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The relationship between capital structure and financial risk: a survey of literatures

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ABSTRACT

Capital structure theories have been developing as an essential topic in finance, and it is relatively crucial for both professionals and scholars to recognize the significance of an optimal capital structure and the corresponding financial risks. The purpose of the research is to find out the previous research about capital structure, financial risk, and their relationship. As a structured and comprehensive literature review, the survey adopts the qualitative methodology, describing the fundamental definitions, the development of theories, and the important researches about China and other detailed related data. Furthermore, this paper suggests future researches to provide more in-depth knowledge with more geographic regions and respected scholars as the sample of studying capital structure, as well as the measures of financial risks.



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Introduction

Professionals and scholars need to recognize the significance of an optimal capital structure and the corresponding financial risks. The research propose is to find out the previous research about capital structure, financial risk, and their relationship, answering the research question, what has been studied and developed about the theories of capital structure and financial risk.

First, for capital structure, the paper focuses on the basic definition. Second, choosing the most essential capital structure theories, the researcher discusses the development of capital structure theories that including Modigliani and Miller (M&M) theory, Pecking Order Theory, Static Trade-Off Theory, Net Income Approach, and Market Timing Theory. Furthermore, the two close subjects, leverage and capital structure, and the determinants of capital structure, are analyzed in detail. Importantly, the study selects the respected researcher of Capital Structure, Stewart Clay Myers, to investigate how he gradually generated and modified his theoretical knowledge in capital structure. The researches of the capital structure topic in China are collected from eight prestigious and significant finance journals including The Journal of Finance, The Review of Financial Studies, Journal of Financial Economics, Journal of Finance and Quantitative Analysis, Journal of Money, Credit and Banking, Journal of Banking and Finance, Mathematical Finance, and Journal of Financial Intermediation (Currie & Pandher, 2011).

As a complement, the paper provides detailed knowledge about financial risk with the definition and importance of financial risk before linking it with leverage and capital

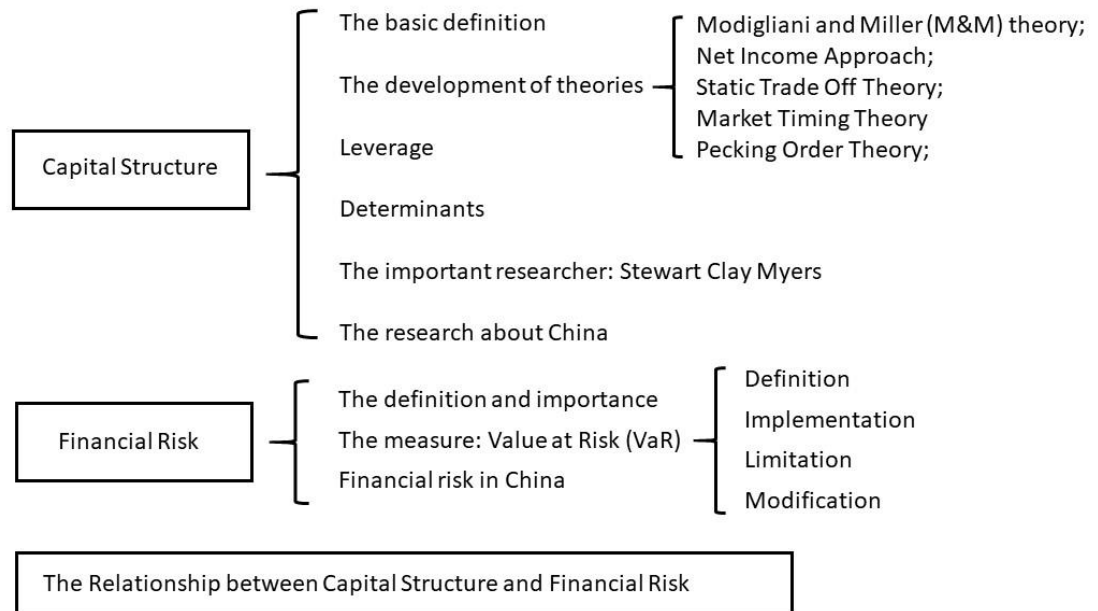
structure. Then, the measure of financial risk is demonstrated, especially the Value at Risk (VaR) Model as a critical model to measure financial risk, with its definition, implementation, limitation, and modification, along with the researches about financial risk in China. In addition, the prior literature about the relationship between leverage, namely capital structure, and financial risk, are provided.

When it comes to the contribution, on the one hand, as a comprehensive literature review with clear structure, the paper can be a preliminary reading for the finance learners at introductory level, who are interested in gaining more knowledge about the relevant topics, and a reference reading for the researchers who want to research on capital structure and financial risk, especially in China. On the other hand, the study can stress the importance of the capital structure choice and financial risk issue for firms and scholars, since it is important for firms to aware of the optimal choice of capital structure and identify the risk, especially for companies in China, which is a developing emerging economy.

Approach/research design

The paper adopts a qualitative research method. In detail, it is a comprehensive survey and overview of the significant previous literatures about the capital structure, financial risk, and the relationship between capital structure and financial risk. The illustration of

the conceptual framework is as follows



Since it is a qualitative research, the basic data source is journal papers referenced, such as *The Journal of Finance*, *The Review of Financial Studies*, *Journal of Financial and Quantitative Analysis*, *Journal of Financial Economics*, *Journal of Banking & Finance*, *Financial Analysts Journal*, *The Journal of Portfolio Management* *Special Real Estate*, *Journal of Development Economics*, *The Review of Economics and Statistics*, and *Journal of Money, Credit and Banking*.

Literature Review and Findings

A. Capital structure

The basic definition

Capital structure is an important financing choice for corporations. It is relevant to the value of a firm (RAJAN & ZINGALES, 1995). The pecking order theory and the static tradeoff theory are essential in capital structure decisions. Furthermore, the modified pecking order theory indicates that firms will have fewer incentives to issue risky securities to finance the projects having a positive net present value in the future since both the information asymmetry and financial distress costs will be identified. The increasing need for external financing during the period for achieving a desired dividend payout ratio will be reflected by debt ratios as well (Myers, 1984).

From another perspective, Baker and Wurgler (2002) conclude that the capital structure at present is highly related to the market value in historical time. Furthermore, it results from the increase and aggregation of past attempts of “equity market timing”, a practice that exploits short-term fluctuations between the cost of equity and capitals in other forms by repurchasing at prices that are lower than the issuing prices (Baker & Wurgler, 2002).

