DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE OF CHINESE MARKET

By

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I confirm that this independent study has been carried out under my supervision and it represents the original work of the candidate.

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ABSTRACT

This study aims to find determinants of capital structure of Chinese market. The data of financial statement and income statement from 2012 to 2016 are collected from the Thomson Reuters Datastream which include sales, earnings before interest and tax (EBIT), fixed assets, market capitalization, long-term debt, short-term debt and total debt. This study use panel regression to find the relationships between those variables.

The results suggest that sales, fixed assets and market capitalization have significant relationship with debt ratio. EBIT is only correlated with the long-term debt ratio. Those results provide various implication to academicians, investors and managers.

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CHAPTER I

GENERALITIES OF THE STUDY

1.1 Background of Study

Nowadays, many countries and regions have their own financial markets. The economy of those countries may be growing, recovering or in recession, but they have their own capital characteristic and policy condition. As a result of the differences, the determinants of corporate capital structure of different countries might be different across the world.

As same as other countries, China also has a specific capital characteristic and policy situation. In the last two decades, China has been growing rapidly on economic and financial market. Following the growth of economy of China, the foreign capitals have been attracted to Chinese market while high expected returns prevailed in China. Eventually, as confirmed of World Bank, China became the second largest economy by nominal GDP and the largest economy by purchasing power parity in 2015. Until the 30 December 2016, the total number of listed companies, listed on the two national exchanges, is more than 3,000. Consequently, China, which has the large number of listed companies, becomes a laboratory for the study of the corporate financial policy in developing countries.

Started from the three papers of Modigliani and Miller (1958), many studies and research (Myers & Majluf, 1984, Ross, 1977, Frank & Goyal, 2003, Jensen & Meckling, 1976, etc.) advocated to relax the assumptions introduced by M&M for trial of development of determinant of capital structure. They employed an abundance of variables such as difference of economies, bankruptcy costs, industrial characteristics, firm characteristics and ownership structure. Thus, numerous factors, which impact capital structure, lead to the complication of understanding of the determinants of capital structure. However, previous research and studies provided a lot of successful results of determinants of capital structure which relate or not relate to Chinese Stock Market. The differences of each study still exist while they employ the different variables and the variables are diversely defined. Many studies (Liu 1999, Chen & Roger, 2005, Chen, Jiang & Lin, 2013, etc.) on determinant of capital structure of Chinese Stock market used firm characteristics as the variables to determine capital structures. Therefore, this study inspired by the studies discussed

above to employ four characteristics used in the previous studies to examine the determinants of capital structure of companies listed on Chinese Stock Exchanges.

1.2 Statement of Problem

Previous studies of determinants of capital structure give many alternatives of firm characteristics which impact capital decisions of company, such as profitability, firm size and growth opportunity. Moreover, the leverage also has different measurement. There are many empirical studies on the relationship between firm characteristics and leverage level. However, as the reason of undefinable variables, until now there is no consistent result to this relationship.

The studies in Chinese capital market did not give the clear answer of determinants of capital structure in China. Those studies provide the different measurement of variables and also acquire the different approaches to study the relationship between firm characteristics and leverage. It is, therefore, interesting to investigate the determinants of capital structure in China.

1.3 Research Objectives

This study aims to test the determinants of capital structure and their impacts in China, whose financial markets have been growing fast and have high growth opportunity. However, previous studies don't have consistent result of the determinants of capital structure. Therefore, the main objective of this study is to determine factors which have significant impact on capital structure of listed companies in China.

1.4 Research Questions

Based on the research objectives, the following question should be set:

Which firm characteristics have the impacts on the firm leverage?

1.5 Scope of the Research

Chinese company only releases annual report; therefore, this study intends to find the determinants of capital structure of listed companies in China over 5 years from 2012 to 2016 by using accounting information. This study focuses on the relationships between leverage and firm characteristics, including firm size, profitability, tangibility, and growth opportunity and industry classification. And all data are collected from Datastream.

1.6 Limitation of Study.

This study may limit on only four main characteristics and one minor characteristic of listed Chinese company while there are more variables affecting the capital structure of firms. Hence, the other variables could be considered in further research.

1.7 Significance of Study

The results of this study can provide evidences of determinants of capital structure of listed companies in China during 2012 to 2016. Therefore, academicians, investors and managers can use the results as the reference for their study, investment, and management.

Academically, this study provides the information on Chinese financial markets which may introduce the better understanding of Chinese Capital Market. Alternatively, this study adds more literature about the capital structure of listed companies in China.

1.8 Definition of Terms

Terms	Definitions
Agency cost	The cost of the conflict of interest between principle and agency, The cost of the conflict of interest between insiders and outsiders. (Jenson and Meckling, 1976; Harris and Raviv, 1911)
Capital structure	The proportion of debt and equity used by firms. (Modigliani and Miller, 1958, 1963)
Firm size	The size of firm. (Titman and Wessels, 1988)
Growth opportunity	The expected future investment opportunity of firm. (Fama and French, 2002)
Leverage	The debt of a firm, usually implies firm's financial risk. (Modigliai and Miller, 1958)
Profitability	The ability of a firm to make profit. (Fama and French, 2002)
Tangibility	The value of a firm's tangible assets such as property, equipment and plant. (Frank and Goyal, 2009)

CHAPTER II

REVIEW OF RELATED LITERATURE AND STUDIES

2.1 Related Theories of Capital Structure

This section starts from the capital structure irrelevance which is the cornerstone of modern theory of capital structure placed by the studies of Modigaliani and Miller (1958). Subsequently, more theories related to corporate capital structure are mentioned. Those theories are M&M Theory, Trade-off Theory, Agency Cost Theory, Pecking Order Theory and Signaling Theory. The second part of this chapter reports the empirical research related to capital structure.

2.1.1 M&M Theory

Capital structure irrelevance emerged after the illustrious paper of Modigaliani and Miller (1958) published. They argued that the relationship between corporate capital structure and corporate value is irrelevant under strong and important assumptions. The assumptions of their study include 1) market conditions are perfect with no taxes and no bankruptcy cost, 2) investors and managers have the symmetric information, 3) investors and corporates are free to borrow and lend at the same interest rate, and 4) earnings before interests and taxes would not be impacted by debt. And M&M (1958) proved that, under those assumptions, the firm value is irrelevant to the capital structure of firm.

Real world corporate taxes are applied differently to the two kinds of financing approaches which are debt and equity. Thus, Miller and Modigaliani (1963) relaxed one of the assumptions which is corporate tax. In the presence of corporate taxes, shareholders receive the after-tax profits but bondholders receive the before-tax profits. Because of this reason, firms can use leverage to reduce the earnings before taxes and then reduce the tax payment. Therefore, company should use 100% debt financing to maximize the value of firm.

Miller (1977) discussed the firms' capital structure in the circumstance of the existence of the personal income tax. The benefits of raising debt would be reduced with the presence of personal tax, however, firm would still use 100 percent of debt. In general, bonds generate interest tax whereas stocks create dividend tax and capital

gains tax. The income taxation on interest and dividend realized when investors received them. The income taxation on capital gains realized when investors sell stocks. The existence of personal income tax will lead investors to invest in the low tax assets. Therefore, the tax-exempt investors invest in debt whereas high tax bracket investors buy stocks. Firms can issue more debts to investors if the demand of the tax-exempt investors is still abundant. However, in equilibrium, the firms cannot alter their value by increasing or decreasing their debts. Hence, the capital structure does not have any effect on the firm's value in market equilibrium. Miller (1977), therefore, concluded that with both corporate and personal taxes, capital structure is irrelevant, in equilibrium.

