Hamza Abu Arrah

The Impact of Capital Structure on Financial Performance of Manufacturing Firms

Evidence from US

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Author: Hamza Abu Arrah

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ABSTRACT:

This paper investigates the impact of leverage on manufacturing firms' performance measured by Return on Assets (ROA) for the primary test and Tobin's Q for the robustness test. Also, the paper investigates whether leverage level has a varying impact on the performance of firms during recessions, compared to the performance during ordinary economic periods. Furthermore, the study examines whether higher or lower debt levels can optimize the performance of highly and conservatively levered firms. Leverage is measured as the ratio of Total Debt to Total Assets. Financial performance is measured with Return on Assets (ROA) for primary tests and Tobin's Q for robustness. The study employs a panel data regression of 641 manufacturing firms in the US market over 21 years (2003-2023).

Empirical findings reveal that debt levels have a significant negative impact on firms' performance using ROA. The results are robust when substituting ROA with Tobin's Q. However, during recessions, the analysis does not show a significant impact of recession on firms' performance. Additionally, the results do not provide significant evidence that highly and conservatively levered firms perform differently during recessions. Moreover, less debt for conservatively levered firms significantly optimizes financial performance. On the other hand, the results do not provide significant evidence of whether highly levered firms can optimize their performance by increasing or decreasing the debt levels in their capital structure. Finally, even though the leverage negatively impacts firms' performance, the comparative analysis between highly and conservatively levered sub-samples showed that highly levered firms perform better. That implies the non-linearity of the relationship and reinforces the urge to investigate the relationship among segregated sub-samples of firms based on relevant characteristics, such as firm size, asset structure, liquidity, and industry and sector.

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Abbreviations

ROE: Return on Equity (Net Income/Total Equity)

ROI: Return on Investment (Net Income/Total Financial Investment)

P/E: Price to Earnings Ratio (Firm's Market Value/Net Income)

WACC: Weighted Average Cost of Capital

ROA: Return on Assets (net income/ total assets)

T'Q: Tobin's Q (total market value/total assets)

LEV i,t : leverage ratio (total debt/total assets) for firm i at time t

ASSETS i,t : the natural logarithm of total assets for firm i at time t

SALES i,t : the natural logarithm of total sales for firm i at time t

MV i,t : the natural logarithm of total market value for firm i at time t

RE i,t : the natural logarithm of retained earnings for firm i at time t

WC i,t : working capital for firm i at time t

AG i,t : assets growth for firm i at time t

SG i,t : sales growth for firm i at time t

1 Introduction

1.1. Background

Capital structure refers to the mix of debt and equity that firms issue to finance their operations and investments. A firm's capital structure is expressed as its debt-to-equity ratio (Vipond, 2023). However, there is a divergence amongst scholars regarding the optimization of capital structure. On one hand, some scholars believe that it is essential for firms to identify the optimum debt and equity levels that allow them to attain ideal financial goals. Additionally, they believe that sub-optimum financial decisions could result in inefficient capital structure and corporate failure (Akomeah, Bentil, & Musah, 2018).

On the other hand, some scholars believe that managers seek ‘‘satisficing’’ financial decisions rather than optimal decisions. In addition, they have argued that no single decision-making process is suitable for all firms in each area, industry, or even the same organization in different eras (Agarwal, 2013; Jaros & Bartosova, 2015). This opinion is consistent with the notion that no single general theory holds for all firms under different circumstances. Furthermore, managers face challenging decisions that go beyond achieving financial goals of Return on Equity (ROE), Return on Investment (ROI), and Price-to-earnings ratio (P/E), to meet the expectations of various stakeholders, such as creditors, debtors, and government. The expectation of every stakeholder is considered a financial obligation, which complicates financial decisions that shape the capital structure of any firm (Agarwal, 2013).

However, researchers have provided many pieces of literature that are inconsistent with their results regarding the existence of the optimum capital structure, its relevance to firm’s value, and the approaches used to determine the optimum leverage level. Modigliani and Miller (1958) provided a simplistic theory, suggesting that a firm's capital structure is irrelevant to the firm value. However, their findings

do not hold to be true in the real world because they assumed perfect market conditions and neglected taxes. Thus, the results provided by MM can be considered a cornerstone to develop more advanced theories.

Modigliani and Miller (1958) carried their previous study forward and developed the Trade-off theory. Trade-off theory suggests that ideal capital structure is the product of a trade-off between the advantages and disadvantages of leverage financing. It is an extension of MM theory, considering the tax advantage (Kraus & Litzenberger, 1973; Modigliani & Miller, 1963; Myers, 1984). However, pecking order theory suggests that firms tend to rely on a certain pecking order when they need to raise capital. The theory suggests that internal financing is preferred to external financing when firms need to raise capital. When external financing is inevitable, firms opt to issue debt rather than equity (Myers, 1984; Myers & Majluf, 1984). Deciding the optimal capital structure can be an outcome of the agency costs that emerge from a conflict of interest among stakeholders (Jensen & Meckling, 1976). Furthermore, executives consider the risk of takeovers when deciding on a proper capital structure mix. Thus, the threat of a takeover is a main factor that shapes the capital structure of firms (Milton Harris & Raviv, 1988; Jensen, 1986). Also, deciding the financing source can be heavily impacted by the firm's accessibility to capital markets. Ultimately, financial distress and asymmetry of information can impose a higher cost of borrowing on firms or even restrict borrowing entirely (Povel & Wrath, 2001).

However, capital structure is a thoroughly studied topic, but due to the several factors influencing the decisions of capital structure, researchers have not established a single theory that could be reliable for all firms under all circumstances and times. Thus, because of the several confusing factors that determine firms' capital structure, it is vital to investigate the relationship between the leverage levels and firms' performance. However, empirical researches

regarding the association of leverage levels and firms' performance have inconsistent results (Chandra et al., 2019; Margariti & Psillaki, 2010).

1.2. The Purpose and Hypotheses

This thesis aims to investigate whether the association of leverage levels and financial performance is homogeneous amongst manufacturing firms or across different sub-sets of manufacturing firms. Additionally, this thesis examines the relationship between financial leverage and the firm's performance. Moreover, this thesis relies on a longitudinal dataset to address a longer period, including the financial crisis period instead of focusing on a specific period. Hence, this approach allows an efficient examination of the dynamics between capital structure and financial performance of firms in both stable and unstable states of the economy. In addition, cross-country examination of the capital structure of manufacturing firms may not provide definitive and clear results. Thus, a one-country examination is the subject of this thesis, because firms within the US are subject to the same institutional context. Finally, while the capital structure dynamics are well documented, the relationship between leverage and the financial performance of manufacturing firms is yet ambiguous. Hence, the following hypothesis will be tested.

Hypothesis 1: financial leverage influences the financial performance in the selected market and firms.

This hypothesis implies that the financing decision is correlated with the firm's efficiency if the analysis provides statistically significant results. The question is whether the leverage level has a positive or negative impact on financial performance.

Hypothesis 2: financial leverage is more impactful on the performance of highly levered firms than conservatively levered firms.

Hypothesis 3: during economic recessions, the leverage level significantly impacts firms' performance.

1.3. Practical and Theoretical Contribution

The approximate income generated by the US constitutes 20% of the world's income, making it the largest economy in the world and a leading global trader (Economy & Trade, 2023). Additionally, the contribution of the manufacturing industry accounts for 24% of total US GDP in the year 2021 (Thomas, 2023). Therefore, identifying the relationship between leverage levels and the financial performance of the US manufacturing sector is crucial for the US and the world economy.

This thesis aims to contribute to the extant literature and the economy through several aspects. First, the topic of capital structure and its optimality is widely investigated in finance. However, scholars did not reach a single unanimous conclusion regarding this issue. Second, the extant literature did not widely investigate the optimal capital structure of the manufacturing industry in the US market. Therefore, this thesis aims to fill the gap in the literature by considering the US manufacturing sector, serving as a baseline for further investigations.

1.4. Summary of Chapter One

Chapter One provided a background about the importance of Capital Structure for firms. In addition, this chapter provided the purpose and formulated the hypotheses to be tested throughout this research study about the Impact of the Capital Structure on Performance Manufacturing Firms. Then, the chapter

provided an overview of various and remarkable theories for capital Structure for firms. The next chapter, Chapter Two, provides an overview of capital structure and performance in manufacturing Firms and provides a discussion of studies investigating the impact of capital structure on the performance of manufacturing firms.

2. Literature Review

The purpose of this study is to determine the Impact of Capital Structure on the Performance of Manufacturing Firms. This study is important as it will offer a thorough understanding of the capital structure and how it affects the performance of manufacturing firms. Gaining this insight in this regard is essential to enhancing the manufacturing firms' performance and raising the effectiveness of their capital structure.

In this chapter, the following topics will be addressed: 1) theories of capital structure, 2) the impact of capital structure on firms' performance, and 3) the inter-industry variations in capital structure. By means of this investigation, the study attempts to provide insights that can be useful to explain the impact of leverage levels on the performance of manufacturing firms and to highlight the variables and factors influencing the Leverage-performance relationship.

2.1 Theories of Capital Structure

Theories of capital structure are of certain significance as they propose the philosophy for which each firm must build up and design its capital. Since the dissemination of the Modigliani and Miller (1958)"irrelevance theory of capital structure", the theory of corporate capital structure had gained finance economists attention and started to be a study of interest. Over the years, three major theories of capital structure have emerged. The first one is the trade-off theory which proposes that firms trade off and outweigh the benefits versus costs of debt and equity financing and then determines "optimal" capital structure after considering market imperfections, for example, taxes, bankruptcy costs, and agency costs. The second one is the pecking order theory (Myers, 1984; Myers & Majluf, 1984). This theory argues that companies follow a funding hierarchy to reduce potential problems of information asymmetry between the firm's managers-Internal and the external shareholders. Overview of these theories is provided in the next three sections.