The development of important capital structure theories

- Modigliani and Miller (M&M) theory

The M&M Theory was first put up by Franco Modigliani and Merton Miller in their work, *The Cost of Capital, Corporation Finance and the Theory of Investment*. Essentially, the

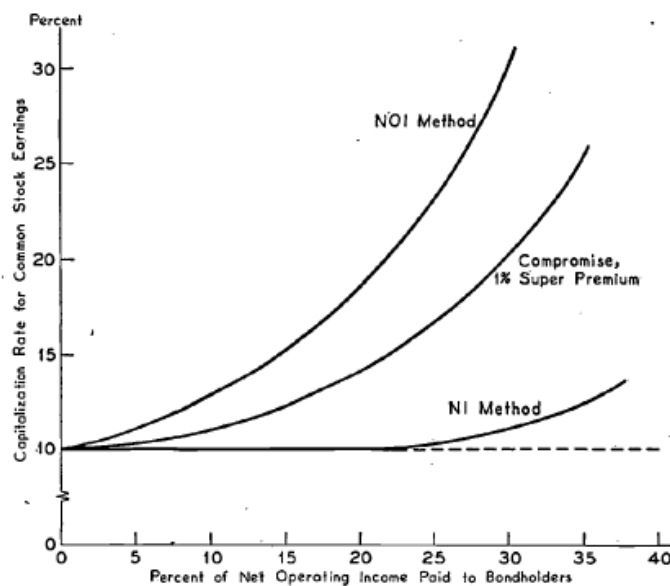
first proposition is that the firm's value is entirely irrelevant to capital structure, and It is calculated by discount the expected future returns at an appropriate capitalization rate to its class. Similarly, the average cost of capital, which is unrelated to the capital structure, equals to the result of capitalizing the class' pure equity stream. For the second proposition, for firms in the same class, the expected return of the common stocks is positively related to the leverage; specifically, the increasing debt proportion and debt to equity ratio will increase the cost of equity. For the third proposition, its key information is that the different types of financial instrument for investment has no relationship with its worth. That is to say, the types of investment sources and instruments will not affect the investment' "cut-off point" (Modigliani & Miller, 1958). In 1966, Bertil Hållsten noted on how their theory contributes to the investment and finance field as an effort to extend it beyond the perfect capital market case, although it has some problems, for instance, when assessing various investment plans, it only considers a market equilibrium condition (Hållsten, 1966). Importantly, the Modigliani and Miller (M&M) theory is a fundamental work for the study of capital structure.

Scholars have been interested in and made efforts to study the M&M Theory. For example, in the work of Sheridan Titman that is focusing on the theorem and market efficiency issue, he calls for researchers' attention to consider the effects of the supply side in the imperfect capital market. The financing and risk management choices with connected cross-sectional variations can be explained by the specific models with the perfect market assumption (Titman, 2001). However, when testing the specific form of the theories, the researcher Fosberg finds that the total value of firms cannot be precisely predicted by

either the tax or no-tax valuation equation of M&M Theories. In detail, in regressions of the firm value, including the variability of earnings, other tax shields, and growth of firm variables to ensure robustness, the variable, the interest tax shield, has a negative coefficient, which is disagreed with the positive result as Modigliani and Miller estimated; the predicted value of the firms with no leverage is much higher than the real value of the firms (Fosberg, 2010).

- Net Income Approach

The net income approach was first put up by David Durand. Its viewpoint is that the amount of capital raised by the businessman for the overall business is based on his or her self-interests, which is wealth maximization, which has a higher level of flexibility and less occurred error than income maximization. A chart for the differences in capitalization rate among different models is as follows:



(Durand, 1952)

- Static Trade-Off Theory

The Static Trade-Off Theory was firstly elaborated by Kraus and Litzenberger in 1973. According to the paper, A State-Preference Model of Optimal Financial Leverage, there exists no relationship between the capital structure and market value of firms in the perfect capital market conditions. With the combination of the previous theories, optimal leverage is supposed to be determined by considering tax advantage and the matter of bankruptcy penalties. Specifically, the difference of the market value between the levered and unlevered firms is associated with the positive effects of the tax reduction from debt and the negative effects of the tax payment on bankruptcy cost (Kraus & Litzenberger, 1973).

The theory is widely tested with empirical evidence in a different geographical area. For instance, with the data of the Spanish SMEs from 1995 to 2004 and the trade-off theory, probably due to the capital markets' financial constraints and agency problems, high costs in transactions are charged on the firms; the SMEs demonstrate comparatively distinctive financial behaviors. It also confirms the debt of firm and non-debt tax shields are negatively related. However, without sufficient trust from the banks and other institutions in the financial situations of SMEs, the capital structure of these companies is independent of the default risk, which is measured by income volatility (Gracia & Mira, 2008). Furthermore, since the default risk plays a key role in the Static Trade-Off Theory, a test is conducted for the relationship between default probability and capital structure. Surprisingly, being different from the theoretical prediction, firms that have a higher

marginal tax rate or a lower bankruptcy risk tend to the lower cost of financial distress or bankruptcy (Hovakimian, Kayhan, & Titman, 2011).

- Market Timing Theory

Market timing is a relatively vital subject in corporate finance. It was analyzed that when the market value of companies is higher than their book values, they are generally more motivated to issue new equity; on the contrary, they tend to repurchase their equity when having a low market value. Importantly, the significant effects of market timing on capital structure were emphasized: the firms that raise capital when having high market values have low leverage typically (Baker & Wurgler, 2002). In a test with the debt and equity using fluctuations, the Market Timing Theory that without relying on semi-strong market efficiency explains better than the Pecking Order Theory and the Static Trade-Off Theory (Huang & Ritter, 2004). Additionally, in terms of the persistence of the theory, the Market Timing has less robust effects in determining the firm's financing activities in the long term and works better in the short term (ALTI, 2006).

However, the international data of seven industrialized countries revealed an opposing result: except Japan, equity market timings illustrates a limited effect on leverage in all the other counties. The negative association between historical market-to-book ratio is and leverage is not due to market timing (Mahajan & Tartaroglu, 2008). More interestingly, the impacts of the theory perform differently in different periods. For instance, with the sixteen-year panel data of publicly-traded firms in Taiwan, the Market

Timing Theory is well applied for the stock market for the first 12 years while not suitable for the last four years (Chen, Chen, Chen, & Huang, 2013).

- Pecking Order Theory

As revealed in Myers's 1984 paper, corporates are supposed to raise external funding from bond markets; it is better to financing with debt than equity (Myers & Majluf, 1984). Further, in 1999, researchers tried to analyze the model by using new empirical evidence. They compared if the Pecking Order Theory is followed or an optimal industry-average capital structure is achieved, and they found the two hypotheses coexist (Ghosh & Cai, 1999).