2.1.2 Trade-off theory

Initially, firms should use debt financing to generate tax shield as much as possible in the M&M's perfect market. However, there is no perfect market in real world. Thus, following the debt increases, the bankruptcy-related costs will go up. And the increasing bankruptcy costs will counteract tax saving benefits of debt. An optimal capital structure exists while firm trades off between tax saving benefits and bankruptcy cost of using debt (Kraus and Litzenberger, 1973). Therefore, managers would put more effort on work to prevent bankruptcy rather than taking perquisite by using firm resources.

Debt is a kind of obligation of a firm. If this obligation cannot be fulfilled, the firm would get into financial distress which may lead to bankruptcy. The bondholders of bankruptcy firm have the priority to the assets of firm, and they have the right to claim their borrowing back. If a firm goes bankrupt while the equity value equals the debt value, equity will have no value after paying back the debt. As long as bankruptcy happened in reality, the cost is expensive (Liu, 1999). There are two kinds of costs along bankruptcy, direct and indirect. Direct bankruptcy costs are usually legal and administrative costs which happened in the process of bankruptcy, and it is not big compared to the assets of firm. On the other hand, the indirect bankruptcy costs include the loss of valuable employees, loss of opportunities to profitable investment and the decline in revenues (Ross, Westerfield, Jordan & Roberts, 1996).

2.1.3 Agency Cost Theory

In an efficient market, when a business becomes larger enough to become a public firm and owners do not have the capacity to manage a firm, the firm will need

managers to join managements of firm. In that state, there are some differences between the interest of owners of firm (principal of firm) and the interest of employed manager (agency of firm). Principal and Agency want their utility to maximize, thus the differences may engender Agency in operating the firm according to their own interest rather than interest of Principal. Consequently, Principal of firm may have to set some expenditure for that kind of behavior of Agency or prevent that kind of behavior of Agency (Jensen and Meckling, 1976).

The problem would become complicated when owners of firm have capacity to join management team of firm. In that state, there is a new role called owner-managers which can sell stock to outsider. Subsequently, owner-managers and outsider shareholders have mutual interest in some points while they share the costs of operation taken by managers. Jensen and Meckling (1976) argued that when owner-managers sell stocks of firms, they tend to take perquisite by using larger amounts of resources of firm in order to maximize their utility. The perquisite engenders other shareholders spend more resources in order to monitor their behavior which may damage other shareholders' interests. Nevertheless, the ownership of owner-managers falls leading to negative attitude to do some profitable ventures while they may simply avoid those ventures because of the work is arduous or they just do not like that venture.

Furthermore, if a firm sell bonds to an outsider, there is a new role called bondholders which may raise the conflict against shareholders. The bondholders require fixed rate of return on face value of bonds. Therefore, given success on investment and a large return, shareholders take most of the earnings. On the other hand, if firm gets fail, bondholders will bear the loss according to the fair value of assets and shareholders take limited loss up to amount of their investment. Therefore, the firm gets benefits on taking debt while providing an incentive to shareholders or owner-managers to invest in very risky and profitable project.

2.1.4 Pecking Order Theory

Myers (1977) finds four facts about firm's financial behavior. 1) Firms try to stabilize their dividend payout even though their profits fluctuate, 2) the internal resources of fund are the first choice of corporate finance and then are external sources, 3) firm will take safe debt first if it is necessary to acquire external funds, 4) firms will issue more equity only if firms require more external funds and cannot issue more bonds. The approach that firms try to get financing is called pecking order.

However, Myers and Majluf (1984) argue that the informational asymmetries between insiders and outsiders engender that outside investors consider firm's financing

activities as the signal of firm's performance. When the firms raise fund for their new project, the internal fund is the priority choice because managers do not want to deliver any signal to outside investors. If internal funds cannot fulfill the requirement of investment, firm would like to raise debt as the more favorable external funds resources rather than equity which has higher risk than debt. However, if debt is not enough to fulfill the requirement of investment, firm may give up that project rather than bearing risk. Thus, firms with high profitability would like to take lesser debt while free cash flow can fulfill the demand of funds of investment.

Moreover, Myers and Majluf (1984) suggest that firms can issue equity to financing under the circumstance that managers do not have or have very small asymmetrical information advantages against outside investors.

2.1.5 Signaling Theory

Initiated by Ross (1977) and Leland and Pyle (1977), the asymmetric information between insiders and outsiders is the basic of signaling theory which announced that firm's financing activities deliver either good messages or bad messages to outside investors. In other word, outsider investors would consider capital structure of firms as a signal of firm value. In general, once firms receive funds to start the new profitable project by issuing debts, it is considered as good news to outside investors. On the other hand, if the firms use equity financing, outside investors consider such action as bad news of firm.

Even if the firm's financing decisions bring good news to outside investors, the informational asymmetries engender that outside investors may consider the good news as fake news created by managers to increase firm value by signaling new investment opportunities to market. However, managers must signal information of raising funds for profitable project to outside investors while the moral hazard blocks this possibility. Therefore, observable eagerness of investment actions of the persons with inside information is the signal of good news of profitable project to outside investors (Leland and Pyle, 1977).

2.2 Review of Previous Studies on Determinant of Capital Structure

This section is to review the previous studies on determinants of capital structure. Many empirical studies on this topic stated that the definitions of factors of capital structure are ambiguous, thus this section presents the definition terms and the proxy

of each firm characteristic used in previous studies.

2.2.1 Leverage

The leverage, the ratio of debts to total assets, is defined by numerous studies to represent the firms' financing composite (Titman & Wessels, 1988; Liu, 1999; Fama & French, 2002, etc.). Number of studies (Stohs & Mauer, 1996; Titman & Wessels, 1988; Rajan & Zingales, 1995; Chittenden et al, 1996) suggested that firm characteristics have the effect on the debt maturities. The short-term debts are classified as maturity of less than one year, and the long-term debts are more than one year.

2.2.2 Firm size

Many studies (Rajan & Zingales, 1995; Stohs & Maurer, 1996; Liu, 1999; Fama & French, 2002.) suggested that firm size has effect on the firm leverage. Trade-off theory shows that the tradeoff between costs and benefits of taking leverage is the major problem of firm. The benefits of taking leverage usually include the tax deduction of debt and discouragement of manager in using large amount of firm resource to take perquisite. The costs of taking leverage include the increased bankruptcy costs and agency problems. Large firms usually have the good diversification of risk. Thus, the large firm can take more benefits by taking leverage when the cost of bankruptcy is minimized (Rajan & Zingales, 1995). Moreover, large firm have low risk contrast with small firm. Lenders may put their money into large firm to avoid risk. Thus, large firms are willing to take more debt in their capital structure while the other factors are controlled.

In accordance with agency cost theory, small firms do not have enough resources to monitor the manager's behavior; therefore, smaller firms have more severe agency problem than larger firms. Consequently, smaller firms may use more short-term debt to pull up the required rate of return to prevent managers from taking perquisite by using firm resources (Stohs & Maurer, 1996). Signaling Theory (Leland & Pyle, 1977) suggested that debt can be used as the reliable signal of firm's performance quality. Large firm can afford more debt in order to run their new projects.

There are numbers of studies which use various measurements of firm size and the effect on the several of leverage measurements as shown in the Table 2.1. For instance, they use natural logarithm of sales as the measurement of firm size. Titman and

Wessel (1988) produced the result of negative correlation between firm size and leverage by using the US samples which follow the predication of Pecking order theory. In contrary, Chen, Jiang and Li (2013) found that the leverage moves in the same direction with the firm size by using sample of China. Same as the results of Chen, the studies of Liu (1999) and Song (2005) demonstrated the positive relationship between firm size and leverage in China. And for the studies that use natural logarithm of total assets to measure firm size, they have the following results. Fama and French (2002) reported that the firm size is positively related to leverage in US. Chen and Roger (2005) found the same result as Fama and French (2002) which is the large firms have more debt than small firms by using the sample of Chinese listed firms. Frank and Goyal (2009) use log of book value of assets as the proxy of firm size. They reported positive relationship between firm size and leverage in their study. Liu, Bhabra and Tirtiroglu (2008) reported a positive relationship between firm size and leverage.