2.1.1 Traditional Theories

The conventional theories of capital structure are fundamentally concerned with the cost of capital, in which the market value of a company is generally determined by discounting the stream of future cash flows. Firms raise capital using debt, equity, or both. If a firm issues loans or bonds, it is called debt financing. In this case, they are obligated to pay the principal debt, besides a fixed regular amount of interest until the debt maturity. However, if a firm issues shares, it is called equity financing. Firms allocate a proportion of their earnings to equity holders as a reward for their investment. A firm's use of debt, equity, or both is called the capital structure (Thu, 2016).

The cost of capital consists of debt and equity costs. The expected return on assets (rA) is defined as the percentage of the expected income divided by the market value of assets. Assuming an investor holds all of a firm's equity and is obligated to all its debts, the investor is entitled to the entire profits. Hence, the expected return on assets for the investor equals rA. : According to Brealey, Myers, and Allen (2011), "the expected return on a portfolio is the sum of the weighted average of expected returns of individual investments in the portfolio". In other words, the expected return of the individual assets is as follows:

rA = (proportion in debt x expected return on debt) + (proportion in equity x expected return on equity)

According to Pindado, Rodrigues, and de la Torre (2006), the optimal capital structure is the mix of equity and debt that yields the lowest weighted average cost of capital (WACC). However, equity financing generally costs more than debt financing. Thus, they suggested increasing leverage levels can lower the total cost of capital. However, despite the argument that the optimal capital structure is the

one that yields the lowest cost of capital, the main aim of lowering the cost of capital is maximizing the shareholders' wealth (Brealey et al., 2011). Hence, a counterargument emerged to state that excessive and arbitrary use of debt can impose financial distress and bankruptcy risk. To reduce the risk of financial distress, firms need to increase their reliance on equity financing (Myers, 1977). Consequently, the relationship between leverage and the optimal capital structure is irrelevant.

Brealey et al. (2011) stated that the WACC approach is beneficial to decide the optimal capital structure. This approach depends on a simple logical methodology, which justifies its widespread acceptance among managers. In addition, the WACC approach efficiently considers the components of capital structure. Furthermore, the approach provides efficient results when used for firms with normal leverage levels. On the other hand, this approach is a subject of criticism for several shortcomings. The most challenging criticism is that this method is not appropriate for deciding the marginal cost of capital for new investments. As a result, two firms of the same size would have different decisions about taking a new project because they have different capital structures and different WACCs. Additionally, this approach is not efficient when used for firms with low profits. Alternatively, if a firm is not attaining adequate profits, the shareholders and managers are encouraged to achieve higher returns by pursuing investments with returns significantly higher than the WACC. Hence, in the case of low-profit firms, WACC is not the decisive parameter to make investment decisions. Finally, this approach does not provide accurate results when adopted by firms with low debt costs. Financially distressed firms rely heavily on short-term loans to finance their temporary urgent obligations or even to restructure the business. However, the short-term debts issued by distressed companies are usually not included in the calculation of WACC because long-term debts are classified as a component of capital structure. As a result, the WACC approach will provide a misleading, typically understated, benchmark for future investment decisions.

The optimality of capital structure was discussed for the first time by Modigliani and Miller (1958) who set a cornerstone for other finance scholars with their study concerning the cost of capital. They proposed that capital structure is not relevant to firms' value. They assumed the absence of corporate tax and agency costs, securities markets are efficient, and homogeneous expectations for future earnings among investors. Following these assumptions, they suggested that the cost of capital of a firm is indifferent whether it is a totally levered or unlevered firm. Furthermore, they suggested that shareholders who desire to benefit from corporate borrowing can borrow on their own and adjust their portfolios. MM argued that the source of capital has no impact on firms' value. They suggested that the market value of a firm is typically the present value of future cash flows it is expected to generate.
In other words, they assumed that under perfect market conditions, a firm value is represented by the value of the assets it owns.

In the second proposition, Modigliani and Miller (1984) provided, they argued the influence of leverage on the firms' cost of capital. They suggested that when a firm reduces its leverage level by offsetting it with equity, the firm value will remain unchanged. However, the cost of capital will increase in response to an increase in the cost of equity. They assume that the cost of equity will increase because the shareholders seek higher compensation for the risk of investing in a levered firm. In other words, the second proposition suggests that higher leverage leads to higher returns for shareholders without impacting the value of the firm.

However, these findings were a subject of criticism that they do not hold in the real world. The reason for the criticism is that their study was based on unrealistic assumptions. Investors are irrational and conjectural, contrary to how Modigliani and Miller (1984) described them as rational. Numerous scholars argued that markets are not typically efficient. Most, if not all financial markets around the

world have witnessed periods of inefficiencies, where individual and institutional investors utilized arbitrage opportunities. In addition, MM overlooked the transaction costs, which is a significant factor in limiting arbitrage opportunities. Moreover, a significant limitation of the framework they provided is that they also overlooked the costs of bankruptcy in their analysis. In fact, bankruptcy cost plays a significant role in capital structure decisions. Giordani, Jacobson, Schedvin, and Villani (2011) suggest that firms with higher levels of leverage are more likely to file for bankruptcy than firms with low leverage ratios. Therefore, they stated that highly levered firms are less appealing for investors if the risk of financial distress exists. Finally, the most critical criticism of this theory addressed their failure to consider corporate taxes. Since interest expenses are deducted from taxable income, debt financing serves as a tax advantage for levered companies.

However, Myers (1977) introduced a new theory relaxing the hypotheses of the previous study, suggesting that taxes on dividends received by shareholders act in a reversal of corporate tax advantage. These findings imply that if taxes on individual investors were higher than corporate tax, debt financing is assumed to enhance the shareholder's wealth and therefore, the firm's value.

Five years after publishing their first study, Modigliani and Miller (1963) introduced a developed theory, which carried a significant correction to the previous theory. In this study, they addressed the impact of the tax advantage of levered firms. They also argued that despite the tax advantage of debt financing, firms should not seek arbitrary debt financing. They pointed out that internal financing can be cheaper than debt financing in some circumstances when the tax status of individual investors is taken into consideration.

2.1.1.1. Pecking Order Theory

The Pecking Order Theory was first proposed by Donaldson (1961) before Modigliani and Miller developed it in 1984. This theory addresses the critical choice

between debt and equity, as it significantly influences the firm’s cost of capital and its value.

The essence of this theory is based on the trade-off between the options of financing sources in the circumstances of asymmetric information. In other words, The Pecking Order Theory relies on asymmetric information as an alternative model explaining the practical capital structure decision. Asymmetric information, which is the main pillar of this theory, is a term used to describe managers' awareness about their firms. It indicated that managers know their firms' risks and valuations more than externals do. Managers often attempt to provide information to the investor in terms of announcements of the firm's profit distribution policy. When managers anticipate the likelihood that their firms‟ stock prices may rise, announcements of higher revenues and dividends paid are designed to notify investors as a positive indicator of higher future profitability expectations.

Moreover, asymmetric information influences the choice of firm financing, internal vs. external financing, debt, or equity securities. This can lead to a pecking order which is a hierarchical allocation of capital sources as proposed by Modigliani and Miller (1984) when they suggested that the owners or managers of the firms often prefer using internal financing sources rather than external ones due to their fear of losing the firm’s control. Thereafter, debt financing dominates equity financing if external sources are inevitable. Firms issue new equity as a last resort when they encounter financial distress due to the higher costs of issuing new equity. Shareholders are hesitant to open a firm´s equity to external investors to be able to maintain the firm´s control. They only resort to debt when the internal financing is exhausted. This strategy is also advocated as it helps managers to retain profits as well as avoid undesired costs such as costs that occur when the new securities are underpriced.

Also, under the pecking order theory, the target debt-to-equity ratio is non-existent due to two forms of equity, internal and external, one on the top of the hierarchical

allocation and the other at the bottom. The debt ratios vary as the firm varies, which reflects the cumulative requirements for external sources. The Pecking Order Theory explains why profitable firms commonly borrow the least. Higher profit can maintain higher retained earnings, which enables firms to generate their internal source of finance to run their investing activities. Myers (1984) also reports that investors' responses and managerial incentives influence the choice between debt and equity. Myers and Majluf (1984)argued that due to symmetric information between internal and external users, a firm can attract investors by employing the hierarchy order of capital sources. In other words, when firms carry out a new profitable project, equity financing is the least viable alternative. The reason is that the current shareholders will opt not to share the profits with new shareholders. Instead, they would seek to reduce the costs of financing this project by using internal or debt financing. On the contrary, when the project is expected to be risky, the shareholders opt to allocate the high risks with a larger stake of shareholders.

Surprisingly, Chen (2004) conducted a study, aimed to investigate the determinants of capital structure of publicly listed firms in China. He opposed that some insights of the modern theories of capital structure are valid and portable to China. The paper signaled that institutional hypotheses and models underlying Western developed markets are not valid in the Chinese market. Using firm-level panel data, the author provided empirical evidence that Chinese firms have a different pecking order than the one provided by Modigliani and Miller (1984). The pecking order introduced by this study is internal financing, equity, and long-term debt accordingly.