The Pecking Order Theory is tested widely and empirically. With the data of over 1500 companies from 1994 to 2000 in Spanish market, the researchers concluded that the Pecking Order Theory is supported well especially by the firms with high growth rate, high leverage ratio, and small or medium sizes, and the retained earnings is a major source for high-growth firms (Sánchez-Vidal & Martín-Ugedo, 2005). Moreover, Pecking Order Theory is compared with the Static Trade-off theory with the evidence of Pakistan and fits better to the country's leasing sector. The results indicate that the asset size is significantly and negatively affects the leverage. For suggestions, the less profitable enterprises are expected to use internal financing rather than debt or other external resources (Butt, Khan, & Nafees, 2013).

INSERT TABLE 1 APPROXIMATELY HERE

Leverage and Capital Structure

Typically, the leverage is closely related to the capital structure and the financial risk of firms or companies. Typically, the more potential and possibilities to get higher returns through leverage, the more risk will be caused by it (Gordon & Tse, 2003). Similarly, Hurdle (1974) affirms that leverage level itself will impact returns independently, and capital structure can capture the difference in profits. Nevertheless, he also concerns that market power and profitability of firms are two factors affecting the relationship between capital structure and a general risk issue since firms with large market power and with high profitability basically will not increase risk by profiting through capital structure and leverage. Specifically, high debt indicates not a high business risk but a high financial risk (Hurdle, 1974). Concentrating on newly privatized firms in developing countries, Boubakri and Cosset (1998) find a significant result that privatization, that is changing from public to private ownership, is generally followed by a drop of unadjusted leverage ratios, because the cost of debt will increase with the removed debt guarantees by the government and the public equity markets will be accessed more easily (BOUBAKRI & COSSET, 1998). The analysis of firms' capital finance also focused on internal finance and specific regions, for instance, China. In the paper, *Internal finance and growth: Microeconomic evidence on Chinese firms*, a "Chinese miracle" with high a growth rate of economic development, has been powered by a sufficient amount of internal finance from the profitable private firms regardless of their financial constraints. Furthermore, the state-owned enterprises (SOEs) in China typically demonstrate a comparatively high level of leverage, having better capability to borrow mainly from banks; the higher level

of the firms' leverage, the more motivations of them to conduct risky investments (Guariglia, Liu, & Song, 2011). In other words, capital structure, leverage, and financial risk and returns are intuitively connected.

In research with international data to investigate capital structure, financial leverage can be calculated by different methods in different countries: the ratio of Total Debt and Total Asset (it is the most common definition of financial leverage, but whether a firm has a default risk in the coming future cannot be indicated and Account Payable and Personal Liabilities items included will overstate the real leverage); the ratio of Nonequity Liabilities and Total Asset (it ignores the fact that several certain kinds of non-debt liabilities, for instance, trade credit, will offset corresponding assets), the ratio of Debt and Net Asset (non-financing factors, for example, pension liabilities, may affect the results), and Interest Coverage Ratio (earnings before interest and taxes (EBIT) and earnings before interest, taxes, and depreciation (EBITDA) to interest expense both assume the rolling over of short-term liabilities) (RAJAN & ZINGALES, 1995). Thus, adjustments for determining leverage have both advantages and disadvantages, suiting for different countries' firms. Hence, with several formulas to calculate, leverage is a general representation of the capital structure.

The determinants of capital structure

In the paper about the determinants of capital structure choice, by separately considering financial leverage measures with short-term, long-term, and convertible debt, the researcher investigated that the Uniqueness of their products, which is indicated by such as research and development expenditure dividing sales, quit rates, and selling expense

dividing sales, and associated with comparatively high costs in their liquidate event, has a negative relationship with the debt ratios. Furthermore, the transaction cost is another determinant of capital structure, while the amount and importance of the cost are relatively insignificant. The high transaction costs that firms in small size pay to issue long-term financial instruments is reflected by the negative relationship between firm size and short-term liability ratios (TITMAN & WESSELS, 1988)

More empirical studies are conducted about the determinants of capital structure. Based on the paper, *Determinants of Capital Structure: Theory vs. Practice*, while the majority of the listed Finnish firms target a capital structure to maximize the value of firms, information asymmetry reasonable the pecking order theory. Moreover, as firms listing on HSC and OTC illustrate different financing preferences, they extrapolate that the size of firms may result in different preferences (Kjellman & Hansén, 1995). According to Psillaki and Daskalakis's paper, by studying the sample of four European countries' SMEs, the researchers conclude that the size of the firm is positively related to leverage, the growth prospect is significant in the relationship of leverage, and profitability and riskiness are related to the leverage negatively. Also, attention should be paid that the four countries demonstrate a similar pattern of capital structure, and that is to say, the factors that determine the capital structure choices are specified at the firm level rather than the country level. (Psillaki & Daskalakis, 2009)

The study about determinants of capital structure also focused on the consideration of external investors' control rights when an optimal capital structure is settled. It is concluded that the optimal structure dynamically adjusts according to the change of stock

prices and assets value as firms tend to increase the issue of equity after the increase of stock returns; the control rights to external financiers depend on two endogenous factors, the amount of accumulated cash and the issued security (Boot & Thakor, 2011).

INSERT TABLE 2 APPROXIMATELY HERE

The important researcher of Capital Structure: Stewart Clay Myers

Myers' academic study, particularly about capital structure, started in 1966. The very first paper, *Problems in the Theory of Optimal Capital Structure*, took Modigliani and Miller's pathbreaking work as a starting point, and importantly proposed two questions about if there is a relation between the cost of financing in debt and the combination of debt instrument, and if it does, how people determine the optimal combination of financing sources (Robichek & Myers, 1966).

Although the 1968 paper focused on security valuation, the paper also mentioned a particular case related to the determination of optimal capital structure in his 1966 paper. In addition, assumptions were specified for investigating the relationship on the present value between security and the contingent returns. For the "available securities" assumption, replacing a number of outstanding common stocks with newly issued bonds in capital structure does not necessarily imply changes in the real sector's conditions or investment strategy (Myers, 1968).

The discussion in 1971 on debt management was a step further as a foundational and supplementary preparation for his future study on the capital structure since debt is an essential component. He absorbed the knowledge about the maturity and timing of debt,

while pointed out two problems about the objective to minimize interest cost and about the implementation of establishing a dynamic programming approach (Myers, Brigham, & Higgins, 1971).

In the next year, Myers discussed more issues about capital, for instance, capital rationing and capital budgeting decisions. Specifically, he noted that the only market imperfection substantially is the capital constraints, and the most fundamental goal of firms to maximize the market value should not be altered by capital rationing (Myers, 1972). Subsequently, Myer researched more about capital budgeting, presenting a general method to analyze how capital investment decisions and corporate financing interact with one another (Myers, 1974). In 1975, Myers, Brennan, and Carleton discussed correcting the capital structure to the book value base along with deriving the cost of equity in the stock price regulatory process. For firms whose share price is maximizing and investments have a diminishing returns, the average cost of the equity's market value is less than the book equity's average rate of return (Brennan, Carleton, & Myers, 1975).