Table 2.1: Relationship between firm size and leverage of the previous studies

Measurement of firm size	Leverage	Result	Reference	Country
Natural logarithm of sales	Short-term debt/Market value of Equity Long-term debt/Book value of Equity	Negative	Titman and Wessels (1988)	USA
	Long-term debt/Market value of Equity Convertible debt/Market value of Equity	Statistical insignificance		
Natural logarithm of sales	Total debt/Book value of total assets Long-term debt/Book value of total assets Short term debt/Book value of total assets Total debt/ (Market value of Equity + total debt) Long-term debt/ (Market value of Equity + total debt) Short-term debt/ (Market value of Equity + total debt)	Positive	Chen, Jiang and Lin (2013)	China
Natural logarithm of sales	Total debt/Book value of total assets Long-term debt/Book value of total assets Total debt/ (Market value of Equity +total debt) Long-term debt/ (Market value of Equity +total debt)	Positive	Liu (1999)	China

Table 2.1 continued

Natural logarithm of total assets	(Total assets – book value of common equity)/Total assets (Total Assets – book value of Common Equity)/ [(Total assets – book value of common equity) +Market value of Common Equity]	Positive	Fama and French (2002)	USA
	Total debt/Book value of total assets Total debt/ (Market value of Equity +total debt)	Positive	Chen and Roger (2005)	China
	Total Debt/Total asset Short-term Debt/Total asset Long-term Debt/Total asset	Positive	Song (2005)	Swedish
Log of book value of assets	Total Debt/Market Value of Assets	Positive	Frank and Goyal (2009)	USA
Natural logarithm of Assets	Book value of total debt / Book value of Total assets Market value of total debt / Market value of total assets Book value of long-term debt / Book value of Total assets Market value of long-term debt / Market value of total assets	Positive	Liu, Bhabra and Tirtiroglu (2008)	China

2.2.3 Profitability

In accordance with Trade-off theory prediction, holding other factors constant, firms with high profitability are more likely to take comparatively high leverage. The

retained earnings are one of the important determinants of capital structure (Myers, 1984; Myers & Majluf, 1984). The argument of the theory is that high retained earnings firms have lower chance to encountering financial distress, hence they acquire more benefits from interest tax deduction than low profitable firms (Frank & Goyal, 2009). Moreover, debtor may consider profitability as a factor which influence the credit level of firms. A high profitability firm are a more desirable target of lending.

Nevertheless, according to Agency Cost Theory, one of the advantages of taking debt is that the costs of manager's perquisite would be restricted. Thus, the firms with high profitability have more willingness to use debt to constrain the firm's resources devouring of perquisite of managers. The high profitable firms therefore have relatively high leverage level compared with low profitable firms (Jensen, 1986). Also, signaling theory predict that, the firms can use debt as the signal to show that profitable firms have ability to pay the interests and principals. Thus, the firms with high profitability can afford more debt than low profitable firms (Leland & Pyle, 1977).

On the other hand, there is an opposite prediction under Pecking Order Theory (Myers & Majluf, 1984). The firms with high profitability have high retained earnings meaning that they have big amounts of internal funds. In accordance with Pecking Order Theory, high profitable firms would like to use internal funds rather than external funds. Thus, high profitable firms usually have low leverage level compared with low profitable firms.

Table 2.2 presents the measurements of profitability in previous empirical studies. By using sample of the US, Fama and French (2002) found significantly negative correlation between profitability and leverage as in the prediction of pecking order theory. Titman and Wessels (1988), Liu (1999), Song (2005), Chen and Roger (2005), Frank and Goyal (2009) and Chen, Jiang and Lin (2013) also reported that the profitability significantly conversely related to leverage. Frank and Goyal (2009) found that the leverage is negatively correlated with profitability.

Table 2.2: Relationship between Profitability and Leverage of the previous studies.

Measurement of profitability	Leverage	Result	reference	Country
Earnings before interest and tax/ Total assets	(Total assets – Book value of Common equity) / Total assets (Total assets – Book value of Common equity) / [(Total assets – Book value of Common Equity) + Market Value of Common Equity]	Negative	Fama and French (2002)	USA
	Total debt / Book value of total assets Total debt / (Total debt +Market value of Equity) Long-term debt / Book value of total assets Long-term debt / (Total debt + Market value of Equity)	Negative	Liu (1999)	China
Earnings before interest and tax / Total assets	Total liabilities / Book value of Total assets Total liabilities / (Total liabilities + Market value of common stock)	Negative	Chen and Roger (2005)	China
	Total Debt/Total asset Short-term Debt/Total asset Long-term Debt/Total asset	Negative	Song (2005)	Swedish

Table 2.2 continued

Measurement of profitability	Leverage	Result	reference	Country
Gross profit / Total assets	Book value of total debt / Book value of Total assets Market value of total debt / Market value of total assets Book value of long-term debt / Book value of Total assets Market value of long-term debt / Market value of total assets	Negative	Chen, Jiang and Lin (2013)	China
Operating income before depreciation/Assets	Total debt/Market value of assets	Negative	Frank and Goyal (2009)	USA
Operating income / Assets **Operating income / Sales**	Long-term leverage / Market value of stock Short term leverage / Market value of stock	Negative	Titman and Wessel (1988)	USA
	Convertible leverage / Market value of stock Long-term leverage / Book value of Equity Short-term leverage / Book value of stock Convertible leverage / Book value of Equity	Statistical insignificance		

2.2.4 Tangibility

Generally, tangibility is the factor to measure the assets of firms, which are plant, property and equipment, in the empirical studies of capital structure. Firms with high tangibility have the nature of less chance encountering financial distress which engender the lower agency cost. Thus, in accordance with Agency Cost theory, high tangible firms would be taking less leverage than low tangible firms. However, lenders may consider fixed assets of firms as the security assets of their money. Once the firms go bankrupt, during the liquidation of fixed assets, it may bring debtors money back. Thus, banks may perceive level of fixed assets as an indicator of collateral (Liu, 1999).

Firms with high tangibility would be facing less expected financial distress, in accordance with Trade-off Theory. They can raise more debt for more tax shield benefits than less tangible firms. Again, firms with high tangibility are less informational asymmetry than firms with lower tangibility, in accordance with Pecking order theory, they can issue new equity. On the other hand, the pecking order theory suggests the same direction with trade-off theory. Firms with high tangibility might have low retained earnings and consequently leverage level is expected to be higher than low tangible firms (Frank & Goyal, 2009).

Table 2.3 shows empirical studies on the tangibility. For example, Liu (1999) reported the positive correlation between tangibility and leverage. Frank and Goyal (2009) found that tangibility, measured by ratio of fixed assets over total assets, is positively related to leverage. Moreover, the results of capital structure choice by Liu, Bhabra and Tirtiroglu (2008) show that tangibility is positively related to leverage especially to long-term leverage. However, Zhang (2008) found the opposite result which is the negative relationship between debt financing and tangibility. Song (2005) found that the relationship between tangibility and leverage is negative. However, Chaklader and Chawla (2016) found the negative relationship between leverage and proportion of fixed asset in total asset as well as the results of Nguyen (2014) and Ramadam (2009).