On the contrary, Qu, Wongchoti, Wu, and Chen (2018) conducted a study to refute the new pecking order of the Chinese market. The authors pointed out that the sample period used in Chen's study (2004) was when the Chinese state predominantly owned non-tradeable shares (NTS). They argued that NTS investors are not exposed to significant information asymmetry. Therefore, equity issuance

does not harm Chinese firms, under such circumstances. Finally, the authors provided economically and statistically significant results that refute the unconventional pecking order.

2.1.1.2 Trade-Of Theory

The trade-off theory, also known as the balance theory, claims that debt has tax benefits. Firms can benefit from debt tax shields as an incentive to use debt, which represents a cheaper source of funding. However, increasing debt levels may increase the firm's risk of falling short of generating sufficient income to fulfill its payment requirements (Damodaran, 2016). Myers (1984) indicated that a firm's ratio of borrowing is a balance between the benefits and risks of using borrowed money. The practicality of the trade-off theory is that each firm has an optimal capital structure that maximizes its financial value and performance. However, this might face certain challenges, it might be difficult for firms to run their operations at their optimal capital structure as they demand spare debt capacity to make them able to encounter unexpected situations such as competitors' actions in the market share. For any firm operating at the optimal cost of capital, indicates that any additional debt will raise the firm's cost of capital. These unexpected charges may negatively influence its financial performance. In contrast, an optimally structured capital may not guarantee that managers will use the funds for profitable projects.

The trade-off theory also suggests the optimal capital structure is a trade-off/equilibrium/balance between the tax advantages and the costs of financial distress. This means that if the level of debt is moderate, the likelihood of financial distress is low which gives a non-considerable present value of financial distress. In such cases, the tax benefits dominate over the financial strain or distress. On the other hand, when the level of debt is increasingly high, the likelihood of financial distress increases to a certain point that will be multiplied to coincide with the increment of borrowings, which maximizes the cost of financial distress, and consequently, makes this distress being dominant over the tax shield. Therefore,

attainment of the theoretical equilibrium of this theory is actualized when the present value of the tax shield is substituted by maximizing the present value of costs of distress. According to the trade-off theory, the firm value is enhanced when the marginal tax benefit dominates over the marginal bankruptcy costs, and the point is identified as an equilibrium stance between these two factors. This relationship was further examined by Myers (1984) in which he proposed the static trade-off hypothesis. Myers (1984)reports that firms hypothesize a 31-target debt-to-value ratio and then gradually move toward the target. The target debt ratios are not the same for all firms. For instance, safe firms with huge amounts of property, plant, and equipment should pursue higher ratios. On the contrary, companies with low profits or huge amounts of intangible assets should rely heavily on equity issuance. He also emphasized that hazardous firms should make their debt ratio less. When the market value of the firm is volatile, the probability of default increases. As a result, safe firms should issue more debts before the costs of financial distress surpass the tax reduction benefits.

Köksal and Orman (2015) conducted a comparative test of the trade-off and pecking order theories. They used a comprehensive firm-level dataset from a manufacturing, non-manufacturing, small, large, publicly traded, and private companies in Turkey, where its economy is counted as a major developing one. Throughout this comparison, it was found that the trade-off theory outperforms the pecking order theory for the capital structures of all forms of firm. Moreover, the trade-off theory provided better fir for understanding the funding choices of private large companies in the non-manufacturing sector, especially, when the economic environment is somehow stable. In the other hand, pecking order theory is useful when it applied to small publicly traded manufacturing companies, especially when the economic environment is relatively unstable.

Barclay and Smith (1999) pointed out that despite the evidence provided in favor of capital structure theories, scholars have failed to develop an efficient model to

test the competing theories in this field of study. Therefore, relying on the available models, it is not possible to reject a theory in favor of another. Fama and French (2015) suggested that each of the tradeoff and pecking order theories reflect a side of truth in addressing the capital structure dilemma. Researchers cannot measure every variable. Even if they could, some variables and proxies cannot be accurately measured.

However, trade-off and pecking order theories were found to be not mutually exclusive in explaining the capital structure decisions. A study conducted to analyze whether the executives of small and medium sized firms in Portugal are closer to follow the assumptions of pecking order theory or to those of trade-off theory. It was concluded that the oldest and most profitable firms have lower leverage levels, confirming the assumptions of pecking order theory. Firms with greater size are relatively more levered than smaller ones, confirming the assumptions of trade-off theory and pecking order theory. In addition, firms adjust their leverage levels towards the optimal level, which confirms the projections of trade-off theory. These findings imply, contrary to what was prevalent, that the pecking order and trade off theories are not mutually exclusive (Serrasqueiro & Caetano, 2015).

2.1.2 Non-Traditional Theories

2.1.2.1 Zero and Conservative Leverage Theory

Capital Structure is designed based on certain policies. Among these policies, zero leverage policy and the policy of conservative debt capital structure has been increasingly adopted by firms worldwide. Strebulaev and Yang (2013) documented that the proportion of zero leverage US firms has increased from 4.3% in 1980 to 19.5% in 2009. According to Saona, Vallelado, and San Martín (2020), around 20%

of publicly listed corporations worldwide adopt zero or near-zero leverage policies. Lefebvre (2021) stated that 25% of publicly listed firms in France exhibit lower leverage ratios than the ones expected by capital structure theories. These findings challenge the validity of the conventional theories of capital structure. This section investigates the motivations and the outcomes of adopting this policy.

Several studies challenged the classical theories of capital structure. Lotfaliei (2018) suggested that unlevered firms choose this particular capital structure to enhance their prospects of debt issuance in the future. Suggesting that zero leverage structure is optimal because it reflects the flexibility and ability to issue debts and hedge the costs of debts in the future. Similarly, Wang, Xu, and Yang (2018) proved that leverage firms are the most adversely affected by downturns in the liquidity of the debt market, suggesting that unlevered firms are highly flexible to contend against market liquidity issues.

Haddad and Lotfaliei (2019) concluded that, in essence, the tradeoff theory does not controvert the zero-leverage policy. They justified their findings by arguing that the tradeoff theory has failed to consider the timing of equity issuance. The main argument is that the timing of equity issuance plays a significant role in producing zero-leverage firms. However, this view was criticized for employing certain and overstated risk-free rates in their models.

Determinants of Zero Leverage Policy involves several theories: First, Financial Constraints Theory. This theory implies that the absence of symmetric information in debt markets is crucial for firms' access to debt financing. In other words, not all firms have equal access to debts. Faulkender and Petersen (2005) proved that firms lacking access to public debt markets have significantly lower leverage than firms with access. Alternatively, firms with bond ratings were significantly highly levered in comparison to the firms without bond ratings. Similarly, Lefebvre (2021) introduced consistent evidence with the theory of financial constraints, suggesting

that young firms are more likely to be unlevered because of their limited or costly access to debt financing.

Second, Financial Flexibility. According to Marchica and Mura (2010), financial flexibility is defined as the firm's capability to make effective decisions and measures to retort the fluctuations in cash flows and urgent needs and the ability to utilize unanticipated investment opportunities. Bessler, Drobetz, Haller, and Meier (2013) suggested that unlevered firms temporarily maintain their structure to attain the desired level of financial flexibility, developing strategies to save and enhance their borrowing capacity for future investment and growth opportunities. This phenomenon has been documented in numerous markets, such as the UK, China, and 21 emerging markets (Dang, 2013; Deb & Banerjee, 2018; Iliasov & Kokoreva, 2018). Regardless of borrowing capacity, Moon, Lee, and Waggle (2015) argued that unlevered firms generate abnormal returns in the long-term horizon if they successfully control for critical factors of risk. Among these factors are firm size, market returns, and momentum. Similarly, Yasmin and Rashid (2019) analyzed a sample of Pakistani firms and concluded that zero leverage is a strategic policy for most unlevered firms. Furthermore, Bae and Chung (2022) found that unlevered firms have more chances to secure large acquisition deals in comparison to moderately leveraged firms.

However, Denis and Mihov (2003) pointed out that the credit score of a firm affects its capital structure options and decisions. Debt financing is costly for risky firms. Therefore, risky firms usually resort to equity financing, incurring higher costs of informational dilution. Theories of asymmetric information indicate that borrowing decisions rely on private information about the probability of default. In this regard, Froot, Scharfstein, and Stein (1993) concluded that since it is cheaper for firms to finance their investments with internal funds, the optimal policy is to manage their risks and be sufficient with their internally generated funds. Numerous further investigations concluded consistent results. Bessler et al.

(2013) analyzed a sample of 20 developed markets between 1988 and 2011. The results showed an ascending risk and ascending proportion of unlevered firms. They suggest the same ascending pattern to prevail in the future. Daouk and Ng (2011) documented a tight positive relationship between financial leverage and volatility asymmetry. Moreover, Lundberg and Lotfaliei (2019) suggested that unlevered capital enhances the hedging value of the option to issue debts in the future. That supports the conclusion that asset volatility is a key player in determining zero-debt decisions. Finally, Ferrão, Curto, and Gama (2016) investigated the dynamics of corporate borrowing aversion and added the financial distress factor, which implies that zero or conservative leverage policies depend on the level of risk. Alternatively, the higher the asset volatility, the higher the odds of maintaining zero leverage capital.