In 1976, Myers furthermore talked about debt and leasing. It is necessary to have simultaneous solutions since the displaced debt amount both depends on and has an effect on the leasing value (Myers, Dill, & Bautis, 1976). Based on the previous studies, in Myers's paper about the of corporate borrowing in 1977, the optimal choice of debt that maximizes the firms' value is zero debt. He explained the rationality of limiting borrowing, no matter with the advantage of tax reduction or not, as well as revealed that practical people tend to use book value instead of market value to determine the target debt portions. Also, he explained firms' borrowing behaviors that matching the maturities of

the assets with debts, predicting an inverse relationship between real options' market value and corporate borrowing (Myers, 1977).

The Capital Structure Puzzle may be the most famous paper by Myers. He provided the empirical evidence for the static trade-off theory and the pecking order theory, trying to stimulate the research to explicate the corporates' actual financing behavior further and understand how it affects the returns on securities. Importantly, he summarized five facts of the corporate behavior: first, "internal versus external equity", indicating not only the pecking order framework but also the static tradeoff one since the external way would be comparatively expensive with extra transaction costs of issuing equities and less tax requirement on capital gains than dividends (also, that is the reason why a corporate generally does not try to achieve an intended lower debt-to-equity ratio by issuing new stocks to pay back debt); second, the "timing" of external financing in practical situations is basically after the rise of stock prices, a fact that is inconsistent with the two theories; third, the corporates having growth opportunities, as well as crucial intangible assets, have fewer incentives to debt, and a more tremendous rate of capital expenditure is connected with a higher debt level; fourth, an offer of exchanging debt for equity basically happens when the stock prices increase, and vice versa (since the offers intuitively disclose an alteration to debt-to-equity ratio, they also reveal risk or value change of firms); fifth, the new stock issues generally will lower the stock prices, and this fact cannot be well justified in a static trade-off model while the announcement itself will decrease the stock value supports the pecking order principle with asymmetric information model (Myers, 1984).

In the same year, Myers published on financing decisions and the related information issue. Based on the model, he concluded that the reluctance of issuing stocks for financing might impede significant opportunities to invest for companies. However, issuing stocks if more critical information is exposed to managers will decrease the stock price, while issuing debt with no default risk will not. Thus, the results also to an extent rationalized investors' preference for internal financing sources and debt rather than equity in external financing sources (Myers & Majluf, 1984). Additionally, in 1985, Myers commented on Gravelle's article about capital stocks. The increase of about a percentage point earning rate of return typically comes with the shift to economic pricing with no increase in consumers' burden immediately (Myers, 1985).

The 1998 paper of Myers stressed the liquidity issue, especially about the negativity. To elaborate, the ability of firms to finance externally can be reduced by excess asset liquidity (Myers & Rajan, 1998).

The research in 1999 tested and compared the traditional static tradeoff and the pecking order capital structure model. They suggested that it is because the unanticipated cash requirements and, more importantly, the anticipated deficits are planned to be financed with debt by firms that the pecking order model performs much stronger than other models. The time-series explanatory power of the pecking order model is much higher than that of the static trade-off model. Additionally, mature firms will gradually modify their leverage and debt ratio to be optimal (Shyam-Sunder & Myers, 1999).

Myers accomplished his work, *Financial architecture*, in 1999. Essentially, he stated that the capital structure is fully adjusted to financial architecture. That is to say, setting the proportion of debt and equity financing, namely the determination of capital structure, basically follows a second-order if financial architecture. He also mentioned that managers might be inclined to maximize value when having leveraged buyouts (Myers, 1999).

The paper, *Outside Equity*, paid more attention to agency cost, capital, and equity financing, which is developed with unverifiable asset value and cash flows. It rationalized the reasons not only why corporates go public but also of the rising agency costs without immediately verifiable investment behaviors. Besides, the agreement and cooperative costs with insiders will limit the investors' intervention (Myers, *Outside equity*, 2000).

Importantly, in 2001, Myers provided a sophisticated overview about capital structure, explicitly summarizing and responding about the Modigliani-Miller Propositions, free cash flow, debt and taxes issue, the Tradeoff Theory and taxes, The Pecking Order Theory with several criticisms on it, and agency costs with firms financial goal. Since the insiders are targeting future payoffs when rising human capital and investing, the "present value" is emphasized in theoretical works. Besides, more profound optimal capital structure theories without conditional constraints are expected with modeling firm managers' financial objectives (Myers, 2001). In the same year, he focused on insurance companies and capital allocation as well, clarifying the determination of option pricing methods, the amount of capital that insurance companies are supposed to carry, and the allocation of capital requirements across the insurance business lines (Myers & Read, 2001).

Myers studies diverse industries and markets. In 2002, the US railways were taken as an example to explore the asymmetric risk and returns as well as sunk costs; taking them into account, they estimated the errors caused by the real option approach. The study involving market theories and investment cost is another supplement knowledge about capital investment (Hausman & Myers, 2002). In December, Myers took part in a pharmaceutical research and development program with Healy and Howe. Applying a simulation model and assuming all financed with equity, they assessed the relevance and objectivity of accounting information. Even with widespread earnings management, the successful-efforts method is much related to economic values than both the full-cost and cash-expense methods in capitalizing research and development (Healy, Myers, & Howe, 2002). In terms of the stock market, the research about stock market synchronicity, especially with the R^2 measurement, confirmed that a higher R^2 is generally connected with countries having weaker and less developed cooperate governance, financial market, and protection of property rights as well as with a higher frequency of crash. Besides, the opaqueness, namely the lack of transparency, has both advantages as more cash flow can be captured by insiders when firms are operating in good conditions, and disadvantages with taking downside risks (Jin & Myers, 2006).

In 2007, Myers spent more effort on option models and takeover theories. The higher the debt level of the firms, the less attraction of them to be takeovers (Myers & Lambrecht, 2007). As debt and equity finance are two essential parts of capital structure, the paper in 2008 discussed the two issues with the capital investment theory and the real option models. An optimal debt policy will be adapted by managers for investment and

disinvestment. Being different from the traditional assumptions about financial objectives, the researchers regarding maximizing the overall firm value as the ultimate goal of managers (Myers & Lambrecht, 2008).

Internal governance is also related to and more or less alleviate the agency problem, which is also vital in capital structure theories. The CEOs who act on their own interests use dividends to balance the internal and external control, and they also tend to make more managerial effort and further to extract more returns from the raising shareholders' capacity (Acharya, Myers, & Rajan, 2011). Afterward, the paper in 2012 took a closer examination of agency subject by generating the dynamic agency model. Having the high risk aversion characteristics and large volatility of profits, managers are likely to underinvest, while the "habit formation" has an offset effect on it. Moreover, with fixed capital stock, the debt ratio cannot well adjust to a target debt ratio (Myers & Lambrecht, 2012).

