A Review of Empirical Capital Structure Research in Different Industries

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Abstract. The choice of capital structure is an important aspect of a firm's financial decision-making, and the differences between industries make it challenging for firms to develop a capital structure strategy. The right capital structure is critical to a firm's financial position, competitiveness, risk management, and strategic development. Existing capital structure theories provide different perspectives to understand the choice and impact of a firm's capital structure. However, the proposed assumptions are all ideal and irrational, differing significantly from the real capital market situation. By reviewing existing empirical research, this paper aims to analyze the variability of corporate capital structure choices under different industries and the influencing factors behind them. Based on the analysis of industry-specific factors affecting capital structure choices, industries are broadly categorized into three major groups: capital-intensive industries, labor-intensive industries, and innovative industries. Through case studies and empirical research on each industry, it explores how different industries' unique economic and operational characteristics shape enterprises' strategic choices in capital structure.

Keywords: Capital Structure, Financial Decision-Making, Empirical Evidence.

1. Introduction

The capital structure of a company is how it finances and manages its assets and liabilities. It consists of two main components: debt capital and equity capital. Debt capital is money raised through borrowing, which requires interest payment and has a fixed repayment period. Equity capital is money raised through the issuance of shares, which does not require the payment of fixed interest but entitles shareholders to share in profits and participate in decision-making. A company's capital structure is determined by the debt-to-equity ratio and significantly impacts the company's economic health and competitiveness.

For example, Huawei is a Fortune 500 company that is not publicly traded. Its founders and executive team, key employees, and others hold the majority of the equity. This capital structure brings a number of advantages, such as centralizing decision-making power, helping to focus on the goal of long-term technological R&D and innovation, and protecting the privacy of corporate development. It aligns with Huawei's development goals as a technology-based company and is conducive to its stable and healthy development. Another example is PricewaterhouseCoopers (PwC), one of the world's Big Four accounting firms, which is a partnership of partners and is also not listed. This partnership system helps maintain a high degree of professionalism, independence and long-term client relationships. It aligns with the nature of the professional services industry to maintain high quality growth in the long term.

The appropriate capital structure is critical to a firm's financial position, competitiveness, risk management and strategic development. It can help the company reduce financing costs, improve profitability and ensure that it can maintain financial stability in an unstable economic environment. Therefore, it is crucial to construct an optimized capital structure for the company.

However, industry differences make firms face various opportunities and challenges in developing capital structure strategies. By reviewing existing empirical research papers, this paper analyzes the commonalities and differences in capital structure choices among different industries based on the analysis of industry-specific factors affecting capital structure choices. This paper broadly classifies

industries into three categories: capital-intensive industries, labor-intensive industries, and innovative industries, to improve the understanding of corporate financial decision-making.

2. Theoretical Basis

MM Theorem is the capital structure theory that was first proposed in 1958 by French economist Modigliani and American economist Miller [1]. The theorem asserts that in the absence of taxes, bankruptcy costs, and information asymmetry, a firm's capital structure will not affect its total value. It separates the value of a firm from its capital structure and argues that the value of a firm depends only on its operating assets. At the same time, it provides a new idea, because in the real economic environment, tax, bankruptcy cost, and information asymmetry always exist, so the value of the company and the period of the capital structure are closely related. Therefore, the value of a company is closely related to its term capital structure. Following this new idea, many economists carried out a series of further thinking and expansion of the MM theorem, trying to research more in line with the reality of the economic environment of the universal theory. In 1963, Modigliani and Miller amended the theory [2]. Since the interest cost of debt is expensed before tax, the cost of debt financing is lower than that of equity financing. Therefore, the value of the enterprise is positively correlated with the proportion of debt financing. This was the early stage of the Trade-off theory. The main idea of the trade-off theory is that a company needs to weigh debt and equity when choosing a capital structure, emphasizing that a company needs to consider both the tax advantages of debt and the flexibility of equity when weighing different capital structure options.