Third, Dividend policy. Agrawal and Jayaraman (1994) and Morais, Serrasqueiro, and Ramalho (2020) argued that firms with a low debt ratio follow a policy that allows them to attain high dividend payouts. This notion is consistent with the conclusion of (Fama & French, 2015), suggesting that highly profitable firms tend to pay a higher proportion of their profits as dividends. In addition, (Fama & French, 2015) found a negative relationship between financial leverage and dividend payout ratio. Dang (2013) demonstrated that unlevered non-dividend paying companies are relatively smaller and younger, but they have better growth potential than their counterparts. Furthermore, Byoun and Xu (2013) and Miglo (2019)argued that highly profitable, large unlevered companies are making a tremendous effort to address the agency problem of free cash flows. On the other hand, small firms with high growth potential are financially constrained and attempting to prevent the expropriation of free cash flows while trying to reserve access to equity markets. Lotfaliei (2018) suggests that dividend-paying companies can retain their optimal unlevered structure to hedge the risk of default. Accordingly, scholars suggest that unlevered firms that do not pay

dividends are financially constrained. On the contrary, unlevered companies that allocate dividends are attempting to mitigate the agency cost of free cash flows.

Fourth, Corporate governance and agency structures. Governance structures are considered a means to diminish agency problems and bridge the gap between managers' and shareholders' interests. Thus, theories view debt financing as a governance mechanism. Accordingly, governance systems are closely associated with leverage levels.

El Ghoul, Guedhami, Kwok, and Zheng (2018) used a sample of worldwide firms to investigate the relationship between cultural context and the variations in the prevalence of conservative borrowing policy among developed and developing countries. The analysis revealed that in highly conservative cultures, firms have a higher probability of being unlevered. Additionally, the anti-director rights index was utilized as a proxy for governance variable. The results showed an adverse relationship between governance quality and the adoption of conservative leverage policies. Moreover, the results indicate companies with more independent executives, larger boards, and shorter tenure of chief executive officers (CEO) are less likely to adopt conservative borrowing policies.

However, Saona et al. (2020) introduced robust results indicating that firms with efficient corporate governance can tolerate the direct and indirect costs of leverage. Conversely, firms with poor governance should maintain sub-optimal or even zero leverage ratio. Contrarily, Strebulaev and Yang (2013) revealed that the CEO ownership and tenure period have a positive impact on adopting conservative leverage policies.

Fifth, Corporate behavioral biases, firm size, and contextual characteristics. In the behavioral lens of finance, executives have numerous behavioral biases that may lead to sub-optimal decisions that lower firms’ value. (Hackbarth, 2009)

developed a model of capital structure incorporating managerial traits. The results indicate that optimistic and confident managers overestimate the expected profits of the firm. Thus, they assume that their firms are likely to be undervalued by the market. As a result, optimistic managers are discouraged from issuing debt. In alignment with Hackbarth's theory, Ebrahimi, Gupta, and Ozkan (2020) reported the same findings.

According to the Pecking-order theory, Myers (1984) suggested that small and young firms are constrained to access debt markets because they are a subject of higher information asymmetry. Several recent studies have backed the proposition of Myers by reporting a significant adverse relationship between firm size and the adoption of conservative borrowing policies. Morais et al. (2020) demonstrated that financial systems have a significant impact on financing decisions, particularly the decision to follow zero-leverage policies. Firms are more likely to be unlevered in market-based systems compared to those in bank-based systems. They reported that 16% of firms in a market-based system are unlevered firms. Whereas only 6% of firms in a bank-based system are identified as zero-leverage firms. Also, macroeconomic conditions influence capital structure decisions. Ghose and Kabra (2016) revealed that macroeconomic conditions are adversely related to the zero-debt policy in the Indian market. The same findings were reported in the UK (Dang, 2013). Conversely, Yasmin and Rashid (2019) found that the growth of GDP in Pakistan is positively related to the proportion of unlevered firms.

In summary, zero-leverage is a mysterious phenomenon that has not been documented and investigated thoroughly until the past two decades. Conventional theories of capital structure are not capable of fully explaining the expansion of this phenomenon among firms. However, recent studies have revealed numerous explanatory variables to justify the adoption of a zero-leverage policy.

2.1.2.2. Market Timing Theory

According to market timing theory, firms tend to secure the financing needed through equity when their market value is high, relative to the historical market values and book value. However, firms are more likely to repurchase their stocks when their market is low. The main aim of timing the market is to benefit from the temporary changes in the cost of equity, relative to the cost of other sources of financing.

According to the efficient market hypotheses, Modigliani and Miller (1958) that the costs of different financing sources do not vary independently, suggesting that firms cannot reduce their cost of capital by switching between debt and equity. However, under inefficient markets, it is believed that firms can enhance the shareholders' value by timing the equity markets.

Several studies investigated the importance and applicability of market timing on practical levels. A study analyzed the long-term stock returns after corporate finance decisions. The analysis revealed evidence that equity issuances were followed by low long-term-stock returns. Whereas stock repurchases were followed by high long-term stock returns. The results imply that on average, managers are successful at timing the equity market (Baker & Wurgler, 2002). In addition,Graham (2022) surveyed a wide range of Chief Financial Officers (CFOs) to document their perspective on corporate capital structure decisions. The survey results showed that the majority of CFOs believed that in a typical quarter, the stock of their company was undervalued, suggesting the prevalence of actual or perceived asymmetry of information between CFOs and investors. Ultimately, information asymmetry serves as an incentive for firms to time the equity market and rebalance the stock price. Therefore, equity valuation has a significant impact on equity issuance decisions.

However, Kayhan and Titman (2007) conducted a thorough analysis to test the results introduced by Baker and Wurgler (2002). Kayhan and Titman (2007) confirmed that historical stock prices have a significant influence on capital structure decisions. Additionally, they argued that the long-term effects of historical prices on leverage levels are exaggerated in recent research. They criticized Baker and Wurgler (2002) for using the average market-to-book ratio as a measure of market timing. They argued that the average market-to-book ratio can be explained by market timing. However, it can also be explained by other variables such as growth opportunities. Therefore, they introduced several specifications that utilize the average market-to-book ratio as an explanatory variable. The analysis revealed that the average market-to-book ratio has a statistically significant adverse impact of 1.76% on the leverage ratio. Furthermore, the persistence analysis demonstrated that the average market-to-book ratio does not have persistent effects on leverage levels. The effects are fully reversed within five years.

On the other hand, Zhao, Lee, and Yu (2019) analyzed the Chinese market. In response to previous criticism for using market timing measure that is influenced by firms' specific characteristics of capital structure, they used the change in individual securities accounts as a proxy of equity market timing (ΔINDACC), arguing that this measure is independent of firms' characteristics. The results revealed that the effects of market timing on capital structure last for over seven years in the case of Chinese firms. Therefore, they concluded that equity market timing has a significant impact on capital structure decisions.

Despite the inconsistent results in academic empirical research and the conflicts between academics and practitioners. Graham (2022) highlighted the necessity to investigate corporate decisions and their outcomes. Furthermore, he directed scholars to examine the assumptions adopted by professional practitioners to bridge the gap between literature and practice. He suggested that surveys are an

efficient approach to compile the required information that can be utilized to test and improve empirical research models.

2.2 The Impact of Capital Structure on Firms' Performance

The relationship between capital structure and financial performance, represented by profitability, cannot be overlooked as improvements in profitability are crucial for the sustainability of firms. Many scholars investigated the existence of the optimal capital structure and its role and the extent to which the integrated capital structure, the adopted theory of capital structure can influence the manufacturing firm's performance. However, inconsistent conclusions were provided.

A significant study to examine the impact of capital structure on profitability (measured by return on equity) of American service and manufacturing firms employs a sample of 272 American firms listed on the New York Stock Exchange (NYSE) for 3 years from 2005 – 2007. Empirical findings show that in both industries, the ratios of short-term debt to total assets (STD/Assets) and long-term debt to total assets (LTD/Assets) have a significant positive impact on profitability (Gill, 2011).

A study that examined the impact of capital structure on the profitability of Vietnamese companies. The study employed a sample of 300 firms for the period between 2012 and 2018. The findings indicated that there is a positive relationship between liquidity and a firm's profitability proxied by Return on Equity (ROE) and Return on Assets (ROA). The study revealed an adverse relationship between leverage and profitability, while short-term debts had a positive impact on profitability (Nguyen et al., 2023).

On one hand, some studies demonstrated a positive impact of leverage levels on the financial performance of firms. The agency cost theory implies that there is a

conflict of interest between shareholders and managers. However, despite the risk of financial distress, it is argued that increasing the level of leverage can bridge the gap between the interests of both principals. Debt can serve as a discipline mechanism for managers to pursue the best interest of the shareholders and honor the debt obligations. In addition, it is crucial to urge managers to efficiently invest the free cash flows at their discretion instead of avoiding risks and investing the free cash flows in projects with lower returns than the cost of capital. Therefore, it is argued that debt financing is an efficient motivation for managers to invest the free cash flows in projects with returns outperforming the cost of capital (Jensen, 1986).

Profitability as a financial performance indicator of success in the corporates, in an Indian study to evaluate the impact of capital structure on the profitability of 50 companies in the period from 2008 to 2017. The authors studied the individual effect of total debt and total equity ratios on profitability (ROA and ROE). In the four used regression models where models have been tested with pooled OLS, fixed effects, and random effects, a significant positive effect of capital structure on a firm's profitability was found (Singh & Bagga, 2019).

Moreover, several empirical studies show that when firms announce a change in capital formation, most transactions that increase leverage level or undermine the equity component, the stock prices witness a significant positive increase, implying a positive relationship between leverage levels and the value of firms (Dann & Mikkelson, 1984). Also, it is worth mentioning that the tax rate is one of the most decisive factors when deciding the optimal leverage levels. According to Modigliani and Miller (1963), when considering the tax advantage, the optimal capital structure for firms is to be totally levered. Similarly, Faulkender and Smith (2016), argued that as interest payments are tax-deductible, the tax reductions rising from debt issuance are considered a perpetual wealth transfer from the government to the shareholders. Accordingly, these findings indicate that regardless of the costs of bankruptcy and financial distress, higher leverage is favorable for firms' value.

