—as seen in studies by Kedzior et al. (2020). Instead, the scope is expanded to apply broadly across a wide range of startups.

Literature Review

Entrepreneurial finance is a method of raising capital for startups including venture capital, angel investors, equity, and debt financing. Equity financing is selling company shares to raise capital, meaning the third parties become shareholders holding some control over the company. Debt financing is borrowing money through bank loans or bonds while paying back in interest. The pros of equity financing are the lesser threat of bankruptcy due to the inability to repay loans. According to Martino et al. (2022), a key drawback of equity financing is ownership dilution, which often discourages entrepreneurs from choosing it as their preferred financing structure. As Oranburg (2020) highlights, giving up ownership to third parties means less profits for the entrepreneur. Less company control also comes with entrepreneurs losing power due to

selling shares, differing vote rights, and offering board seats to investors. Debt financing, as Martino et al. (2022) emphasizes, is particularly challenging for startups as limited assets provide little collateral for banks, making loan approval less likely. Collateral through assets is vital to debt financing due to informational asymmetry where typically the borrower (the entrepreneur) has more information about the risk associated with the company, and the financial health of the start-up than the lender has, causing credit rationing (Coleman et al., 2016). The unpredictable cash inflows characteristic of startups make it difficult to meet regular debt repayments, a challenge that Oranburg (2020) identifies as increasing the likelihood of defaults or legal complications.

Debt and equity financing is a signaling approach for investors. The choice of capital structure influences investor evaluations and project valuation, as Hahn and Kwon (2017) explain, because informational asymmetry limits investors' knowledge of the company's financial health. The small track record of the startup, these signals can be vital for investors to determine their valuations. The study developed a model where the entrepreneur selects a debt-equity ratio to signal the startup's value. It showed that a higher debt level can signal greater startup valuation, indicating the entrepreneur's confidence in their repayability. However, higher debt levels come with an increased risk of bankruptcy, which investors consider when determining their investment returns. As the required investment increases, the equity in the company also rises, indicating that Venture Capitalists seek to compensate for higher risks that come with more significant investments.

In a study by Nazara et al. (2023), data from five telecommunications companies listed on the Indonesia Stock Exchange were analyzed to assess how equity and debt financing affect

company profitability. The results indicate a direct relationship between equity financing and company profitability as companies increase their equity financing, they can better support their operational activities, leading to greater profitability. Likewise, debt financing also shows a direct effect on profitability. Although moderate debt levels can boost profitability due to lower costs, higher levels cause more risks and agency costs, such as increased financial requirements. The study by Zhang and Nik Azman (2023) found that debt financing can hurt profitability, especially if heavily reliant on it. The study used a model with panel data to see the return on assets, finding that the average rate was around 1.891%. Though the results varied across the average, some companies were doing well while others were struggling. The study showed that higher debts result in lower return on assets, showing debt's damage to profitability.

Many studies have shown the general impact of macroeconomic trends on startup success and profitability. Macroeconomic factors include Real GDP, interest rates, inflation, and exchange rates, all of which influence businesses. The relationship between UK business performance, measured by Return on Assets, and macroeconomic variables was analyzed by Issah et al. (2017). Using multiple regression models, the study found the firm's performance relationships with Real GDP, exchange rates, and adjusted unemployment rate. A positive correlation was found between the adjusted unemployment rate and return on assets, indicating that as unemployment rises, the firm's performance increases, possibly due to lower inflation that comes with higher unemployment rates. Surprisingly, there was a negative relationship between Real GDP and the return on assets (ROA), showing that as the Real GDP increases, the ROA decreases, possibly due to higher inflation or increased competition. There was a positive correlation with exchange rates, meaning favorable exchange rates with countries other than

pounds meant better business performances. This is probably due to more favorable trade, mainly when exporting a business's goods.

Capital Structure Theories

This section provides an overview of existing capital structure theories to establish the theoretical foundation.

Pecking Order Theory

Kedzior et al. (2020) explain that, according to pecking order theory, startups prefer to use their funds initially to avoid sharing sensitive information, which causes them to lack funding due to their unwillingness to be transparent. Startups often prefer internal financing to avoid giving out sensitive information to investors due to fears about competitive advantage and revealing R&D strategies, leading to underinvestment. Information asymmetry, the lack of information supplied to banks and investors about the company's financial health and projection, can turn off investment in the company. The next option in the line is getting loans when needed. Colombo and Gomes (2023) note that, following internal funding, startups typically turn to loans when necessary, with issuing shares considered a last resort, as it signals to the market that their stock may be overvalued and can lead to a decline in share price.