Pecking Order Theory was proposed by Myers and Majluf in 1984 and emphasizes the impact of information asymmetry [3]. The theory constructs a signaling model under conditions of information asymmetry and rational expectations. It suggests that firms tend to use endogenous financing, followed by debt financing and equity financing. This is because endogenous financing is low cost and does not signal unfavorable information. In contrast, debt and equity financing are more costly, subject to market influences, lack stability, and may signal unfavorable information.

Market Timing suggests that a company's capital structure decisions are influenced by market conditions and the volatility of the company's share price [4]. According to this theory, companies tend to issue equity when they believe their share price is overvalued and raise debt financing when they believe the market undervalues their share price. Both the IPO boom in the United States in the 1980s, when many technology companies raised money through the stock market. The collapse of the Internet bubble, the 2008 subprime mortgage crisis, and the ensuing global financial crisis in the late 1990s and early 2000s reflect on a practical level that firms try to finance their capital according to the timing of the market under different market conditions, corroborating the theory.

The dynamic capital structure theory considers changes in the capital structure of a company at different points in time in response to market and economic fluctuations. It argues that firms should dynamically adjust their capital structure in response to changes in the external environment to maximize the firm’s value. Myers proposed a theory of dynamic capital structure in 1984 that emphasizes that firms should adjust their capital structure in response to market conditions and financial needs [5]. Harris and Raviv published a debt selection and capital structure of the firm in a paper that introduced concepts related to the dynamic capital structure theory [6]. In addition, Murrell and Vivian have made important theoretical and empirical studies on the dynamic capital structure theory at different times and in the literature.

Although these theories provide different perspectives to understand the choice and impact of a firm's capital structure, the assumptions made are idealistic and irrational. The real economic environment is far more complex than the assumptions, and a company's choice of capital structure may be affected by a combination of factors, many of which are ignored by the above theories. Therefore, in the practice of the company's development of capital structure strategy, there often needs to be a deviation from the conclusions of the theoretical level.

3. Capital Structure under Different Industries

Industry factors are critical when examining a firm's capital structure options. The risks and opportunities faced by a company are usually different depending on the industry in which it operates. The characteristics and environment of different industries can have a significant impact on a company's capital structure decision. Existing empirical studies have also proved that industry factors impact the choice of capital structure. For example, Guo and Sun suggested that there are significant differences in the capital structure of listed firms in different industries [7]. Such differences are not due to outliers in individual industries but are generalized across industries.

Industry characteristics are a key consideration when firms decide their capital structure. Different industries have unique economic and operational characteristics directly affecting a firm's financing choices. The characteristics considered in this paper include three main indicators: risk, cash flow stability, and capital intensity.

Differences in risk levels can have a significant impact on firms' decisions on capital structure. High risk industries, such as the technology, innovation, and energy industry, may prefer to use equity financing to mitigate financial risks. Whereas relatively low-risk industries, such as utilities or infrastructure, may be more likely to utilize debt instruments to access capital.

Cash flow stability is also an important consideration in capital structure selection. Companies in industries with high cash flow volatility may be more inclined to choose a more conservative capital structure to ensure that they can meet their debt obligations in a timely manner. On the other hand, industries with higher cash flow stability, such as the consumer goods sector, may be more amenable to a degree of financial leverage.

Capital intensity varies widely across industries. Highly capital-intensive industries like manufacturing or airlines may rely more on debt financing to meet their large-scale capital needs. Less capital-intensive industries like services may be more suited to equity financing to reduce financial risk. In capital structure decisions, the adaptation of the chosen structure to industry characteristics is a critical step in ensuring the financial health and sustainability of a firm.

Therefore, this paper will explore the choice of capital structure by industry. Regarding the classification of three indicators of industry characteristics, the industry types are mainly categorized into three major industries: capital-intensive industries, labor-intensive industries, and innovative industries. It mainly studies the influence of the ratio of equity and bond financing in the company's capital structure on the company's performance.

3.1. Capital-Intensive Industries

Capital-intensive industries are typically those that require large capital investments, have significant physical assets, or require large-scale equipment and infrastructure. These industries typically involve the purchase, construction and maintenance of physical assets which value impacts a company's operations over the long term. The industry is highly capital-intensive, and its business model typically involves long-term investment in and management of physical assets. In the manufacturing industry, companies typically need to make large-scale investments in equipment and production infrastructure to support the manufacture and delivery of products.