Table 2.3: Relationship between tangibility and leverage of the previous studies

Measurement of tangibility	Leverage	Result	Reference	Country
Fixed assets / Total assets	Total debt / Book value of total assets Total debt / (Total debt +Market value of Equity) Long-term debt / Book value of total assets Long-term debt / (Total debt + Market value of Equity)	Positive	Liu (1999)	China
	Book value of total debt / Book value of Total assets Market value of total debt / Market value of total assets Book value of long-term debt / Book value of Total assets Market value of long-term debt / Market value of total assets	Positive	Liu, Bhabra and Tirtiroglu (2008)	China

Table 2.3 continued

Measurement of tangibility	Leverage	Result	Reference	Country
Fixed assets / Total assets	Total liabilities / Book value of Total assets	Negative	Zhang (2008)	China
	Total debt/Total asset Short-term debt/Total asset Long-term debt/Total asset	Positive	Song (2005)	Swedish
	Total debt/Total asset	Positive	Chaklader and Chawla (2016)	USA
	Total debt/Total asset Short-term debt/Total asset Long-term debt/Total asset	Positive	Nguyen (2014)	USA
	Total debt/Total asset Short-term debt/Total asset Long-term debt/Total asset	Positive	Ramadam (2009)	The UK
(Property, Plant and Equipment) / Total assets	Total debt / Market value of Total assets	Positive	Frank and Goyal (2008)	USA

2.2.5 Growth Opportunity

As agency cost theory predicted, the equity-controlled firms have the incentive to take wealth from debtholders of the firms by investing at suboptimal level. This agency problem is higher in growing industries because those industries have more flexible future investment selections (Fama & French, 2002). When firms are lacking investment, or staying in constant period of firms' earning and growing, managers would like to consume perquisites from surplus free cash flow (Jensen & Meckling, 1976). Hence, the growth opportunity should be negatively associated with long-term leverage.

The trade-off theory predicts that the high growth opportunity firms usually take less debt because they do not accept the high financial distress generated by raising high leverage. Moreover, growth opportunities are untouchable assets of firms that add value to the firms but cannot be collateralized in the financing activities. Thus, the arguments above suggest the negative relationship between long-term leverage and growth opportunity (Titman & Wessels, 1988).

The pecking order theory suggests that the growing firms should accumulate more leverage over time with the growing future investment and fixed profitability. Firm with high growth opportunity usually have no enough retained earnings to invest in larger project which engender the raising of external fund. The first available external fund is debt. Thus, the growth opportunity should be positively related to leverage. The argument of the signaling theory also supports the analysis (Frank & Goyal, 2009).

Table 2.5 shows the measurement and results of previous empirical studies on the relationship between leverage and growth opportunity. There are several studies, for example, Liu (1999) found that growth, measured by change of total assets, is positive related to the leverage on some special firms which were supported by the state under the policy of Chinese government. And Fama and French (2002) reported that the total market value over total assets as the growth opportunity is positively correlated with book value measured leverage while it was negatively related to market value measured leverage. Moreover, Fama and French (2002) captured that research and development expenditure as growth is negatively statistically significant with Leverage. However, Chen and Roger (2005) discovered that average percentage growth rate of sales as the growth opportunity tends to be insignificantly related to leverage. Chen, Jiang and Lin (2013), using Main operating income growth as growth opportunity, found the statistical insignificant result of the relationship between growth and leverage. Additionally, Frank and Goyal (2009) did not observe the statistical significant relationship between growth and leverage while acquiring two measures of growth which are change in logarithm of total assets and capital expenditure over total assets.

Table 2.4: Relationship between Growth Opportunity and Leverage of Previous studies

Measurement of growth opportunity	Leverage	Result	Reference	Country
Change rate of total assets	Total debt / Book value of total assets Total debt / (Total debt +Market value of Equity) Long-term debt / Book value of total assets Long-term debt / (Total debt + Market value of Equity)	Partly Positive significant	Liu (1999)	China
Total market value / Total assets	(Total assets – Book value of common stock) / Total assets	Positive	Fama and French (2002)	USA
	(Total assets – Book value of common stock) / [(Total assets – Book value of common stock) + market value of common stock]	negative		
Research and development expenditure / Total assets	(Total assets – Book value of common stock) / Total assets (Total assets – Book value of common stock) / [(Total assets – Book value of common stock) + market value of common stock]	Negative		

Table 2.4 continued

Measurement of growth opportunity	Leverage	Result	Reference	Country
Average percentage growth rate of sales	Total liabilities / Book value of Total assets Total liabilities / (Total liabilities + Market value of common stock)	Statistical insignificant	Chen and Roger (2005)	China
Change in logarithm of Total assets	Total debt / Market value of assets	Statistical insignificant	Frank and Goyal (2009)	USA
Capital expenditure / Total assets				
Growth rate of Earnings before interest and tax	Book value of total debt / Book value of Total assets Market value of total debt / Market value of total assets Book value of long-term debt / Book value of Total assets Market value of long-term debt / Market value of total assets	Statistical insignificant	Chen, Jiang and Lin (2013)	China

2.2.6 The effects of industry classification

Many studies (Titman & Wessel,1988; Varela & Limmack, 1998; Liu, 1999; Chen, Jiang & Lin 2013; etc.) have examined the impact of industry classification on the capital structure decision. Titman and Wessel (1988) found that the leverage level of firms produce machines and equipment is higher than firms that do not produce those in the US. Varela and Limmack (1998) suggested that there are significant differences

in capital structure among nine industry groups which encompass 112 firms in the UK. However, the result of Liu (1999) suggested that manufacture firms have significant high long-term debt contrast with others in China. Chen, Jiang and Lin (2013) argued that real estate industry is the sole significant factor which relate to level of debt. As the result of Liu, Bhabra and Titiroglu (2008), leverage level of retail, services and trade industry is not significant related with their industry classification. However, Tes and Rodgers (2013) found that Mining & Oil industry have significant impact on the leverage level.

Chapter 3

Data and Methodology

The chapter consists of two sections, the first section is the illustration of the measurement of dependent and independent variables and sample selection with the data sources, and then second section is the explanation of the methodology of this study.

3.1 Data and the Measurement of the Variables

The samples consist of a cross-sectional data of Chinese listed firms from 2012 to 2016 retrieved from DataStream. All non-financial firms and non-utility firms in two Chinese Stock Markets, namely Shanghai Stock Exchange and Shenzhen Stock Exchange, will be investigated. Financial firms would have special capital structure and utility firm may be regulated by government sponsor to ensure the special capital structure; therefore, they are excluded from the study.

3.1.1 Dependent Variables.

The measurement of leverage level used in this study partially follows Chen, Jiang and Lin (2013). The definition of leverage is ratio of book value of leverages to book value of total assets. There are three dependent variables, Total liabilities, Long-term liabilities and Short-term liabilities which are defined as follows:

Total liabilities over total assets ratio:

$$TL = \frac{Total\ \ liabilities}{Total\ \ assets}$$

Total Long-term liabilities over total assets ratio:

$$LTL = \frac{Total\ \ long\ \ term\ \ liabilities}{Total\ \ assets}$$

Total short-term liabilities over total assets ratio:

$$\text{STL} = \frac{Total\ \ short\ \ term\ \ liabilities}{Total\ \ assets}$$

3.1.2 Independent Variables

A. Size

There are a lot of studies using natural logarithm of sales as a proxy of firm size (Titman & Wessel; 1988, Chen, Jiang & Lin, 2013; Liu, 1999; and Goyal et al. 2001). Hence, in this study, natural logarithm of sales is used as the proxy for the size of firm.

$$\text{Size} = \text{Ln}(\ \text{Sales})$$

As we discussed earlier, Trade-off Theory suggested that large firms can raise more debt to take tax shield benefits while they usually are well diversified and high credit rated. Agency Cost Theory encourages firms to take more debts in order to monitor manager's behavior by introducing debt covenant. Larger firms usually can afford more debts in order to run their new projects which may be interpreted as a good signal by outside investors, in accordance with the suggestion of Signaling Theory. Therefore, firm size may have positive relationship with level of firm leverage. The hypothesize of firm size should be as follows:

H_0: There is no relationship between leverage and firm size.