Myers's knowledge base and understanding were reviewed in his 2015 paper. To elaborate, the essential capital structure theories, for instance, the Trade-Off Theory and the Pecking Order theory; the corporate finance issues, such as discounted cash flow, security valuation, and adjusted present value; and real option are studied and concluded in the paper (Myers, 2015). After that work, he specifically emphasized on corporate finance and risk management, offering a risk capital theory with the cost allocation problem. In detail, the allocation of risk capital is provided by the marginal default values; the credit quality, which is measured by default option of firms' value over the default-

free option values, is maintained in and risk shifting is precluded by providing efficient capital allocations (Erel, Myers, & Read, 2015).

A dynamic framework was described in 2016 by Lambrecht and Myers to analyze payout decisions, investment decisions, and borrowing behaviors of public companies along with information asymmetry, debt policy, and leveraged buyouts. Managers having distinctive risk preferences have different investment performances. For instance, risk-averse managers are more rigid about free cash flow and more likely to underinvest, changing borrowings to absorbing the instability of operating income (Lambrecht & Myers, 2016). In tandem with, focusing more on the dynamics in corporate finance, in 2017, they improved a specific dynamic agency model. Interest tax shields are not fully exploited by managers even without financial frictions. To explain, realistic leverage is calculated with the optimal payout policy and investment condition. The profitability and tax rate will positively contribute to the optimal capital investment level, while the risk aversion characteristic of manager, volatility, and rent extraction cost will decrease the target level. More significantly, their CARA model generates consistent results with the pecking order theory, that the debt is negatively related to profitability, regarding the debt as a short-term volatility absorber (Lambrecht & Myers, 2017).

The research of capital structure in China

In order to investigate the most significant findings about the Capital Structure topic in China, the study highlights the results from the A tier financial journals, which of the highest quality and importance in academic field of finance, including *The Journal of*

Finance, The Review of Financial Studies, Journal of Financial Economics, Journal of Finance and Quantitative Analysis, Journal of Money, Credit and Banking, Journal of Banking and Finance, Mathematical Finance, Journal of Financial Intermediation (Currie & Pandher, 2011).

- The Journal of Finance

The paper *Capital Structure and Financial Risk: Evidence from Foreign Debt Use in East Asia* analyzed the choice of currency in debt and capital structure as well as how the companies performed in reacting the Asian financial crisis, finding that only China (including Hong Kong) is the only country where an exchange rate maintained stable against the US dollar and was not depreciated. Examining the capital structure choice of non-financial firms in East Asia including China, the researchers find that firstly, the lower cost and the necessity to utilize foreign currency in oversea market, and the role as a risk management tool are determinants of firms' local and foreign debt decisions; secondly, a poor performance in reacting the financial crisis is primarily caused by debt in unhedged foreign currency with the illiquid derivatives market (Allayannis, Brown, & Klap, 2003).

- The Review of Financial Studies

The paper, *Formal versus Informal Finance: Evidence from China*, not purely focused on the capital structure issue but considered more about the contribution of financing patterns, especially the informal finance to the fast growth of firms in China, one of the developing countries. With a comparison of financing patterns at the firm level in China and other developing countries, it reveals that the fast growth of firms is positively

correlated with the formal finance, importantly, bank financing instead of the informal finance (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2010).

- Journal of Financial Economics

The paper's analysis focused on the external financing factor, which is an essential component of capital structure. Chinese firms with better performance are more likely to get external funding from Chinese banks as well as the larger firms are able to access more external sources more quickly and easily than the smaller ones. Specifically, the survey of Chinese firms from 2000 to 2002 shows that the more external financing borrowing from a bank, the more reinvestment a firm possibly will make (Cull & Xu, 2005).

With 634 Chinese state-owned enterprises (SOEs)' data, the paper tested the change of leverage when comparing the firms' performance before and after the privatization process. Basically, the leverage level is supposed to be high in terms of the SOEs in China since they have advantages in the low cost of borrowing. Importantly, although a number of previous researches expect the decrease of leverage after privatization as a result of the withdrawal of debt guarantee from the government, the result shows that leverage level is likely to be higher after the firms go privatized. The rationales are as follows: first, the loans are still provided effectively and substantially from banks; second, the firms will have stronger ability to raise funds after obtaining the proceeds from share issuing privatization (SIP); third, as indicated by the capital structure theory, firms can benefit from the high leverage and interest tax shield, gaining higher returns and enhancing firm value (Sun & Tong, 2003).

- Journal of Finance and Quantitative Analysis

There is no research about China published in the *Journal of Finance and Quantitative Analysis*.

- Journal of Money, Credit and Banking

Analyzing the credit information with the panel data of 45 countries, the paper showed that for China, the proportion of short-term debt to the total debt of companies is averagely around 78%, which is the highest short-term debt among the samples. Also, the firms that have a larger size, more profitability, more tangible assets, and more positive prospects to grow and develop are able to be long-term financed. What is more, there is a positive correlation between leverage and debt maturity, which is importantly determined by the connection between creditors' legal protection and information asymmetry (SORGE, ZHANG, & KOUFOPOULOS, 2017).

- Journal of Banking and Finance

Wu and Yue (2009) analyzed how the changing of government policy on corporate tax affect the leverage decisions of Chinese listed firms and calculated the leverage ratio by dividing the total liabilities by total assets' book value in the study. In detail, the termination of local government tax rebate (LGTR) policy, that is, an increase of tax rate for corporates, resulted in more debt of firms and the increase of firms' leverage level, regardless of the industry and regional GDP growth. Also, the constriction of accessing to finance resources are affecting the leverage, and the feasible adjustment greatly requires the support from bank loans (Wu & Yue, 2009).

The paper, *Does banks' systemic importance affect their capital structure and balance sheet adjustment processes*, focused on the bank industry. It examined whether the frictions, which is a constriction for the capital ratio adjustment of banks, are larger for regulatory or plain leverage and the channels for capital ratio adjustment for banks. They conjectured that the adjustment speed of systemically important financial institutions (SIFIs) for a targeted capital structure is lower in China than in other OECD countries on account of the restricted external capital and still developing stock market (Bakkar, Jonghe, & Tarazi, 2019).

The study of Ding, Guariglia, and Knight (2013) emphasizes on working capital and the external financing constraints, which is related to capital structure, using panel data from 2000 to 2007 of 116,000 Chinese firms. To begin with, it is sufficient internal sources rather than the access to external finance that contributes to the high growth rate of Chinese private companies. Secondly, based on the results, on average, the SOEs demonstrate the highest leverage level while the foreign firms display the lowest. What is more, the high working capital to cash flow (WKS), low fixed capital to cash flow (FKS), and more indebted firms endure more constraints on external finance (Ding, Guariglia, & Knight, 2013).