Furthermore, Graham, Leary, and Roberts (2015) empirically demonstrated that the aggregate leverage ratio of US firms has grown dramatically during the past century. The aggregate leverage ratio more than tripled in 1970 in comparison to 1945. The aggregate leverage ratio surged from 11% in 1945 to approximately 35% in 1970. Similarly, in 1990, the aggregate leverage ratio exceeded the 45% threshold. Moreover, Roden and Lewellen (1995) conducted a study to investigate the association between leverage and firms' financial performance. The study revealed that the leverage ratio is positively associated with the financial performance of the selected sample. These findings were asserted by other studies with different settings, samples, and sample periods. Ghosh, Nag, and Sirmans (2000), for instance, have provided similar conclusions supporting the notion that firms with higher levels of leverage tend to perform better.

Korteweg (2010) used a panel data set of monthly debt and equity values from 1994 to 2004 to examine whether firms' values would increase in case they increased their leverage ratio. Korteweg hypothesized that firms, in general, are underlevered in comparison to the optimal leverage level at refinancing. He explained that firms are underlevered due to zero-levered companies. The study revealed that companies can benefit from adjusting their capital structure by increasing their leverage ratio up to the optimal level. One of the key findings of Korteweg's analysis is that the median company in the sample chosen can increase its market valuation by 5.5% if its leverage ratio were adjusted to the optimal level.

On the other hand, many scholars challenged the previous view and argued that leverage can enhance the performance and the value of firms when overlooking the downside of borrowing, represented by the cost of financial distress and bankruptcy.

Myers (1977) argued that despite the tax advantage accomplished by interest payments on borrowings, excessive leverage is not favorable for firms. Myers

indicated that management should be cautious of the law of diminishing returns. In other words, Myers suggested that the companies can utilize the tax advantage up until some specific threshold where they cannot borrow beyond it because the tax advantage will no longer offset the cost of financial distress. Modigliani and Miller (1963) recommended having a reserve borrowing capacity for firms to finance future projects with reasonable borrowing costs. Similarly, Myers (1977) hypothesized that the markets are efficient. Therefore, the market evaluates the companies based on the economic benefits they make for their shareholders. Thus, a firm's value is dependent on the net present value of its projects. Consequently, Myers suggests that highly levered companies that act to maximize shareholders' wealth may adopt suboptimal strategies and decisions to honor the debts issued. This argument suggests that leverage can restrict the management from implementing a prosperous future strategy to meet the debts. In other words, Myers suggests that the optimal capital structure is a trade-off between the benefits of tax reductions and the cost of pursuing suboptimal projects.

Many studies aimed to compare the benefits of high leverage to the costs of financial distress, attempting to reveal whether the benefits of tax reduction outweigh the cost of financial distress. Altman et al. (2017), and Bris et al. (2006) provided empirical evidence, implying that the direct costs of financial distress are not significant. However, they suggest that the indirect costs of financial distress are more significant than the direct ones.

Gilson, John, and Lang (1990), Gilson (1997), and Betker (1997) attempted to measure the direct costs of financial distress, which are administrative and legal fees associated with bankruptcy. This strand of literature revealed that the direct costs range between 2% to 5% of the firm's market value pre-bankruptcy. Despite the difficulty of capturing and quantifying the indirect financial distress costs, some authors considered these costs as the opportunity loss of sales, which can be

measured by comparing the industry sales to the distressed firm's sales (Altman, 1984; Pindado et al., 2006).

Opler and Titman (1994) suggested that the opportunity loss of sales and the excessive cost of debt induced by financial distress are critical to firms' performance. They also suggest that the cost of financial distress is positively associated with the leverage ratio. Similarly, Salim and Yadav (2012) used a sample of 237 publicly listed companies in Malaysia to investigate the relationship between leverage levels and firms' performance. The analysis revealed that when using the ROA or ROE to measure firms' performance, the leverage ratio is inversely associated with firms' performance. However, when using Tobin's Q as an indicator of firms' performance, the analysis shows a positive relationship. Furthermore, Gleason, Mathur, and Mathur (2000) conducted a thorough analysis using a sample consisting of 14 countries. The analysis documented a negative relationship between leverage and firms' performance. The authors argued that the main reason firms tend to adopt higher leverage than optimal is due to the agency problem.

However, numerous authors investigated the reverse causality of firms' performance impact on capital structure formation decisions. Berger and Bonaccorsi di Patti (2006) discussed and tested two hypotheses of reverse causality from efficiency to capital structure. The efficiency-risk hypothesis implies that firms with high-profit efficiency seek higher leverage, relying on their efficiency to offset the risk of bankruptcy. Conversely, the franchise-value hypothesis implies that high-profit efficiency firms prefer having conservative capital structures with high equity proportions, shielding their efficient assets from the expected costs of bankruptcy. Their tests revealed that neither one of the hypotheses has domination over the other. However, Margariti and Psillaki (2010) tested both hypotheses and revealed that high-profit efficiency firms prefer higher leverage since they expect lower costs of financial distress. Jeremias (2008) demonstrated that the impact of capital structure on firms' financial performance is dependent on several factors, such as

firm size, competitive intensity, and business operation strategy. The tests confirmed that firms adopting a product differentiation strategy suffer from higher cost of debt than firms with a cost-leadership strategy. Furthermore, they implied that small-cap firms have a positive association between leverage levels and financial performance, whereas big companies showed an inverse relationship.

However, the association between capital structure and the financial performance of firms is not confirmed. So far, extant studies have confirmed that this association depends on several variables, including geographic location, industry, firm size, and business strategy. Therefore, it is critical to examine whether the optimal leverage level exists for the manufacturing firms in the US market for the reasons aforementioned in the introduction section. It is also crucial to determine the type of relationship if proven to exist. Finally, it is important to detect the significant determinants of capital structure for the selected market of this study.

2.3 Inter-Industry Divergence in Capital Structure

The topic of capital structure has been thoroughly and consistently researched in academic literature. Plenty of studies and theories were introduced to address the puzzle of capital structure via different lenses. Also, it is evident that capital structure targets and optimal ranges vary across different industries. However, industry-specific characteristics that shape capital structure decisions are a crucial aspect that is not adequately researched. More importantly, investigating the impact of leverage on the financial performance of firms across different industries and markets is key to building a structured understanding of the applicability of various theories (Daskalakis, Kakavas, & Missiakoulis, 2023).

Balakrishnan and Fox (1993) argued that the industry is not a significant factor compared to the firm-specific characteristics when determining the capital structure. Kayo and Kimura (2011) examined the impact of industry determinants

on capital structure and found that 12% of leverage variance is explained by industry determinants. Similarly, Coleman (2006) revealed that the industry is not a key determinant of small and mid-sized firms' financial leverage. Instead, she suggested that the size, age, profitability, and asset structure are significant determinants of capital structure.

On the other hand, M Harris and Raviv (1990) and Jordan, Lowe, and Taylor (1997) argued that firms within an industry share more similarities in their capital structure than firms in other industries. Similarly, MacKay and Phillips (2005) examined the variation in leverage levels for competitive and concentrated industries. The analysis revealed that, in concentrated industries, firms rely on debt financing more than those in competitive industries. Also, they documented that industry-related factors significantly impact capital structure decisions. Sinha (1993) analyzed the average leverage ratios of 23 industries in India to determine the most significant factors influencing capital structure patterns. The analysis showed that profitability and asset type are significant explanatory variables for the relationship examined. Talberg, Winge, Frydenberg, and Westgaard (2008) examined the capital structure of firms across several industries in the US market, using independent industry analysis to investigate the causality of the results. They concluded that firms across different industries exhibit a substantial difference in their capital structure. In addition, they found a significant difference in explanatory variables across the industries examined. Daskalakis et al. (2023) examined the marginal effects of profitability, size, asset tangibility, and liquidity on the capital structure of manufacturing, commerce, services, and tourism firms. They revealed that the difference among industries is statistically significant.

3. Data and Methodology

The empirical analysis employs data on publicly listed manufacturing firms in the US. Those firms are listed in the National Association of Securities Dealers Automatic Quotation System (NASDAQ) and New York Stock Exchange (NYSE) markets to observe the impact of capital structure on the financial performance of the manufacturing firms. The sample period studied is from 2003 to 2023. The thesis employs a longitudinal dataset to ensure accurate and comprehensive results by isolating the impact of macroeconomic and industrial fluctuations. The original sample consists of 16,218 firms, including 6,872 firms listed in NASDAQ and 9,346 firms listed in NYSE. However, firms with missing data were eliminated entirely from the dataset. After filtering for missing data and duplicates, the final dataset consists of 641 firms observed over 21 years. Therefore, the final dataset consists of 13,461 firm-year observations formatted as a cross-sectional panel dataset.

OLS Regression model is used to analyze firms' performance as a dependent variable, the financial leverage as the main explanatory variable, in addition to other control variables.

3.1 Measuring Firm Performance

Firm performance is measured by return on assets (ROA) in one test and by Tobin's Q as a robustness test. The ROA is calculated as net income divided by total assets. Tobin's Q is calculated as the total market value divided by the total assets for each company.

3.2 Capital structure

Capital structure or financial leverage is calculated as the total debt over total assets.

3.3 Control Variables

To test the first hypothesis, the main independent variable used is the leverage ratio. Other control variables used are the log of total assets, the log of market value, the log of retained earnings, working capital, assets growth, and sales growth. Logged control variables are employed to address the normality and Heteroscedasticity issues. However, to test the second and third hypotheses, the same control variables are used.