H_1: There is positive relationship between total leverage and firm size.

H_1: There is positive relationship between long-term leverage and firm size.

H_1: There is positive relationship between short-term leverage and firm size.

B. Profitability

In this study, earnings before interest and tax (EBIT) to total assets ratio employed as the proxy of profitability as suggested by Chen and Roger (2005).

$$Profitability = \frac{EBIT}{Total\ \ assets}$$

Firms with high profitability may have more retained earnings. According to the suggestion of Pecking order theory, firms will take less debts if the retained earnings are adequate to finance their new projects. Agency Cost Theory predicted that high profitability firms may be eager to raise debts for the circumstance of manager who used up all of retained earnings. However, Trade-off Theory suggested that firms with higher retained earnings have lower chance to encounter financial distress. Hence, high profitability firms may take more debts. Moreover, firms with high profitability

may raise more debt to signal that it is doing well under Signaling theory prediction. However, many studies showed that level of leverage of firm is negatively related to profitability of firm. Pecking order theory may intensely impact the relationship between profitability and leverage. Thus, the hypothesis of profitability should be as follows:

H_0: There is no relationship between leverage and profitability of firm.

H_2: There is negative relationship between total leverage and profitability of firm.

H_2: There is negative relationship between long-term leverage and profitability of firm.

H_2: There is negative relationship between short-term leverage and profitability of firm.

C. Tangibility

Tangibility is the ratio of fixed assets over total assets by following the study of Liu (1999).

$$Tangibility = \frac{Fixed\ \ assets}{Total\ \ assets}$$

The chance of financial distress of a firm with a high tangibility would be lower. Therefore, the Agency Cost Theory predicted that firm with high tangibility may have lower leverage level. Higher tangibility firms usually are less informational asymmetry than firms with lower tangibility firm. Thus, Signaling Theory and Pecking Order Theory do not influence on the tangibility. Trade-off Theory suggested that larger firm can raise more debt due to the well diversification of risk. Hence, the hypothesis of tangibility would be as follows:

H_0: There is positive relationship between leverage and tangibility of firm.

H_3: There is positive relationship between total leverage and tangibility of firm.

H_3: There is positive relationship between long-term leverage and tangibility of firm.

H_3: There is positive relationship between short-term leverage and tangibility of firm.

D. Growth opportunity

Growth opportunity is defined as the ratio of market value to book value of total assets as suggested by Fama and French (2002). The market value is the sum of total liabilities and market value of common equity.

$$Growth\ \ opportunity = \frac{Market\ \ value}{Book\ \ value\ \ of\ \ total\ \ assets}$$

Growing firms usually are equity-controlled firms which have the incentive to take wealth from debt-holders of the firms by investing at sub-optimal level. However, managers of mature firm may build empire inside of company and consume perquisites by taking resources of firm. Thus, Agency Cost Theory suggested that firms with high growth opportunity may raise less debt compared with lower growth

opportunity. Growing stage firms do not like financial distress brought by raising debts

Consequently, growth opportunity may have negative relationship with firm leverage. Therefore, the hypothesis of growth opportunity should be as follows:

H_0: There is negative relationship between leverage and growth opportunity of firm.

H_4: There is negative relationship between total leverage and growth opportunity of firm.

H_4: There is negative relationship between long-term leverage and growth opportunity of firm.

H_4: There is negative relationship between short-term leverage and growth opportunity of firm.

3.1.3 Control variables: Industry effects

The industry classification by Datastream contains 33 industries. Table 3.1 shows the industry list and the dummies of industry.

Table 3.1 Industry classification and Dummies

Industry classification	dummies
Aerospace and Defense	Industry no.1 (omitted in regression)
Alternative Energy	Industry no.2
Automobiles and Parts	Industry no.3
Beverages	Industry no.4
Chemicals	Industry no.5
Construction and Materials	Industry no.6
Electricity	Industry no.7
Electronic and Electrical Equipment	Industry no.8
Fixed Line Telecommunications	Industry no.9
Food and Drug Retailers	Industry no.10
Food Producers	Industry no.11
Forestry and Paper	Industry no.12
General Industrials	Industry no.13
General Retailers	Industry no.14
Health Care Equipment and Services	Industry no.15
Household Goods and Home Construction	Industry no.16
Industrial Engineering	Industry no.17
Industrial Metals and Mining	Industry no.18
Industrial Transportation	Industry no.19
Leisure Goods	Industry no.20
Life Insurance	Industry no.21
Media	Industry no.22
Mining	Industry no.23
Mobile Telecommunications	Industry no.24
Oil and Gas Producers	Industry no.25
Oil Equipment and Services	Industry no.26
Personal Goods	Industry no.27
Pharmaceuticals and Biotechnology	Industry no.28
Real Estate Investment and Services	Industry no.29
Software and Computer Services	Industry no.30
Support Services	Industry no.31
Technology Hardware and Equipment	Industry no.32
Travel and Leisure	Industry no.33

3.2 Methodology

This section discusses the regression model and model specification employed in this study.

3.2.1 Panel Regression

This study employs panel regression to find the relationship between dependent variables and independent variables as explained in the first section.

3.2.2 Model Specification

The panel regression has two models which are fixed effects model and random effects model. Hausman Test is employed to decide which model should be used. Hausman Test specification is the chi-squared test based on Wald criterion:

$$W = \chi^2[K-1] = (b-B)'[(Var_b - Var_B)^{-1}](b-B)$$

where b is the coefficient of variables of fixed effects model
B is the coefficient of variables of random effects model
Var_b is the variance of variables of fixed effects model
Var_B is the variance of variables of random effects model
W has a limiting chi-squared distribution with K-1degrees of freedom.

The null hypothesis of the chi-squared test is:

H_0: the preferred model is random effects model

After running the Hausman Test, then we choose the correct the model. The details of fixed effects model and random effects model are as follows:

The Fixed effects model:

$$leverage_t = \alpha_t + \beta_s Size_t + \beta_p Prof_t + \beta_{Tan} Tan_t + \beta_g Growth_t + \sum_{i=2}^{33} \beta_i D_i + \varepsilon_t$$

where $Leverage_t$ refers to the individual leverage components of year t,

$Size_t$ denotes the natural logarithm of sales of year t,

$Prof_t$ refers to the EBIT ratio of year t,
Tan_t refers to the fixed assets to total assets ratio of year t.
$Growth_t$ denotes the market value to book value of total asset ratio of year t.
t refers to the years from 2012 to 2016. D_i refers to dummies of industry.
i represents the number of dummies from 2 to 33.
where α_t is the intercept of year t, ε_t is the error term of year t.

The Random effects model:

$$leverage_t = \alpha_t + \beta_s Size_t + \beta_p Prof_t + \beta_{Tan} Tan_t + \beta_g Growth_t + \sum_{i=2}^{33} \beta_i D_i + \varepsilon_t + u_t$$

where $Leverage_t$ refers to the individual leverage components of year t,
$Size_t$ denotes the natural logarithm of sales of year t,
$Prof_t$ refers to the EBIT ratio of years,
Tan_t refers to the fixed assets to total assets ratio of year t.
$Growth_t$ denotes the market value to book value of total asset ratio of year t.
t refers to the years from 2012 to 2016. D_i refers to dummies of industry.
i represents the number of dummies from 2 to 33.
α_t is the intercept of year t, ε_t is the error term of year t.
u_t is the between-year error

Chapter 4

PRESENTATION AND CRITICAL DISCUSSION OF RESULTS

This chapter illustrates the descriptive statistics and empirical results. Cross-sectional regression is employed to examine the relationship between four firm characteristics and firm leverage. The first section presents descriptive statistics of data. The last section shows the empirical results and hypotheses testing.