- Mathematical Finance

There is no research about China published in the *Mathematical Finance*.

- Journal of Financial Intermediation

The Zou and Adams' paper took 235 listed Chinese cooperates as an example to investigate the purchase of property insurance. The result showed that the leverage, opportunities for future growth, regulatory status, size of firms, and managerial ownership are significant determinants for companies to purchase insurance on the property. The higher level of leverage, a reflection of capital structure, basically leads to a higher volume of property insurance that is purchased by Chinese publicly listed corporations. Also, the risk aversion feature of managers in China rationalizes the different impact of managerial ownership from that in the US. When it comes to the insurance aspect, the decision about volume is different from, and much more complex than the decision about participation (Zou & Adams, 2006).

The paper of Huyghebaert, Quan, and Sun examined the IPO market in China, and its finding both follows the Pecking order theories and highlights the unique Chinese environment. The post-listing data was selected from more than 200 partially privatized state-owned enterprises (SOE) in China to investigate their financial decisions about external financing with either debts or equity. The results demonstrated that the external fundraising is positively related to cash deficits while negatively related to cash surplus; if including the non-cash working capital, the shortage or deficit cash flow will encourage firms to raise more financing eternally, especially from banks, and vice versa. Furthermore, result from both default risk and asymmetric information issues, the Chinese SOEs have more incentive to finance from debts rather than equity (Huyghebaert, Quan, & Sun, 2014).

A relatively new paper in 2019 specifically focused on China among the emerging economies to research about informal financing, which is a method to alter the capital structure for firms and can contribute to the firms' even the economy's development. In China, state-owned enterprises have advantages in information, sound and reliable accounting practices, banks' state ownership, and more importantly, few financing constraints. Consequently, the private and small firms in China have to turn to broader alternatives for financing their operation and growth. In conclusion, compared with other countries, China is not an "outlier" in the use of informal financing but is relatively at an average level (Allen, Qian, & Xie, 2019).

INSERT TABLE 3 APPROXIMATELY HERE

B. Financial risk

The definition and importance of financial risk

In terms of financial risk, it is an essential consideration for the overall operation of a company. According to Gale's study in 1972, financial risk is defined as a risk to stockholders based on the debt to equity ratio (as cited in Hurdle, 1974). In tandem with, in a study of political, economic, and financial Risk, the evaluation of financial risk can predict and includes the most information about a firm or company's cross-section expected future returns (Erb, Harvey, & Viskanta, 1996). To be specific, it is useful and valuable in assessing the returns.

The measure of financial risk: Value at Risk (VaR) Model

Generally, Value at Risk (VaR) can be used to measure the financial risk of a firm. It is applied on a regular basis to measure and evaluate the impact and effect of volatility in terms of the stock and bond portfolio. Compared with The Sharpe ratio and other traditional methods, VaR is an improved measure for gauging the risk to compare leverage levels because the expected losses are estimated by emphasizing on left-hand tails, which practically stands for the consequences of negative events in risk management, of outcomes' distribution. Fundamentally, investors can obtain useful information to determine the most suitable risk levels based on their objectives and purposes of investment with comparison VaR value at between unleveraged levels and various leverage levels (Gordon & Tse, 2003).

However, although it is fundamentally used, it has several drawbacks to be improved. According to Yamai and Yoshiba, on the one hand, Value-at-risk (VaR) has complete applicability, computational capability, and straightforward concept, and thus it has become a standard measure in financial risk management; on the other hand, it is problematic in several concepts, for instance, it only regards the percentiles of profit-loss distributions, leaving out the "tail risk", which is the risk beyond VaR (Yamai & Yoshiba, 2002). Also, disclosed Value-at-Risk results of a firm could measure risk, but spillover effects will be caused as well across financial institutions.

Financial risk in China

According to a paper about credit rating and financial risk, the size of firms and policy support from the government are two important factors to determine the corporate

bonds' credit rating in China; the financial risk, for instance, the debt ratio shows limited impacts on the rating. That is to say, the risk rating system in China is distinctively different from the bond markets in the US and the major European countries (CHEN & GUO, 2008). Moreover, about the economics and financial risks of overseas enterprises in China, price fluctuations in labor and material, the default risk from contractors and subcontractors; the payment delay or default, and inflation are four most substantial reasons why they are facing financial risks (Ling & Lim, 2007).

C. The relationship between capital structure and financial risk

In terms of the relationships between capital structure and financial risk, the relationship between VaR and leverage, leverage and financial risk, and importantly, capital structure and financial risk are investigated.

First, based on Gordon and Tse, focusing on quantitative techniques instead of regulatory, liquidity, or operational risk, the VaR method can measure financial risk since it responds to the varying leverage levels sensitively (Gordon & Tse, 2003). In other words, the VaR method to evaluate financial risk is correlated with financial leverage as well as capital structure. Moreover, from the angle of leverage, which is a comprehensive symbol of capital structure, the leverage level is one of the vital financial characteristics of a firm; it can be used to describe equity risk factors, and it is strongly associated with the changes in the volatility of the stock price. More importantly, although the size of a firm and dividend are negatively related to equity volatility, the total debt factor has a positive and significant relationship with the equity volatility; it implies that financial leverage is a vital factor to evaluate total risk (Bartram, Brown, & Waller, 2015). Also, according to the paper

about financial leverage, the form and sources of financing are closely associated with the financial risk. To be specific, the amount of debt for the operation and growth of firms has a positive relationship with financial risk exposure (Acheampong, Agalega, & Shibu, 2015).

First, Hurdle explores the relationships among the leverage ratio (capital structure), risk level, market structure, and profitability. In the equation, importantly, the DEBT variable stands for the leverage, which is the total debt dividing the combination of total debt and total equity; M stands for the market share variable; π stands for the net income, namely the profitability; GROUP stands for the concentration ratio, measuring how tight the oligopoly is; and the σ stands for the absolute deviation, which is the risk. According to the regression results of Ordinary and Two-Stage Least Squares, the Risk Equation reveals that the profit deviations' size is significantly determined by market structure; the Debt Equation indicates that the larger market shares the firms have, the lower debt and corresponding lower risk the firms prefer, supporting the "risk-debt" hypothesis; and the Profit Equation shows the highly profitable firms have less risk of profit variation. However, the industry study concludes that it is unclear whether business risk or financial risk can be measured by leverage. The regression results table of Hurdle is as follows:

A) Ordinary Least Squares							
(1)	$\sigma = 5.42 - 0.065 M + 0.0009 M^2 - 0.075 ADV + 0.014 GROUP - 6.7 K/Y - 0.45 ASSET$						
	(6.8)	(2.2)	(2.2)	(3.0)	(1.5)	(1.8)	(4.1)
	$- 0.0038 DEBT + 0.094 DV$						$R^2 = 0.207$
	(0.4)	(2.6)					
(2)	$DEBT = 36.69 - 0.23 M - 0.149 GROUP - 0.573 \pi - 0.431 \sigma + 92.29 K/Y - 0.98 ASSET + 1.77 GROW$						
	(6.2)	(2.6)	(2.4)	(2.4)	(0.9)	(3.6)	(2.2)
							$R^2 = 0.194$
(3)	$\pi = 8.74 + 0.299 M - 0.001 M^2 + 0.044 GROUP + 0.201 ADV - 0.57 ASSET - 0.34 \sigma$						
	(4.8)	(4.9)	(1.5)	(2.4)	(3.7)	(2.5)	(2.5)
	$- 0.037 DEBT$						$R^2 = 0.470$
	(2.0)						
B) Two-Stage Least Squares							
(4)	$\sigma = 4.22 - 0.046 M + 0.0008 M^2 - 0.074 ADV + 0.020 GROUP - 10.4 K/Y - 0.43 ASSET$						
	(1.3)	(0.8)	(1.5)	(2.9)	(1.1)	(1.0)	(3.4)
	$+ 0.03 DEBT + 0.098 DV$						$R^2 = 0.206$
	(0.4)	(2.6)					
(5)	$DEBT = 41.22 - 0.139 M - 0.118 GROUP - 0.995 \pi - 0.871 \sigma + 82.78 K/Y - 1.25 ASSET$						
	(2.3)	(0.5)	(1.1)	(0.9)	(0.4)	(2.1)	(0.9)
	$+ 2.28 GROW$						$R^2 = 0.176$
	(1.4)						
(6)	$\pi = -11.99 + 0.538 M - 0.004 M^2 + 0.018 GROUP + 0.433 ADV + 0.758 ASSET + 2.39 \sigma$						
	(1.9)	(5.6)	(3.6)	(0.8)	(5.0)	(1.7)	(2.9)
	$+ 0.15 DEBT$						$R^2 = 0.469$
	(1.8)						

(Hurdle, 1974)

Therefore, leverage is an essential determinant of as well as correlates with equity price risk.

Conclusion

A. Outcome

To begin with, as a detailed survey with clear conceptual framework, this research generates a understandable study focusing on the capital structure, which is an essential component in the finance world, as well as the supplementary knowledge about financial risk, which is proved to be positively associated with the capital structure and leverage by previous researches.

To be specific, the outcome of the paper is the organized previous literatures and studies about the capital structure and financial risk topics. For the capital structure, it includes its basic definition; the development of capital structure theories that including

Modigliani and Miller (M&M) theory, Pecking Order Theory, Static Trade-Off Theory, Net Income Approach, Market Timing Theory; leverage and Capital Structure; the determinants of capital structure; the important researcher, Stewart Clay Myers, of Capital Structure; the researches of capital structure in China from eight prestigious and significant finance journals. In terms of financial risk, the definition and importance of financial risk; the measure of financial risk, especially the Value at Risk (VaR) Model for measuring financial risk with its definition, implementation, limitation, and modification; and researches about financial risk in China are included. In addition, the prior literatures about the relationship between leverage, namely capital structure, and financial risk, are provided.

B. Contributions

First of all, this research can be useful for the researchers who want to study capital structure and financial risk as well as some subordinated knowledge, such as the different determinants of capital structure, how the capital structure theories be modified and improved, and what kind of models can be applied to estimate the financial risk of firms. That is to say, if the researchers intend to conduct relevant studies, they can turn to the particular paper to review their knowledge or check what has been published in the top finance journals about the topics in the cases of China. If they would like to focus on the financial risk issue, the paper can provide a proper idea, providing a number of feasible methods for risk estimation.

Furthermore, this research stresses the importance of capital structure choice and financial risk issues for both corporates and scholars. Especially for corporates in China,

where companies have different debt policies and the equity market has still been developing, it is comparatively crucial for them to be aware and to try to achieve an optimal capital structure that can possibly lead to a better business situation. Moreover, on account of the relationship between leverage and the firms' confront risk, the suitable debt level, that is the proportion of debt finance, is relatively vital to support the development and operation of the companies, increasing the value of firms as much as possible at a certain proper risk level. Therefore, by reviewing and reorganizing the significant past literatures, the importance of the capital structure and financial risk topics is emphasized more.

Moreover, combining the traditional theories and the new implications, the paper introduces not only the fundamental definitions of the capital structure and financial risk but also more practical results and empirical evidence in the related subjects. Thus, the paper can be a preliminary or supplementary reading material for the finance learners at an introductory level. If they are interested in the capital structure and financial risk, which are important contents in corporate finance, they can expand their knowledge and understanding by reading the paper.

C. Limitation

In the research of capital structure and financial risk part, the study only takes China as an example. That is to say, while a large number of researches have been done with diversifying geographic regions, for instance, other emerging economy and developed countries like the United States, the researcher only chose China as the target country. As a consequence, the study automatically ignores the research outcomes in other areas and

overlooks the results that may have distinctive capital structure and financial risk characteristics, and it turns out that few studies have been published on the top finance journals.

Similar to the first limitation, more scholars in the fields are expected to be investigated. The research only demonstrates one researcher, Stewart Clay Myers. Nevertheless, if more viewpoints from different scholars are investigated, the paper will be more abundant and sophisticated. If provided more time, the first two limitations can be improved by further future researches.

Thirdly, as a survey in qualitative research, the paper characteristically lacks quantitative methods. In detail, the statistical evidence may illustrate the level of leverage, the degree of financial risk, and the correlation between capital structure and financial risk more evidently and practically. However, an overview of the significant prior researches is entirely based on the present findings, and the conflicting results due to different situations or from different perspectives may confuse the introductory-level finance learners.

Also, since the capital structure subject is complicated with the development of theories if examined deeper and further, it is not adequate to stop at the fundamental descriptions of the developing theories at different stages. Notably, it is important to include as detailed information as possible.