To maintain basic operations, manufacturing companies usually need to invest large amounts of capital to purchase new equipment and expand production lines to increase production capacity and efficiency. They also need to have a certain amount of working capital to maintain the supply chain’s operation and ensure the smooth operation of material procurement and inventory management. On the other hand, to enhance their competitiveness and market position, manufacturing companies must also continuously invest in pursuing technological innovation and product upgrading. Therefore, capital stability is the most important concern for manufacturing companies.

The impact of the debt-to-equity ratio on corporate performance can be studied by analyzing the financial data and capital structure information of manufacturing companies. The profitability, cash flow situation, return on assets, and other indicators under different capital structures can be compared to understand the impact of different capital structures on the long-term performance of the company.

Existing empirical papers generally agree that corporate capital structure is negatively correlated with corporate performance in the manufacturing industry. The higher the gearing ratio (the higher the debt ratio), the worse the corporate performance. For example, Acaravci argued that capital structure and firm performance are negatively correlated in the manufacturing industry [8]. Luo argued that the gearing ratio of China's new energy automobile listed companies is negatively correlated with financial performance [9]. Ni argues that deleveraging has a facilitating effect on the performance of Chinese manufacturing firms [10]. There is industry heterogeneity in the impact of deleveraging on firm performance, and the performance of capital-intensive firms is more obviously facilitated. In conclusion, firms with higher gearing ratios tend to need better performance in the manufacturing industry.

3.2. Labor-Intensive Industry

A labor-intensive industry requires fewer physical assets for its operation and development than a capital-intensive industry such as traditional manufacturing. Companies in labor-intensive industries tend to invest in a small number of physical assets and do not require large-scale laboratory equipment or highly specialized talent, thus relying relatively less on a large number of physical assets. Industry projects usually have relatively short cycles, emphasizing the flexible use of capital and efficiency.

Due to the characteristics of labor-intensive industries, companies focus more on the flexible use of capital. As a result, capital structures are more likely to exhibit a higher degree of flexibility in these industries and are more easily adjusted to market changes. The relatively low demand for real assets makes companies pay more attention to optimizing their liability structure to use capital efficiently. In particular, the flexibility of equity financing is more emphasized. Firms tend to take advantage of equity financing to support flexible business expansion, technological innovation or market adjustment. The short cycle makes it easier for enterprises to meet their operational and development needs through short-term financing.

From the current empirical research, a higher proportion of equity financing and a lower proportion of debt financing will be more favorable to firm performance. Zhou, Guan, and Huang argued that the gearing ratio and short-term debt ratio have a negative impact on the performance of listed companies in the cultural industry [11]. Riyandi and Riyanto stated that the equity structure of the health service industry is positively correlated with corporate performance, and the debt structure is negatively correlated with corporate performance in general, i.e., the asset structure is negatively correlated with corporate performance [12]. Hou argued that excessive gearing increases the company's bankruptcy costs [13]. Leverage has a significant negative impact on the net asset margin of listed companies in the knowledge-intensive service industry due to the tendency of the knowledge-intensive service industry to finance short-term liabilities.

3.3. Innovative Industry

The unique nature of the technology industry indicates different capital structure choices from other industries. Technology companies are usually committed to highly technical research projects that involve significant investment of time and resources, mainly for purchasing laboratory equipment, hiring specialized personnel, and supporting research funding. Unlike labor-intensive industries, the technology sector requires more physical assets to support its innovation activities. This specificity of capital needs makes S&T firms more inclined to use long-term financing instruments to meet the capital needs of R&D projects over a long period of time.

Existing empirical studies further support the association between capital structure and innovation activities of technology companies. Chang & Song showed that capital structure is negatively correlated with R&D intensity and that high debt ratios may inhibit the innovative activities of science and technology firms to the extent that capital structure is negatively correlated with firm performance [14]. The higher the proportion of debt financing, the poorer the R&D and innovation motivation of the firm and the lower the performance. In particular, a high real leverage ratio may increase debt risk and aggravate a firm's debt burden, thus negatively affecting technological innovation. This

emphasizes the choice of capital structure by technology firms, which tends to reduce financial risk in order to support their innovation goals better.