4.1 Descriptive Statistics

Table 4.1 shows the five-year descriptive statistics for leverage ratios and four firm characteristics in six panels. It presents the mean, minimum, maximum and standard deviation of the variables discussed above. Panel A presents the descriptive statistics of year 2012, Panel B shows the descriptive statistics of year 2013, and so forth. Panel F shows the descriptive statistics of all five years.

Leverage ratios

In 2012, Total debt ratio (TTD) is on average 21.6 percent while the range of total debt ratio (TTD) is from 0 (minimum) percent to 497.7 (maximum) percent. Because the severe loss in this fiscal year, some firms may have TTD ratio over 100 percent under the China Accounting Standard. Short-term debt ratio is much higher than long-term debt ratio. On average, short-term debt ratio (STD) is 15.8 percent while long-term debt ratio (LTD) is 5.92 percent. Also, short-term debt ratio has a range from 0 percent to 497.7 percent whereas long-term debt ratio has interval of 0 percent to 84.5 percent.

In 2013, The interval of total debt ratio is from 0 to 350.5 percent when the average of total debt ratio is 21.6 percent. On average, Short term debt ratio and Long-term debt ratio are 15.7 percent and 6.01 percent, respectively. The range of them are 0 percent to 350.5 percent and 0 percent to 77.5 percent, respectively. The debt ratios drop during this year.

In 2014, Total debt ratio is reported an average number of 21.4 percent while the range of that is an interval from 0 percent to 149.7 percent. However, short-term debt ratio is 15.5 percent on average while it has an interval from 0 percent to 147.9 percent. And, long-term debt ratio has a range from 0 percent to 69.3 percent while it has a mean of 5.9 percent. The debt ratio keeps on decreasing.

In 2015, mean of total debt ratio is 20.8 percent and a range of total debt ratio from 0 percent to 148.4 percent. Moreover, long-term debt has an average of 5.92 percent, a minimum of 0 percent, and a maximum of 66.8 percent whereas short-term debt has a mean of 14.9 percent, a minimum of 0 percent, and a maximum of 148.4 percent. According to the ratios reported, the debt ratios are constant in 2015.

In 2016, It's a good year. In that year, all debt ratios are not above 100 percent. The total debt ratio has a mean of 19.4 percent where the range of that is from 0 percent to 87.5 percent. For different maturity debt, long-term debt ratio has an average of 6.07 percent and an interval between 0 percent and 84.6 percent. However, short-term debt ratio has a mean of 13.4 percent and a range from 0 percent to 76.9 percent.

Panel F reports that the average of total debt ratio is 20.9 percent for five years. The range of that is reported from 0 percent to 497.7 percent. Mean of short-term debt ratio is reported 15 percent whereas that of long-term debt is reported 5.96 percent. The intervals of different maturity debt ratios for short-term debt ratio and long-term debt ratio are between 0 percent to 497.7 percent and between 0 percent to 84.6 percent, respectively.

Table 4.1 suggest that the listed firms of China heavily rely on short-term debt. The short-term debt ratio is much higher which is different from long-term debt ratio. And the means of debt ratio are constant in a certain level while the debt ratios are constantly dropping during the period from 2012 to 2016.

Firm Characteristics

As Panel A shows, mean of firm size (Size) is 14.10 and the range of firm size is from 8.155 to 21.73 in 2012. Mean of firm profitability (prof) is 7.26 percent and the interval of profitability is between -206.6 percent and 226.1 percent in 2012. The average tangibility (tan) of firm is 27.1 percent and the range of firm tangibility is from 0.00162 percent to 97.5 percent in 2012. Growth opportunity (growth) has a mean of 0.185 percent and a range from 0.00768 percent to 23.3 percent in 2012.

In 2013, Panel B shows that the mean of firm size is 14.14 and the range of firm size is from 8.335 to 21.78. Mean of firm profitability, mean of firm tangibility, and mean of firm growth opportunity are 11.9 percent, 27.6 percent, and 0.212 percent, respectively. The ranges of them are -645.4 percent to 10,840 percent, 0.00309 percent to 97.4 percent, and 0.00607 percent to 34.9 percent, respectively.
In 2014, Panel shows that mean of firm size is 14.23 and the interval of that is between 8.964 and 21.75. Mean of firm profitability is 4.86 percent and the range of that is from -4,831 percent to 847.6 percent. Mean of firm tangibility is 27.5 percent and the interval

of that is between 0.000871 percent and 94.9 percent. Mean of firm growth opportunity is 0.285 percent and the range of that is 0.00893 percent to 96.5 percent.

In 2015, Panel D shows that mean of firm size is 14.31 and the range of that is 8.27 to 21.43. Mean of firm profitability is 5.57 percent and the range of that is -162.7 percent and 49.7 percent. Mean of firm tangibility is reported 26.2 percent and the interval of that is between 0.00339 percent and 93.1 percent. Mean of firm growth opportunity is reported 0.453 percent and the range of that is between 0.0000706 percent and 99.1 percent.

In 2016, Panel E shows that mean of firm size is 14.48 and the range of that is 8.592 to 21.38. Mean of firm profitability is 5.72 percent and the interval of that is between -105.3 percent to 935.4 percent. Mean of firm tangibility is 24.4 percent and the range of that is 0.00249 percent to 95.2 percent. Mean of firm growth opportunity is reported 0.325 percent and the maximum of that is 9.16 percent and the minimum of that is 0.000699 percent.

As the Panel F shows, from year 2012 to 2016, mean of firm size is reported 14.26 while the range of that is reported from 8.115 to 21.78. The firm profitability is reported on average 7.04 percent, with a range from -4,831 percent to 10,840 percent. Moreover, firm tangibility has a mean of 26.6 percent. The highest firm tangibility is 97.5 percent whereas the lowest of that is 0.000871 percent. And firm growth opportunity is on average 0.297 percent and the interval of that is between 0.0000706 percent and 99.1 percent.

Table 4.1 Descriptive Statistics

Panel A					
2012	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
size	2,759	14.10	1.550	8.155	21.73
prof	2,600	0.0724	0.118	-2.066	2.261
tan	2,743	0.275	0.192	0	0.975
growth	2,405	0.00184	0.00598	0	0.233
TTD	2,744	0.216	0.209	0	4.977
LTD	2,742	0.0586	0.0998	0	0.845
STD	2,721	0.159	0.177	0	4.977

Table 4.1 Continued

Panel B

2013 VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
size	2,831	14.14	1.544	8.335	21.78
prof	2,657	0.119	2.119	-6.454	108.4
tan	2,826	0.276	0.192	0	0.974
growth	2,298	0.00212	0.00849	0	0.349
TTD	2,827	0.216	0.192	0	3.505
LTD	2,827	0.0601	0.0995	0	0.775
STD	2,805	0.157	0.155	0	3.446

Panel C

2014 VARIABLES	(1) N	(2) mean	(3) sd	(4) Min	(5) max
size	2,959	14.23	1.540	8.964	21.75
prof	2,802	0.0492	0.935	-48.31	8.476
tan	2,954	0.279	0.194	0	0.949
growth	2,526	0.00283	0.0195	0	0.965
TTD	2,955	0.214	0.179	0	1.497
LTD	2,954	0.0585	0.0946	0	0.693
STD	2,950	0.156	0.142	0	1.497