Using the total assets as a control variable is crucial to explain how asset management can impact financial performance. Also, controlling for the market value when investigating the dynamics and impacts of leverage on financial performance is essential as it provides an indicator of the firm's operational and financial current state and prospects. Furthermore, controlling for the working capital aims to control for firms' short-term liquidity to honor the short-term financial obligations. Similarly, controlling for the retained earnings provides useful insights about the cumulative financial performance during the past. It also indicates whether a firm can guarantee sufficient internal financing for projects and operations. In a critical study, Rajan and Zingales (1995) revealed that factors such as growth and size are crucial determinants of firms' performance and capital structure decisions. Sales growth is crucial to attain and maintain better financial performance, establishing more investors' confidence to achieve even better performance. In addition, controlling for asset growth addresses whether the assets and projects expansion has an impact on the performance. Finally, the interaction between leverage and total assets is included in the analysis to test

whether the leverage impact on the performance varies between firms with different firm sizes.

3.4 Models

3.4.1. Financial performance and leverage:

To investigate the impact of capital structure on firms' performance, the following regression model is used as the main test:

$$ROA = \beta 0 + \beta 1 LEVi,t + \beta 2 ASSETSi,t + \beta 3 MV,i,t + \beta 4 REi,t + \beta 5\, WC\ i,t + \beta 6 AGi,t + \beta 7 SGi,t + \beta 8\, SALESi,t + \beta 9 LEVi,t * ASSETS\ i,t + \varepsilon i,t \quad (1)$$

The following model is used as a robustness test for the impact of capital structure on financial performance by substituting the financial performance measure:

$$T'Q = \beta 0 + \beta 1 LEVi,t + \beta 2 ASSETSi,t + \beta 3 MV,i,t + \beta 4 REi,t + \beta 5\, WC\ i,t + \beta 6 AGi,t + \beta 7 SGi,t + \beta 8\, SALESi,t + \beta 9 LEVi,t * ASSETS\ i,t + \varepsilon i,t \quad (2)$$

Where,

ROA: Return on Assets (net income/ total assets)

T'Q: Tobin's Q (total market value/total assets)

LEV i,t : leverage ratio (total debt/total assets) for firm i at time t

ASSETS i,t : the natural logarithm of total assets for firm i at time t

SALES i,t : the natural logarithm of total sales for firm i at time t

MV i,t : the natural logarithm of total market value for firm i at time t

RE i,t : the natural logarithm of retained earnings for firm i at time t

WC i,t : working capital for firm i at time t

AG i,t : assets growth for firm i at time t

SG i,t : sales growth for firm i at time t

LEV i,t *ASSETS i,t : an interaction term between leverage and the log of total assets for firm i at time t

εi,t: the error term.

3.4.2. Firm performance and financial leverage during economic downturns

This study also investigates whether the leverage level has a different impact on firms' financial performance during economic downturns, particularly, during recession periods. Recession indicator data are obtained from the Federal Reserve Economic Data in terms of percentage points with monthly frequency.
To examine the varying impacts of leverage on financial performance, a dummy variable (Recession Dummy) is exhibited, where the Recession Dummy takes a value of 1 when the annual average for the recession indicator exceeds a hundred base points and 0 otherwise. Hence, the regression models used for this test are:

$$ROA = \beta 0 + \beta 1 LEVi,t + \beta 2 ASSETSi,t + \beta 3 MV,i,t + \beta 4 REi,t + \beta 5\, WCi,t + \beta 6\, AGi,t + \beta 7 SGi,t + \beta 8 RECESSION\ DUMMY + \beta 9 RECESSION\ DUMMY * LEV + \varepsilon i,t \quad (3)$$

$$T'Q = \beta 0 + \beta 1 LEVi,t + \beta 2 ASSETSi,t + \beta 3 MV,i,t + \beta 4 REi,t + \beta 5\, WCi,t + \beta 6\, AGi,t + \beta 7 SGi,t + \beta 8 RECESSION\ DUMMY + \beta 9 RECESSION\ DUMMY * LEV + \varepsilon i,t \quad (4)$$

3.4.3. Highly levered and low levered firms' performance

This thesis investigates whether there is a significant difference between the financial efficiency of highly levered and zero or near zero leverage firms. The highest average of leverage in the data sample is 60.5%, whereas the lowest average is zero. There are 12 firms with zero leverage ratios during all the years observed, 95 firms with leverage ratios below 10%, and 59 firms with leverage

ratios over 45%. To address that concern, two dummy variables are introduced. The first dummy variable Dummy (Low Leverage) takes a value of one when the average leverage level during the sample period (2003-2023) is below 10% and zero otherwise. The second dummy variable Dummy (High Leverage) takes a value of one when the average leverage level exceeds 45%. Hence, the following model is used once with Dummy (Low Leverage) and once with Dummy (High Leverage) to have a comparison between both outcomes:

$$ROA = \beta 0 + \beta 1 LEVi, t + \beta 2 ASSETSi, t + \beta 3 MV, i, t + \beta 4 REi, t + \beta 5\, WCi, t + \beta 6 AGi, t + \beta 7\, SGi, t + \beta 8\, DUMMY(LEV) + \varepsilon i \quad (5)$$

4. Empirical Results

4.1. Descriptive Statistics

Table 1. Descriptive Statistics

The table shows descriptive statistics for the main variables used in the analysis. The financial performance is measured by Return on Assets (ROA) and Tobin's Q financial ratio (T'Q). ROA is calculated by dividing the net income by the total assets. T'Q is measured by dividing the market value by the total assets. Leverage is calculated by dividing the total debt by the total assets. Market Value is denoted by (MV), which is the total market capitalization. Retained Earnings denoted by (RE). Finally, Working Capital (WC) is an indicator of firms' liquidity.

	ROA	*T'Q*	*LEVERAGE*	*ASSETS*	*MV*	*RE*	*SALES*	*WC*
Mean	5,789734789	1,402030889	0,233477965	14606580,26	17564,40972	4693067,321	9940591,983	1045375,773
Standard Error	0,107422535	0,013058902	0,001343054	358461,7483	654,1306957	165038,1288	265849,5188	53289,82254
Median	6,12	1,011520407	0,23520857	2646500	2500,23	594556	2247047	250849
Mode	6,03	1,77543755	0	553185	264,21	0	0	448000
Std. Deviation	12,46332898	1,515114002	0,155823215	41589287,55	75893,25704	19147979,47	30844273,16	6182767,795
	155,3345694	2,295570439	0,024280874	1,72967E+15	5759786464	3,66645E+14	9,51369E+14	3,82266E+13

	ROA	*T'Q*	*LEVERAGE*	*ASSETS*	*MV*	*RE*	*SALES*	*WC*
Sample Variance								
Kurtosis	853,160381	148,052872	0,367142272	102,0782991	705,6689756	212,4314491	122,1194745	815,1163463
Skewness	17,73146109	7,290689298	0,294217433	8,297994802	22,18713035	12,20292188	9,430795274	16,13014872
Range	793,86	48,08719552	0,812422296	797767200	2994368,35	485041000	648125000	439884000
Minimum	-675,89	0,000690464	0	1800	2,65	-31114000	0	-149782000
Maximum	117,97	48,08788599	0,812422296	797769000	2994371	453927000	648125000	290102000
Sum	77935,62	18872,73779	3142,846893	1,96619E+11	236434519,2	63173379202	1,3381E+11	14071803278
Count	13461	13461	13461	13461	13461	13461	13461	13461

4.2 Regression Results

Table 2. Firm Performance and Financial Leverage

The analysis uses a main model where the Return on Assets is the dependent variable. The ROA is substituted for robustness with a different performance measure, Tobin's Q (T'Q). The ROA is calculated by dividing the net income by the total assets. T'Q is calculated by dividing the market value by the total assets. The main independent variable in the analysis is the Leverage. However, control variables are the natural logarithm of Assets, Market Value, Sales, and Retained Earnings. In addition to Working Capital, Sales Growth, Assets Growth, and an interaction term between the leverage and assets.
Panel A exhibits the relationship between financial leverage and financial performance, as measured by Return on Assets (ROA). Panel B exhibits a robustness test to examine the relationship between leverage and financial performance as measured by Tobin's Q.

Variable	Coefficient	t-Statistic	Prob.
Panel A			
C	27.49352	31.74886	0.0000
LEVERAGE	-7.556955	-2.451729	0.0142
ASSETS	-12.28319	-43.31792	0.0000
MARKET VALUE	7.993815	49.16322	0.0000
SALES	2.819075	13.07109	0.0000
RETAINED EARNINGS	2.203731	13.77573	0.0000
WORKING CAPITAL	2.32E-08	2.717206	0.0066
ASSETS GROWTH	3.362479	14.86773	0.0000
SALES GROWTH	2.812956	17.64944	0.0000
LEVERAGE*LOG.ASSETS	1.004307	2.113026	0.0346
R-squared	0.331224		
Adjusted R-squared	0.330677		

Variable	Coefficient	t-Statistic	Prob.
Panel B			
C	10.38031	86.34397	0.0000
LEVERAGE	-2.450758	-5.727302	0.0000
ASSETS	-2.706792	-68.75994	0.0000
MARKET VALUE	2.768146	122.6307	0.0000
SALES	-0.078949	-2.636796	0.0084
RETAINED EARNINGS	-0.092216	-4.152295	0.0000
WORKING CAPITAL	6.65E-09	5.597973	0.0000
ASSETS GROWTH	0.066136	2.106443	0.0352
SALES GROWTH	0.140098	6.331742	0.0000
LEVERAGE*LOG.ASSETS	0.335807	5.089228	0.0000
R-squared	0.633062		
Adjusted R-squared	0.632762		

Panel A represents the relationship between leverage levels and financial performance, as measured by Return on Assets (ROA). The results show a significant positive impact of leverage on firms' financial performance. The coefficient for the leverage variable is -7.56 and it is statistically significant at a p-value of 1%. Therefore, there is strong evidence that leverage has a negative impact on corporate performance. The coefficient suggests that when leverage increases by one unit, it is expected that the ROA will decrease by 7.56%. This result is statistically and economically significant. However, all other control variables are statistically significant, which demonstrates that the impact of leverage on financial performance is not a straightforward relationship. Conversely, this relationship is determined by several other factors, such as firm size, type of assets, industry, sales and assets growth, liquidity, and retained earnings. The results reveal a negative association between the amount of assets and financial performance, which can be a surprising finding. However, this coefficient

needs thorough investigation because it can provide a misleading conclusion if the asset type, business models, and industries are not taken into consideration.