Trade-Off Theory

The Trade-Off theory states that firms balance the tax benefits of debt against bankruptcy costs, lowering the company's value over time. The trade-off theory suggests that firms try to find the optimal level of debt to get the best of both worlds. An inference is that firms with more assets to fight bankruptcy are more likely to employ the trade-off theory. Colombo and Gomes (2023) studied the choice capital structure of startups in their early years with the influence of

tradeoff and pecking order theories by surveying 170 high-tech firms in Brazil. The survey was a four-part questionnaire asking the founders' profiles, firm characteristics, business performance, and sources of capital. All the businesses in this study's sample couldn't access bank financing in their first four years, possibly due to insufficient cash inflows to repay the loans. Colombo and Gomes (2023) also argue that, according to the trade-off theory, small companies often avoid bank financing because the tax benefits of debt are minimal. Going to the trade-off theory, firms have limited access to outside capital primarily due to informational asymmetry, causing them to go towards financing from themselves, their family, angel investors, or the government. To align with the pecking order theory, startups increasingly relied on internal funds for financing. However, no bank financing was considered, which is second in the pecking order, and this study found that the startups were financed through angel investors and the government. The study found that the primary funding source for startups over four years was founders' capital, but as time went on, they tried different methods.

Market Timing Theory

Alti (2003) defines equity market timing, or market timing theory, as the practice of issuing stocks when prices are high and repurchasing them when prices are low. Firms often sell stocks when the demand for stocks is high, raising the price, but after their initial public offerings, firms start to issue more debt, alluding to the fact that the market timing theory is a short-term strategy. Setyawan (2011) conducted a study using data from initial public offerings to provide evidence supporting the market timing theory. The paper found a decline after the initial period of going public, most likely due to investors not wanting to seek profits or profit-taking yet. The study found a trend where there was an eventual decline due to debt repayments after the initial spike in earnings from the IPOs. These studies support each other in showing

how the market timing theory is more of a short-term solution, while debt is used in the long term.

Methodology

This paper's methodology uses data from other prominent researchers, thus acting as a secondary data analysis. The studies use quantitative data from different models to explain the results. The data includes financial ratios, coefficients specific to the study, and economic indicators, such as GDP. These help identify numerical patterns and trends that can explain the macroeconomic impact on capital structure.

This study will also include secondary qualitative data by analyzing the conclusions and analysis of other studies. Using qualitative data can help identify different perspectives on the macroeconomic effects of choice of capital structure because the analysis and findings are all drawn from the own studies of individual data. This research method can identify recurring themes related to how macroeconomic conditions impact capital structure by seeing if different studies produce similar results. Some of the data is also from international countries and is used as empirical evidence to draw general conditions on the effects of the macroeconomy.

The first paper analyzed is Kaya (2013), where the data is derived from the Federal Reserve to measure economic activity. The paper uses the ADS index to summarize how the economy performs daily. This study uses dummy variables called Above_Average, which are given a value of one if the ADS index is above its usual average and zero if it is below. The other dummy variable, Improving, is used to decide if the economy is improving; for example, if the ADS index has increased over time, the variable is set to one, indicating an improving economy. The study ran two regression analyses, one with the Above_Average variable and the other with the Improving variable. The regression analysis compares the likelihood of a firm choosing

between equity vs. public debt, equity vs. private placement, and equity vs. syndicated loan.

With the *Above_Average* variable, Kaya (2013) found that equity vs. public debt had a coefficient of -0.43, meaning firms are more likely to choose public debt over equity in above-average conditions. With the *Improving* variable, Kaya (2013) found that equity vs. public debt had a coefficient of -0.10. Still, it had a p-value of 0.24, which tells you to accept or reject the null hypothesis, and since it is more significant than 0.05, it's the practice to say that this data is insignificant as the relationship is due to chance. Conclusions are drawn from the results reported in Kaya (2013), which serves as secondary data.

The subsequent paper reviewed is Bernardo et al. (2018), where they hypothesize that macroeconomic factors and institutional factors, such as company size, can affect the corporate structure choice of a startup. They selected 608 companies from Argentina, Brazil, Chile, Colombia, Mexico, and Peru and obtained their macroeconomic and institutional statistics from the World Bank and the World Economic Forum. The study employs multiple leverage variables relating to financial leverage and leverage at the market value of assets. The leverage ratios are the dependent variables, meaning the study tried to find a relationship between these ratios and the explanatory variables, which for the macroeconomy were GDP growth rate, per capita income, inflation rate, total value of publicly traded companies, and average time to open a business. Using a hierarchical linear model, Bernardo et al. (2018) analyzed how multiple variables act together to shape the leverage ratio. With the GDP growth rate, the coefficient was negative for short-term (-631.435) and long-term leverage (-748.396). With per capita income, the coefficient was negative for short-term (-33.477) and long-term leverage (-39.528). With inflation, the coefficient was positive for short-term (-203.142) and long-term leverage (238.634). With the total value of publicly traded companies, the coefficient was positive for

short-term (34.222) and long-term leverage (40.451). With the average time to open a business, the coefficient was positive for short-term (0.860) and long-term leverage (1.038).

The final study analyzed is Mokhova and Zinecker (2014). The study aims to find how internal factors, such as profitability, and external factors, such as inflation, affect a company's capital structure. The study uses samples from seven countries, four of which are the Czech Republic, Slovakia, Hungary, and Poland. The study splits up the macroeconomic factors into monetary and fiscal policy indicators where monetary policy indicators are long-term, short-term interest rate, inflation rate, and money supply as a percentage of GDP, and budgetary policy indicators are government debt to GDP, tax revenue as a percentage GDP, and income taxes as a percentage of revenue. Other macroeconomic indicators are the unemployment rate and GDP growth rate. The study includes ratios to indicate the different modes of financing while employing Pearson correlation analysis.