Panel D

2015 VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
size	2,953	14.31	1.520	8.270	21.43
prof	2,839	0.0549	0.0870	-1.627	0.497
tan	2,951	0.266	0.195	0	0.931
growth	2,738	0.00449	0.0197	0	0.991
TTD	2,953	0.208	0.179	0	1.484
LTD	2,953	0.0584	0.0945	0	0.668
STD	2,951	0.149	0.139	0	1.484

Table 4.1 Continued

Panel E

2016 VARIABLES	(1) N	(2) mean	(3) Sd	(4) min	(5) max
size	2,950	14.48	1.513	8.592	21.38
prof	2,834	0.0573	0.187	-1.053	9.354
tan	2,950	0.248	0.190	0	0.952
growth	2,950	0.00325	0.00430	0	0.0916
TTD	2,950	0.194	0.171	0	0.875
LTD	2,950	0.0601	0.0971	0	0.846
STD	2,948	0.134	0.128	0	0.769

Panel F

2012-2016 VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
size	14,452	14.26	1.539	8.155	21.78
prof	13,732	0.0700	1.029	-48.31	108.4
tan	14,424	0.268	0.193	0	0.975
growth	12,917	0.00297	0.0134	0	0.991
TTD	14,429	0.209	0.186	0	4.977
LTD	14,426	0.0592	0.0971	0	0.846
STD	14,375	0.151	0.149	0	4.977
Number of years	5	5	5	5	5

As Table 4.2 shows, Top three highest average debt ratios are in the industries of Electricity, Industrial Metals and Mining, and Oil and Gas Producers. They are 0.422, 0.366, and 0.354, respectively. Lowest three average debt ratios are Beverages, Software and Computer services, and Mobile Telecommunications. They are 0.097, 0.085, and 0.084, respectively.

Table 4.2 Mean of Total Debt ratio (TTD), Long-term Debt ratio (LTD), and Short-term Debt ratio (STD) , ranked by TTD

Industry	TTD	LTD	STD
Electricity	0.4221959	0.255876	0.1663198
Industrial Metals and Mining	0.3660054	0.0759969	0.2904958
Oil and Gas Producers	0.353537	0.1625282	0.1910087
Forestry and Paper	0.3428274	0.114029	0.2305058
Industrial Transportation	0.2849984	0.1547111	0.1302873
Mining	0.2818207	0.099787	0.1820337
Real Estate Investment and Services	0.2776804	0.1617558	0.1202717
Alternative Energy	0.2527565	0.0942869	0.1584696
Chemicals	0.246936	0.0570428	0.1901696
General Industrials	0.2456413	0.0652183	0.180423
Construction and Materials	0.2421479	0.0731772	0.169372
Automobiles and Parts	0.2235123	0.0387939	0.1850074
Travel and Leisure	0.2222251	0.1026598	0.1195653
General Retailers	0.2202963	0.0602695	0.1600268
Personal Goods	0.2125811	0.0433652	0.1700852
Aerospace and Defense	0.2103637	0.0605362	0.1498275
Food Producers	0.2081906	0.045399	0.1627916
Support Services	0.2063175	0.0467554	0.1600232
Food and Drug Retailers	0.1911426	0.0259259	0.1652166
Oil Equipment and Services	0.1891031	0.0529529	0.1361502
Leisure Goods	0.1801807	0.0250682	0.1551125
Industrial Engineering	0.1787089	0.0356105	0.1435075
Electronic and Electrical Equipment	0.1605311	0.0319059	0.1289708
Household Goods and Home Construction	0.1592732	0.0246875	0.1346489
Technology Hardware and Equipment	0.1558966	0.028526	0.1277718
Pharmaceuticals and Biotechnology	0.1541484	0.037029	0.1174104
Unclassified	0.1312323	0.134598	0.197864
Fixed Line Telecommunications	0.1121001	0.0044772	0.1076229
Media	0.1073086	0.0359355	0.0716742
Health Care Equipment and Services	0.0997016	0.0202543	0.0794473
Life Insurance	0.0985266	0.0630165	0.037379
Beverages	0.0967901	0.0111766	0.0860594
Software and Computer Services	0.0854168	0.016931	0.0689132
Mobile Telecommunications	0.0841227	0.0120202	0.0721025

4.2 Model specification

Table 4.3 Result of Hausman Test

Hausman Test		
	fixed	random
size	0.0350777	0.0346256
prof	0.0016127	0.0018737
tan	0.2313487	0.2342883
growth	-5.696508	-5.872206
	chi-squared P value=0.0000	

The results from the Hausman Test in Table 4.3 reports the p-value of 0.0000 which indicates that the null hypothesis can be rejected at 1 percent significance level. This can be concluded that the fixed effects model should be used. However, as the time passes, the industry classification of firms does not change which means the usage of fixed effects model holds constant the average effects of each industry. Thus, fixed effects model also signally reduces the impacts of omitted variables by controlling all time-invariant factors.

4.3 Empirical Results

Table 4.4 illustrates the empirical results of panel regression of dependent and independent variables. The table contains the regression result of each leverage ratio with four firm characteristics and industry dummies. From right to left are Short-term debt ratio, Long-term debt ratio and Total-debt ratio.

As Table 4.4 shows, the strong positive significant implication of firm size is presented. The result is consistent with that of numerous studies (Rajan &Zingales, 1995; Stohs & Maurer, 1996; Liu, 1999; Fama & French, 2002, etc.) which suggest that large firm, on average, are more highly leveraged. Large firms usually have lesser costly leverage due to their ability to diversify the risk and their willingness of taking debt for tax deduction purpose. Thus, the evidence of this study supports that large listed firms of China may face a lower cost of financial distress and thereby easily raise more debt which consistent with the predictions of Trade-off Theory, Agency Cost Theory and Signaling Theory. Thus, the null hypothesis of no relationship between firm size and leverage is rejected at 1 percent significance level.

Table 4.4 Panel Regression Result (Dummy Variables are not reported)

VARIABLES	(1) TTD	(2) LTD	(3) STD
size	0.0335*** (0.000)	0.0145*** (0.000)	0.0185*** (0.000)
prof	0.000657 (0.645)	0.00181*** (0.0013)	-0.000860 (0.486)
tan	0.204*** (0.000)	0.129*** (0.000)	0.0772*** (0.000)
growth	-4.560*** (0.000)	-1.507*** (0.000)	-3.253*** (0.000)
Constant	-0.319*** (0.000)	-0.184*** (0.000)	-0.127*** (0.000)
Observations	12,337	12,336	12,298
R-squared	0.275	0.336	0.150
Number of years	5	5	5

Note: P-value in parentheses

*** denotes 1% significance level

Profitability of firm is negatively related to firm short-term leverage ratio which is consistent with the result of Chen and Roger (2005) but it is insignificant. The negative correlation shows the effect of pecking order theory. However, the long-term debt ratio has the significant positive relationship at 1 percent significance level with profitability which indicates that Agency Cost Theory, Trade-off Theory and Signaling Theory overwhelm the effect of Pecking Order Theory on long-term debt. Thus, the null hypothesis of no relationship between leverage and profitability is not rejected.

Evidence form Table 4.3 illustrates that tangibility has positive significant relationship with leverage ratios at 1 percent significance level. The coefficient on tangibility is positive on all three leverage ratios and all of them are measured over 99 percent confidence level. This result suggests that the physical collateral is one of the important factors of firm for lender to lend out their money. However, the result also confirms that Agency Cost Theory and Trade-off Theory have the vital influence on the relationship between leverages and tangibility. which is consistent with that of Liu (1999). Therefore, the null hypothesis of no relationship between leverage and tangibility is rejected at 1% percent significance level.