Market value has a significant positive impact on the corporate performance. Additionally, working capital and retained earnings also significantly positively influence financial performance, implying that firms with higher liquidity and the capability of providing internal financing tend to perform better than their counterparts. Furthermore, firms with higher sales and asset growth perform significantly better than their counterparts. Finally, the interaction term between leverage and the assets provides an insight that larger firms, as measured by their total assets, tend to have more advantages of using leverage than smaller firms. Panel B represents a robustness test by substituting the Return on Assets (ROA) with Tobin's Q as a measure of financial performance. The results shown in the robustness test confirm the findings of the main model to a large extent. The negative relationship between leverage and a firm's performance holds under the alternative model. The coefficient of the leverage variable is -2.45 and it is statistically significant at the zero level. However, the retained earnings had a positive impact using the original test, while it has a slight negative impact on Tobin's Q. Also, asset growth has a positive impact on the performance using both models. The reason behind this divergence can be the fact that ROA is concerned with the profitability relative to total assets while Tobin's Q is concerned with the market valuation relative to the assets. Hence, the retained earnings might have a different association with these two dependent variables as the investors might not consider the retained earnings of a firm when evaluating its market value. Furthermore, according to the interaction term, it is evident that larger firms tend to have an advantage of issuing debt, compared to smaller firms.

Table 3. The Impact of Recession on the Relationship between Leverage and Performance

The analysis uses a main model where the Return on Assets is the dependent variable. The ROA is substituted for robustness with a different performance measure, Tobin's Q (T'Q). The ROA is calculated by dividing the net income by the total assets. T'Q is calculated by dividing the market value by the total assets. The main independent variable in the analysis is the Leverage. However, control variables are the natural logarithm of Assets, Market Value, and Retained Earnings. In addition to Working Capital, Sales Growth, Assets Growth, an interaction term between the leverage and Market Value, and a Dummy Variable that takes the value of one when the annual average for the recession indicator exceeds a hundred base points and 0 otherwise, according to the Federal Reserve Economic Data.
Panel A exhibits the relationship between financial leverage and performance, as measured by Return on Assets (ROA) during recession periods. Panel B exhibits a robustness test to examine the relationship between leverage and financial performance as measured by Tobin's Q during recession periods.

Variable	Coefficient	t-Statistic	Prob.
Panel A			
C	28.26497	44.32933	0.0000
LEVERAGE	-1.748350	-3.678705	0.0002
ASSETS	-9.998614	-49.02541	0.0000
MARKET VALUE	8.057575	49.31402	0.0000
RETAINED EARNINGS	2.607361	16.49190	0.0000
WORKING CAPITAL	2.39E-08	2.781156	0.0054
ASSET GROWTH	3.111190	13.71478	0.0000
SALES GROWTH	2.969558	18.54653	0.0000
RECESSION DUMMY	0.315842	1.102966	0.2701
RECESSION DUMMY*LEVERAGE	-0.269391	-0.258024	0.7964
R-squared	0.321108		
Adjusted R-squared	0.320553		

Variable	Coefficient	t-Statistic	Prob.
Panel B			
C	9.898301	112.4806	0.0000
LEVERAGE	-0.277468	-4.230123	0.0000
ASSETS	-2.697743	-95.84206	0.0000
MARKET VALUE	2.774678	123.0418	0.0000
RETAINED EARNINGS	-0.107028	-4.905025	0.0000
WORKING CAPITAL	6.15E-09	5.186047	0.0000
ASSETS GROWTH	0.066896	2.136664	0.0326
SALES GROWTH	0.134024	6.064944	0.0000
RECESSION DUMMY	0.003774	0.095489	0.9239
RECESSION DUMMY*LEVERAGE	0.046432	0.322235	0.7473
R-squared	0.631808		
Adjusted R-squared	0.631507		

Panel A represents the relationship between leverage and firms' performance as measured by Return on Assets (ROA) during recession periods. Recession is exhibited in the analysis as a dummy variable (Recession Dummy), that takes the value of one when the annual average for the recession indicator exceeds a hundred base points and 0 otherwise, according to the Federal Reserve Economic Data.

Panel B represents a robustness test by substituting the Return on Assets (ROA) with Tobin's-Q as a financial performance measure. Both tests show that leverage levels do not impact firms' performance during economic recessions. As the Recession Dummy and the interaction term between Recession Dummy and Leverage have insignificant p-values, there is no evidence that the debt level can impact the firms' performance during a recession. This result is not necessarily profound because the measure used for recession might not be efficient. Using another measure or proxy for recession might yield into different and significant results. However, the results of this test are consistent with the main test. The leverage variable has a significant negative

coefficient in both tests. Moreover, all other control variables are consistent with the previous test's results and are all statistically significant.

Table 4. The performance of High vs Low levered firms

The analysis uses a main model where the Return on Assets is the dependent variable. The main independent variable in the analysis is the Leverage. However, control variables are the natural logarithm of Assets, Sales, Market Value, and Retained Earnings. In addition to Working Capital, Sales Growth, Assets Growth, and two Dummy Variables. Dummy (Low Leverage) takes a value of one when a firm has a leverage level below 10% and 0 otherwise. Dummy (High Leverage) takes a value of 1 when a firm has a leverage level over 45% and 0 otherwise. There are 12 firms with zero leverage ratios during all the years observed, 95 firms with leverage ratios below 10%, and 59 firms with leverage ratios over 45%. Panel A tests the impact of financial leverage on the financial performance of low-levered firms, as measured by Return on Assets (ROA). tests the impact of financial leverage on the financial performance of high-levered firms, as measured by Return on Assets (ROA)

Variable	Coefficient	t-Statistic	Prob.
Panel A			
C	26.34464	38.57357	0.0000
LEVERAGE	-1.140033	-2.300494	0.0214
ASSETS	-12.05768	-47.03648	0.0000
SALES	2.793564	13.05049	0.0000
MARKET VALUE	8.004105	49.18189	0.0000
RETAINED EARNINGS	2.190030	13.68270	0.0000
WORKING CAPITAL	2.19E-08	2.561710	0.0104
ASSETS GROWTH	3.373894	14.93004	0.0000
SALES GROWTH	2.808210	17.62623	0.0000
DUMMY (LOW LEVERAGE)	0.120890	0.530729	0.5956
LEVERAGE*DUMMY (LOW LEVERAGE)	-7.888724	-3.438827	0.0006
R-squared	0.331830		
Adjusted R-squared	0.331223		

Variable	Coefficient	t-Statistic	Prob.
Panel B			
C	26.48882	40.78791	0.0000
LEVERAGE	-2.470197	-5.187255	0.0000
ASSETS			
	-11.96025	-46.76961	0.0000
SALES	2.686349	12.65841	0.0000
MARKET VALUE	8.044320	49.73695	0.0000
RETAINED EARNINGS	2.180298	13.66971	0.0000
WORKING CAPITAL	2.00E-08	2.351254	0.0187
ASSETS GROWTH	3.386555	15.03830	0.0000
SALES GROWTH	2.795480	17.59548	0.0000
DUMMY (HIGH LEVERAGE)	2.620553	2.108032	0.0351
LEVERAGE*DUMMY (HIGH LEVERAGE)	0.091516	0.036846	0.9706
R-squared	0.335614		
Adjusted R-squared	0.335011		

In Panel A, the Dummy (Low Leverage) is not statistically significant. Hence, there is no evidence that low-levered firms perform better or worse than their counterparts with high debt levels. However, the interaction term between the Leverage and Dummy (Low Leverage) is significantly negative. Therefore, higher debt has a significant negative relationship with the performance of conservatively levered firms.