The study by Mokhova and Zinecker (2014) found that in the Czech Republic, with an inflation rate, there was a negative relationship with the total debt ratio, with a coefficient of (-0.6). With interest rates, there was a negative relationship between the total debt ratio and a coefficient of (-0.2). With government debt, there was a negative relationship between the total debt ratio and a coefficient of (-0.5). With income taxes, there was a positive relationship with the long-term debt ratio with a coefficient of (+0.44). With the unemployment rate, there was a positive relationship between total leverage with a coefficient of (+0.3). In Slovakia, the inflation rate had a positive relationship with corporate capital structure (+0.1), interest rates hurt the total debt ratio (-0.7), government debt was positive with corporate capital structure (+0.6), and unemployment was positive with the influence variable (+0.5). In Hungary, the government's debt with total debt ratio was a negative relation (-0.4), the income to total debt ratio was

negative (-0.3), and the inflation rate to the corporate capital structure was negative (-0.2). In Germany and France, with long-term interest rates, there was a positive leverage with (+0.5), and with short-term interest rates, there was also a positive relation (+0.5). In Poland, with government debt, there was a negative relation to the total debt ratio (-0.4) and with income taxes and total debt ratio there was a positive relation (+0.3). With Greece's GDP growth rate to short-term debt ratio, there was a positive relation (+0.6).

These three studies form the basis for the subsequent section, which synthesizes their findings and explores their implications. The analysis highlights key differences in results and provides guidance on interpreting these outcomes and their implications.

Analysis of Results

Starting with the inflation rate, Kay (2013) and Bernardo et al. (2018) found that there was a positive correlation between the inflation rate and companies' choice of public debt, while Mokhova and Zinecker (2014) found that companies choose equity when inflation is high. Starting with Kaya (2013), although inflation isn't mentioned directly, there was a preference towards debt financing as seen with -0.43 coefficient in above-average conditions. Usually, when the economy is above average, the inflation is higher than the historical average. Bernardo et al. (2018) also, with higher inflation, firms choose debt financing, as it found a positive coefficient with leverage using borrowed funds. A negative relationship between inflation and long-term and short-term debt ratios indicates that firms prefer equity financing. The analysis indicates that firms prefer debt financing when inflation is high because the real value of debt decreases. The real value of debt decreases because the purchasing power of money decreases when inflation rises, so the money companies pay back is less. Fixed interest rates also allow companies to pay less in the real interest rate value as inflation drives down the real interest rate.

Onto interest rates, only Mokhova and Zinecker (2014) specifically mention interest as a variable to find a correlation with where the study found variations in the coefficients based on different countries. Still, generally the trend from the countries showed a negative influence on capital structure, meaning that firms choose equity when interest rates are high. Kaya (2013) shows that under above-average conditions, interest rates tend to be lower as a means of promoting investment. The findings indicate that when interest rates are lower, firms choose debt financing. However, when conditions improve, interest rates are high Kaya (2013), and significant differences in the choice of equity vs debt are found. Bernardo et al. (2018) found that when the growth of GDP increases, there is a smaller reliance on leverage, meaning firms choose equity. GDP growth indicates an inflationary period, meaning interest rates could be lower, so this study's results could go against the idea that lower interest rates mean debt financing. The analysis suggests that when interest rates are higher, equity financing becomes the more likely option as the cost of debt increases. Still, the studies do not show a real correlation with interest rates and capital structure choice.

Taking a more general approach indicates that favorable macroeconomic conditions encourage firms to lean towards equity financing as Mokhova and Zinecker (2014) and Kaya (2013). Mokhova and Zinecker (2014) found a slight correlation between GDP growth and increased use of public debt, but this correlation is almost insignificant. Kaya (2013) found a strong relationship between above-average economic conditions and public debt, indicating that favorable conditions mean public debt is the choice. Though an inevitable conclusion is hard to make, a favorable economy could increase investor confidence, leading to easier loan access. Also, the aforementioned decrease in interest is a reason to pick public debt.

Conclusion

This study underscores the significant influence of macroeconomic variables on startups' capital structure decisions. Inflation, interest rates, GDP growth, and unemployment rates are pivotal in determining whether startups opt for debt or equity financing. Research indicates that favorable business conditions often lead firms to prefer debt financing over equity.

This study includes limitations, mainly due to the lack of data. It used secondary data from mostly a decade ago, each from different countries, providing inclusive evidence. The studies also don't mention all the economic indicators but take a more general approach, making the conclusion more theoretical-based rather than evidence-based.

Despite these insights, findings across different studies and economic environments are inconsistent, underscoring the complexity of capital structure decisions. These variations highlight the need for further research incorporating real-time data and broader sample sizes. Startups must carefully assess macroeconomic conditions alongside firm-specific factors to optimize their financing strategies. Understanding these dynamics can aid entrepreneurs in making informed decisions, reducing financial risks, and enhancing long-term business sustainability.

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