Again, the growth opportunity is negatively related to leverage ratios at 1 percent significance level. The result is consistent with that of Fama and French (2002). However, the result is also consistent with the predictions of Agency Cost Theory and

Trade-off Theory. The market value to total assets ratio is negatively related to leverage ratios. Thus, the null hypothesis of no relationship between firm growth opportunity and leverage is rejected at 1 percent significance level.

Industry effects

In this study, 34 industries are put as the dummy variables and 20 of them are significantly related to leverage level. The result is shown in the Appendix.

The Electricity industry is found to be positively related to total leverage and long-term leverage. The coefficients are 0.104 and 0.134, respectively, and both are significant at 1%. Mobile Telecommunications industry is found to be negatively related to all three types of debt ratio. The coefficients are -0.110, -0.0432, and -0.665, respectively. All of them are significant at 5%. The first result means that electricity industry heavily relies on long-term debt and also it is the heaviest leveraged industry. However, the second result illustrates that Mobile Telecommunications industry uses lesser debt compared with other industries, both on long-term and short-term debt.

Chapter 5

Conclusions and Recommendations

5.1 Conclusions

The empirical results of this study show that firm characteristics and industry classification impact the capital structure of listed firms of Chinese Stock Exchanges which indicates that the objective of this study is accomplished.

The firm size is found to have positive relationships with leverage ratios. And, firm size has strong influence on both short-term leverage and long-term leverage. Moreover, the positive relationship between firm size and leverages is consistent with the predictions of Trade-off Theory, Agency Cost Theory and Signaling Theory and also consistent with the results of papers based on Chinese market, such as Liu (1999), Chen and Roger (2005), Liu, Bhabra and Tirtiroglu (2008).

The firm profitability only significantly positively impacts the long-term debt which is opposite to most literature based on Chinese market and indicates that Agency Cost Theory, Trade-off Theory and Signaling Theory overwhelm the effect of Pecking Order Theory on long-term debt in 2006. However, the long-term debt is reported an insignificant negative relationship which is consistent with Titman and Wessel (1988).

Tangibility is also a vital factor of capital structure which is positively related to leverage ratios. In contrast with firm size, firm tangibility impacts more on long-term leverage.
The result suggested that Agency Cost Theory and Trade-off Theory greatly impact the relationship between leverages and tangibility. Also, this result is consistent with literature such as Liu (1999), Liu, Bhabra and Tirtiroglu (2008), Song (2005), Chaklader and Chawla (2016), Ramadam (2009) and Frank and Goyal (2008).

Lastly, the growth opportunity of firm negatively relates to leverages but similarly heavily impacts short-term leverage which indicates that Agency Cost Theory and Trade-off Theory heavily influence the relationship between leverages and growth opportunity. Moreover, this result is only consistent with Fama and French (2002).

Nevertheless, industry classification also explains the capital structure of firm when over half of number of industries are found that they have influence on capital structure. Moreover, Trade-off Theory, Agency Cost Theory, Signaling Theory, and Pecking Order Theory also can be applied to Chinese Stock Market.

5.2 Recommendations

Academicians, investors and managers can use the results as the reference for their study or investment.

This study provides more evidences of capital structure of Chinese listed firm from 2012 to 2016. The exploration on firm characteristics of this study shows the significant impact of firm size, firm profitability, firm tangibility, and firm growth opportunity, as well as, industry classification on capital structure. Thus, academicians can use this study as a reference on their own studies or their extension studies. However, managers can use this study to enhance the understanding of the capital structure of their own firm's characteristics and industry which let them manage firm more effectively. And investors can use this study as their investment reference which can evaluate the firm by considering the impacts of firm characteristics and industry classification.

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APPENDICES

APPENDIX A

Panel regression of industry dummies

VARIABLES	(1) TTD	(2) LTD	(3) STD
2.industry	0.0493*	0.0410***	0.00833
	(0.085)	(0.005)	(0.738)
3.industry	0.00579	-0.0221*	0.0277
	(0.808)	(0.070)	(0.181)
4.industry	-0.108***	-0.0429***	-0.0648***
	(0.000)	(0.001)	(0.004)
5.industry	0.0248	-0.0104	0.0350*
	(0.288)	(0.381)	(0.084)
6.industry	0.0421*	0.0232*	0.0194
	(0.074)	(0.054)	(0.344)
7.industry	0.104***	0.134***	-0.0310
	(0.000)	(0.000)	(0.152)
8.industry	-0.0111	-0.00702	-0.00401
	(0.634)	(0.554)	(0.843)
9.industry	-0.0204	-0.00942	-0.0102
	(0.788)	(0.807)	(0.877)
10.industry	-0.0382	-0.0316**	-0.00627
	(0.216)	(0.045)	(0.815)
11.industry	-0.00109	-0.0172	0.0145
	(0.964)	(0.161)	(0.488)
12.industry	0.120***	0.0453***	0.0766***
	(0.000)	(0.001)	(0.001)
13.industry	0.0411	0.0167	0.0238
	(0.115)	(0.211)	(0.295)
14.industry	0.0147	0.00543	0.00928
	(0.544)	(0.614)	(0.658)
15.industry	-0.0576**	-0.0113	-0.0471**
	(0.032)	(0.383)	(0.043)
16.industry	-0.0314	-0.0291**	-0.00307
	(0.204)	(0.000)	(0.886)
17.industry	9.01e-05	-0.00599	0.00601
	(0.997)	(0.779)	(0.766)
18.industry	0.0963***	-0.0106	0.108***
	(0.000)	(0.098)	(0.000)
R-squared	0.275	0.336	0.150
Number of year	5	5	5

Note: P-value in parentheses, *** denotes 1% significant level, ** denotes 5% significant level, * denotes 10% significant level

APPENDIX B

Panel regression of industry dummies continued

VARIABLES	(1) TTD	(2) LTD	(3) STD
19.industry	0.0477*	0.0886***	-0.0413*
	(0.051)	(0.000)	(0.051)
20.industry	0.0386	-0.00369	0.0430*
	(0.134)	(0.779)	(0.055)
21.industry	-0.237***	-0.0363*	-0.196***
	(0.000)	(0.098)	(0.000)
22.industry	-0.0651**	0.00337	-0.0691***
	(0.012)	(0.798)	(0.002)
23.industry	0.0103	0.0147	-0.00416
	(0.680)	(0.248)	(0.847)
24.industry	-0.110***	-0.0432**	-0.0665**
	(0.005)	(0.030)	(0.050)
25.industry	0.0563	0.0600***	-0.00298
	(0.104)	(0.001)	(0.921)
26.industry	-0.0158	-0.000438	-0.0161
	(0.587)	(0.977)	(0.535)
27.industry	0.0163	-0.00462	0.0220
	(0.494)	(0.705)	(0.288)
28.industry	-0.0354	-0.0118	-0.0233
	(0.132)	(0.327)	(0.254)
29.industry	0.123***	0.138***	-0.0105
	(0.000)	(0.000)	(0.611)
30.industry	-0.0490**	-0.00212	-0.0469**
	(0.0041)	(0.862)	(0.024)
31.industry	0.0304	0.00850	0.0219
	(0.222)	(0.503)	(0.311)
32.industry	-0.00550	-0.00822	0.00277
	(0.818)	(0.501)	(0.894)
33.industry	0.000124	0.0321**	-0.0323
	(0.996)	(0.012)	(0.137)
Constant	-0.319***	-0.184***	-0.127***
	(0.000)	(0.000)	(0.000)
Observations	12,337	12,336	12,298
R-squared	0.275	0.336	0.150
Number of year	5	5	5

Note: P-value in parentheses, *** denotes 1% significant level, ** denotes 5% significant level, * denotes 10% significant level