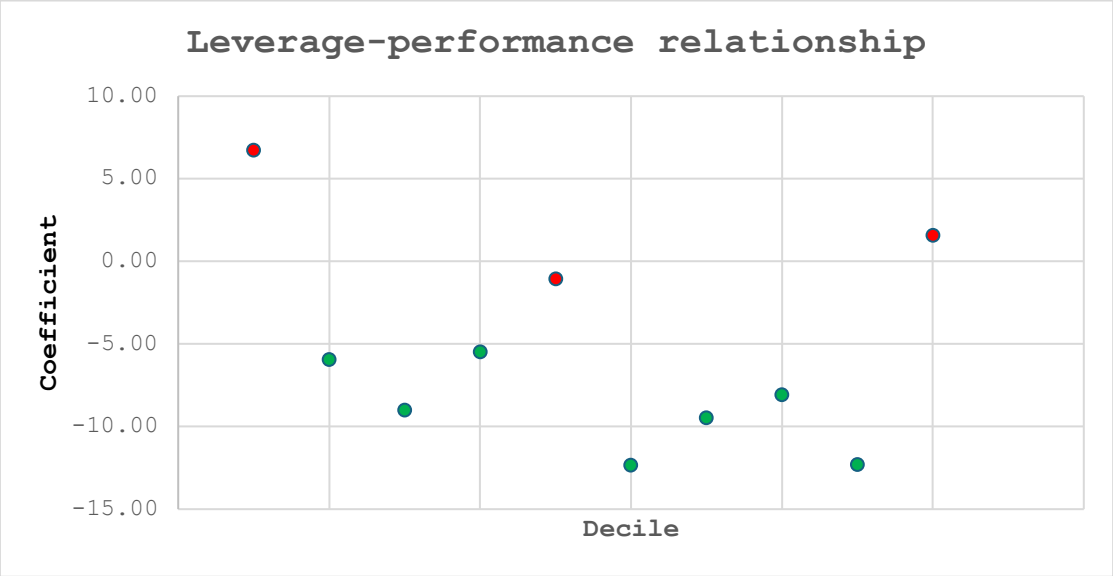
On the other hand, the Dummy (High Leverage) in Panel B is positively significant at the level of 3.5%. Hence, highly levered firms perform better than conservatively levered firms by 2.62% more Return on Assets (ROA). However, the interaction between leverage and Dummy (High Leverage) does not provide evidence on whether more debt can improve the performance amongst highly levered firms. More importantly, in both panels, the coefficient of leverage is significantly negatively associated with

corporate performance. It is worth noting that the leverage impact on firms' performance is more significant in the case of highly levered firms than it is for low levered firms. In panel B, the leverage coefficient is -2.47 and it is significant at the level of 0% whereas the coefficient is -1.14 and it is significant at the level of 2%. That indicates that highly levered firms are more significantly negatively influenced by leverage than their low levered counterparts.

However, in both panels, after adding the dummy variables to both models, the coefficient of leverage remained negative and statistically significant. Therefore, the negative impact of leverage on corporate performance is consistent and robust. The negative impact of leverage on ROA seems to contradict the result that Dummy (High Leverage) provides. Dummy (High Leverage) indicates that firms with higher leverage, on average, perform better than conservatively levered firms. Whereas the continuous leverage variable is significantly negative, implying that the lower the leverage, the better the performance is. However, this divergence in results can be due to the non-linear relationship between leverage and firm performance. In other words, highly levered firms tend to have lower ROA within a certain threshold. However, firms that exceed this threshold tend to take advantage of the high leverage levels to attain better performance. Test results demonstrate that the trade-off theory holds for highly levered firms. Highly levered firms seem as they benefit from the tax shield while mitigating the risks of financial distress. On the other hand, conservatively levered firms encounter restraints represented by higher costs of debt and financial distress. Moreover, after adding the dummy variables and interaction terms, the control variables remained significant and had the same impact on firm performance as revealed in the first main test.

Figure 1. The Impact of leverage on Corporate Performance

Figure 1 Exhibits the impact of leverage on corporate performance across varying levels of firms' leverage by segregating the sample into 10 deciles based on leverage levels. Each scatter plot exhibits the relationship amongst a certain leverage decile. The dataset consists of 640 firms observed over 21 years. Each decile represents 64 companies. Each scatter plot represents the leverage coefficient, where red plots represent a statistically non-significant coefficient, and green plots represent statistically significant coefficients at the level of 5%.



The purpose of segregating firms into deciles based on leverage levels is to examine whether the impact of leverage is constant on highly and low levered firms and whether increasing the debt financing has a linear impact on financial performance. As shown in the figure, generally, there is significant evidence that leverage has a negative impact on corporate performance across 7 firm-leverage deciles. However, there is no significant evidence that leverage has a positive impact on any firm-leverage decile group, as displayed by the red plots in the chart. Furthermore, the figure confirms the notion that the relationship between leverage and performance is non-linear and varies between firm-leverage deciles. Finally, the scatter graph shows that the relationship between leverage and performance is nuanced and does not follow a specific single trendline.

5. Conclusion

This paper investigates the relationship between the capital structure and firm's performance amongst manufacturing firms in the US market. The relationship between leverage and firms' performance is thoroughly addressed and researched. However, extant empirical analysis provided conflicting results. For instance, Shaferi et al. (2019) investigated whether the leverage level impacts manufacturing firms differently than it impacts service firms. The authors concluded that leverage significantly negatively impacts the firms' performance for both industries. However, they found evidence that leverage has a stronger impact on manufacturing firms. In addition, Amed et al. (2024) used the return on assets (ROA) and return on equity (ROE) to test the impact of leverage on firms' performance and the results revealed a significant negative impact of leverage on ROA, whereas the leverage has a significant positive impact on ROE. Furthermore, Gleason et al (2000) used data from retail firms in 14 European countries and found a negative impact of leverage on financial performance. In this context, a tremendous number of studies suggested that debt financing is advantageous for firms' performance, whereas other studies revealed counter results and arguments. Besides, plenty of studies revealed that there are several determinants of capital structure, such as firm size, asset's structure, industry, growth prospects, and firm age, amongst other determinants. Barclay and Smith (1999) argued that there is no model capable of measuring many variables that can determine the optimal capital structure.

This paper aims to include various variables that can impact corporate performance and be profound determinants of capital structure in the analysis to provide an understanding of the leverage impact on the financial performance considering several factors, such as firm size, growth, and liquidity. In addition, this paper explores the impact of capital structure on the financial performance of manufacturing firms by including several control variables to yield findings that can be generalized to firms that are different in size, growth, and liquidity.

The empirical analysis reveals that leverage has a negative impact on manufacturing firms' performance. Therefore, relying heavily on debt financing can undermine the financial performance of firms. This result is robust through two tests, using the ROA and Tobin's Q as parameters to measure firms' performance.
In addition, the analysis revealed no evidence that recession has a significant impact on firm performance. Also, the results do not provide evidence that recession has a different impact on firms' performance based on their leverage levels.

Moreover, the analysis revealed evidence that conservatively levered firms perform better than highly levered ones. However, testing whether more or less leverage is better for highly and conservatively levered firms revealed strong evidence that lower debt levels for conservatively levered firms are associated with better performance. Whereas the results do not provide significant evidence of whether highly levered firms can optimize their performance by increasing or decreasing the debt levels in their capital structure. Finally, the analysis demonstrated that control variables have a significant impact on the financial performance alongside the capital structure. The results reveal that sales, market value, retained earnings, working capital, and asset and sales growth are associated with better corporate performance. That demonstrates that firm performance significantly depends on liquidity, solvency, growth, and the capability of internal funding.

The relationship between leverage and performance is non-linear. Test results revealed that the main relationship between leverage and firm performance is an inverse relationship. Whereas highly levered firms appear to utilize issuing more debt to attain better performance parameters as implied by the coefficient of the Dummy High Leverage in Table 4. The divergence probably indicates that low-levered firms have low risks and low returns, which creates a challenge for these firms to attract investors to secure a low cost of capital necessary to obtain profits and growth. On the other hand, highly levered firms can use more debt while enhancing their performance by

efficiently managing the risks of financial distress and maintaining a satisfying risk-return profile as perceived by the market.

That confirms that the relationship between capital structure and corporate performance is non-linear. Rather, the relationship can be clustered because one generic rule does not correspond with all firms' clusters and sub-groups. Additionally, capital structure cannot be generally addressed for all firms. Rather, each firm has its unique financial and operation environment that significantly affects its performance. Therefore, the optimal capital structure should be determined for each firm in a manner that creates an equilibrium between the advantages and disadvantages of debt financing. Alternatively, firms should structure their capital to attain the optimal risk-return level while maintaining an optimal cost of debt and financial distress. Otherwise, firms are unlikely to utilize the tax shield to enhance financial results.

These results provide an understanding that the relationship between capital structure is very nuanced and reinforces the question of whether optimal capital structure exists and whether it can apply to all firms within several industries and economies, regardless of firm-specific characteristics.

However, the results suggest that leverage has a significant negative impact on corporate performance. Also, leverage has a more statistically negative influence on the performance of highly levered firms. Hence, results provide practical implications for investors and corporate management. According to the findings of this paper, an investor would avoid investing in highly levered firms or allocate less weight for such companies in his portfolio because leverage undermines firms’ profitability and financial flexibility. Finally, corporate management is urged to analyze the risks of issuing debt and assess its implications on performance and business risk level.

6. Limitations and Recommendations

This thesis tested whether leverage has an impact on the financial performance of manufacturing firms, whether leverage has a different impact on firms during recessions, and whether leverage has a different impact on highly levered firms compared to conservatively levered firms. The tests were conducted using a longitudinal cross-sectional data set. All the variables required to perform the test are available. Tests were successful and they mainly provided significant results that align with the extant literature.

However, based on the nuanced relationship between leverage and firms' performance, it is recommended to perform industrial and sectoral analysis to discover how leverage has a different impact on different sectors. For instance, leverage can have a different impact on firms operating in oil and gas than firms operating in manufacturing Information Technology (IT) products. Also, it is recommended to do the comparison analysis on a wide scale of sectors and among multiple markets to provide an extensive understanding of what factors impact leverage-performance relationships the most and whether the impact of leverage is similar across different countries, industries, and firm-size categories.

Finally, when testing whether leverage has a varying impact on highly and low levered firms' performance, the recession indicator of Federal Reserve Economic Data might not be the best indicator of recession. Therefore, it might not provide accurate results. Using the Gross Domestic Product (GDP) growth as a measure of recession is recommended, where a decline in GDP for two subsequent years is considered a strong indicator of recession.

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