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APPENDIX

Table 1: Studies on the development of important capital structure theories

Theories	Key content of the theory (Ahmadinia, Afrasiabishani, & Hesami, 2012)	Literatures
Modigliani and Miller (M&M) theory	With no tax, transaction cost, or asymmetry information, the changing of debt in capital structure will not change the total value of firms.	<ul style="list-style-type: none"> - The Cost of Capital, Corporation Finance and the Theory of Investment (Modigliani & Miller, 1958) - A Note on Modigliani and Miller's Extension of the Theory of Investment and Financing (Hållsten, 1966) - The Modigliani and Miller Theorem and Market Efficiency (Titman, 2001) - A Test of the M&M Capital Structure Theories (Fosberg, 2010)
Net Income Approach (NI)	There is no optimal capital structure, and the changing debt in leverage cannot determine the value of firms since the leverage will both affect the weighted average of cost and stock price.	<ul style="list-style-type: none"> - Costs of Debt and Equity Funds for Business: Trends and Problems of Measurement (Durand, 1952)
Static Trade Off Theory	The optimal capital structure choice has a tradeoff between the advantage, for instance, tax saving, and disadvantage of debt financing source.	<ul style="list-style-type: none"> - A State-Preference Model of Optimal Financial Leverage (Kraus & Litzenberger, 1973) - Testing trade-off and pecking order theories financing SMEs (Gracia & Mira, 2008) - Are Corporate Default Probabilities Consistent with the Static Trade-off Theory? (Hovakimian, Kayhan & Titman, 2012)

Market Timing Theory	The capital structures of firms will be affected by the fluctuations, undervaluation and overvaluation of stock prices	<ul style="list-style-type: none"> - Market Timing and Capital Structure (Baker and Wurgler ,2002) - Testing the Market Timing Theory of Capital Structure (Huang & Ritter, 2004) - How Persistent Is the Impact of Market Timing on Capital Structure? (Alti, 2006) - Equity market timing and capital structure: International evidence (Mahajan & Tartaroglu, 2008) - Panel data analyses of the pecking order theory and the market timing theory of capital structure in Taiwan (D CHEN, C Chen, J Chen & Huang, 2013)
Pecking Order Theory	Firms will prefer internal financing sources and then consider external financing sources.	<ul style="list-style-type: none"> - Corporate financing and investment decisions when firms have information that investors do not have (Myers & Majluf, 1984) - Capital structure: New evidence of optimality and pecking order theory (Ghosh & Cai, 1999) - Financing Preferences of Spanish Firms: Evidence on the Pecking Order Theory (Sánchez-Vidal & Martín-Ugedo, 2005) - Static Trade-off theory or Pecking order theory which one suits best to the financial sector. Evidence from Pakistan (Butt, Khan & Nafees, 2013)

This table reports the results in the development of important capital structure theories part. The first column lists the chosen theories. The second column provides a general definition and essential content of the theory, which is basically summarized from the paper, *A Comprehensive Review on Capital Structure Theories* (Ahmadinia, Afrasiabishani, & Hesami, 2012). The third column the title, author, and publish year of the referenced papers.

Table 2: Studies on the determinants of capital structure

Study	Measures	Independent Variables	Main Results
The Determinants of Capital Structure Choice (TITMAN & WESSELS, 1988)	Dividing convertible, short-term, and long-term debt by book values of equity.	Uniqueness, Asset structure, Growth and size, Non-debt tax shields, Industry classification	(-): Uniqueness, Past profitability (Firm Size and transaction costs); (/): Future growth, non-debt tax shields, asset collateral value, and volatility.
Determinants of capital structure: Theory vs. practice (Kjellman & Hansén, 1995)	Questionnaire for managers about their target capital structure and capital strategy	Firm size, Financing preference (factors related to expected cash flow, risk, long-term survivability, and etc.)	Low-level asymmetric information, financing preferences (not firm size), and managerial attitudes are related to a target capital structure
Are the determinants of capital structure country or firm specific? (Psillaki & Daskalakis, 2009)	Dividing total debt by total assets	Firms' asset structure, Growth (annual earning change), Profitability, and Risk	(-): Tangible assets, Profitability, Risk; (/): Growth
Managerial Autonomy, Allocation of Control Rights, and Optimal Capital Structure (Boot & Thakor, 2011)	Leverage ratio	Security insurance, stock price, the value of assets	(-): stock price; high agreements (+): assets in place value

The table summarizes all the findings about the determinants of capital structure in the Literature Review and Findings. The first column demonstrates the name of the article, the author, and year of publication. The second column lists the measures of the particular research. In the third column, the independent variables in the studies are listed. The last column concludes the major findings, in which the (-) denotes a negative relationship between the factor and the debt level/leverage/capital structure, the (+) reports the positive relationship, and (/) denotes an insignificant effect.

Table 3: Studies on the research of capital structure in China

Journal	Literatures	Focus/Keywords
The Journal of Finance	Capital Structure and Financial Risk: Evidence from Foreign Debt Use in East Asia (Allayannis, Brown, & Klap, 2003)	Capital structure; Foreign Debt; Financial risk
The Review of Financial Studies	Formal versus Informal Finance: Evidence from China (Ayyagari, Demirgüç-Kunt, & Maksimovic, 2010)	Bank financing; Informal financing; Growth of Chinese private firms
Journal of Financial Economics	Institutions, ownership, and finance: the determinants of profit reinvestment among Chinese firms (Cull & Xu, 2005)	Property rights; Investment; Banking; China
	China share issue privatization: the extent of its success (Sun & Tong, 2003)	China; State-owned enterprise; Partial privatization; Restructuring; Performance change
Journal of Finance and Quantitative Analysis	None	/
Journal of Money, Credit and Banking	Short-Term Corporate Debt around the World (SORGE, ZHANG, & KOUFOPOULOS, 2017)	Debt maturity; Law and finance; Information sharing
Journal of Banking and Finance	Corporate tax, capital structure, and the accessibility of bankloans: Evidence from China (Wu & Yue, 2009)	Capital structure; China; Tax; Bank loans
	Does banks' systemic importance affect their capital structure and balance sheet adjustment processes (Bakkar, Jonghe, & Tarazi, 2019)	Capital structure; Systemic size; Systemic risk; Lending; Speed of adjustment; Balance sheet composition; Bank regulation
	Investment and financing constraints in China: Does working capital management make a difference? (Ding, Guariglia, & Knight, 2013)	Working capital management; China; Cash flow; Investment; Financing constraints
Mathematical Finance	None	/

Journal of Financial Intermediation	The corporate purchase of property insurance: Chinese evidence (Zou & Adams, 2006)	People's Republic of China; Property insurance; Agency theory; Corporate sector
	Financing decisions after partial privatization in China: Can a stock market quotation really provide discipline? (Huyghebaert, Quan, & Sun, 2014)	Capital structure; Privatization; Governance; Default risk; Asymmetric information; Governance
	Understanding informal financing (Allen, Qian, & Xie, 2019)	Informal financing, Asymmetric information, Social collateral, Firm growth

The table shows the findings about research of capital structure in China. The first column demonstrates the names of the A tier financial journals based on the paper, *Finance journal rankings and tiers: An Active Scholar Assessment methodology* (Currie & Pandher, 2011). The second column lists the name of research papers that are related to capital structure research and China. The last column shows the keywords and focus of the study.