Therefore, in terms of capital structure choice, technology companies prefer equity financing. Equity financing is more flexible than debt financing. Equity allows for rapid adjustment of strategies to adapt to rapid changes in the market. Some studies have found that technology companies with a flexible capital structure are more likely to adapt to changes in the market and improve their resilience. In addition, equity financing spreads the risk of technology R&D and incentivizes companies to focus more on long-term strategy and growth rather than overemphasizing short-term financial performance. This incentive effect helps increase the probability of technological innovation. The size of a technology-based firm also has an impact on its capital structure. Start-ups may rely more on venture capital, while growth and mature firms prefer equity financing.

In conclusion, the choice of capital structure in the technology sector is influenced by its particular R&D needs, innovation goals, and market characteristics. Long-term, flexible equity financing becomes a more preferred option for technology firms, helping to support their innovation activities and increase their competitiveness in a highly competitive market.

4. Conclusion

According to existing theoretical and empirical studies, a company's capital structure choice is influenced by a combination of factors. Despite the existence of different theoretical perspectives, the complexity of the real economic environment makes companies often deviate from the conclusions at the theoretical level when formulating capital structure strategies.

This paper takes the influence of industry factors on capital structure choice as an example, and through reviewing the existing empirical studies. It finds that the risks and opportunities faced by firms are usually different in different industries. Thus, the appropriate capital structure may also vary. In capital-intensive industries, such as the manufacturing industry, where firms usually need to make large-scale investments in equipment and production infrastructure, debt financing can provide a stable source of funds and reduce the risk of equity financing. Therefore, capital-intensive industries are more inclined to use debt financing to meet the need for large-scale capital investment. Whereas in labor-intensive industries, such as the service industry, where companies have relatively low capital needs, it is more appropriate to use equity financing to maintain flexibility and reduce financial risks. In the technology industry, on the other hand, due to its special R&D needs and innovation objectives, it is more inclined to use long-term financing tools to meet the capital needs of R&D projects over a long period of time. As a result, equity financing is more preferred in this industry to support innovation activities and enhance competitiveness in a competitive market.

However, the above are only broad selection trends, and specific capital structure choices need to take into account company-specific circumstances and strategic objectives. There are still examples in various industries where the reality of the situation is different from the results of logical reasoning using the characteristics of the broader industry environment. Therefore, in practice, companies often need to comprehensively consider a number of factors, such as industry factors, company characteristics, and market conditions, when formulating their capital structure strategies in order to achieve the optimal capital structure allocation.

Although this paper has explored and synthesized the influencing factors of capital structure choice under different industries, there are still some areas for improvement and directions to look forward to. First, existing studies have mainly focused on the relationship between capital structure and firm performance. Specific decision-making processes and mechanisms of capital structure choice are not well understood. Future research can further explore the decision-making process of firms in choosing a specific capital structure in different industries, including the factors considered, the role of decision-makers, and the impact of information asymmetry on decision-making.

There is room for further research on the factors influencing the capital structure choice under different industries. For example, for capital-intensive industries, in addition to the need for debt

financing, the impact of factors such as the degree of development of the capital market and the degree of competition in the industry on the choice of capital structure can also be explored. For labor-intensive industries and technology industries, the impact of factors such as innovation ability and intellectual property protection on the choice of capital structure can be further investigated. Existing studies have mainly focused on the impact of internal company factors on capital structure choice, but more research needs to be done on external environmental factors. Future research can consider the influence of the macroeconomic environment, industry development trends, policies, and regulations on capital structure choice.

Finally, existing studies have mainly focused on the impact of capital structure choice on company performance. However, further research is needed on the impact of capital structure choice on the long-term development of companies in different industries. Future research could consider the impact of a company's choice of a specific capital structure in different industries on innovation ability, market competitiveness, and long-term growth.

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