Gearing of Chinese listed companies

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Abstract

This paper studies the determinants of gearing of 558 Chinese listed companies between 2007 and 2012. The Least Square Dummy Variable (LSDV) model is employed to investigate the influence of related variables on gearing. Explanatory variables include: profitability, size, growth opportunity, tangibility, liquidity, non-debt tax shield, percentage of tradable shares, proportion of top ten share- holders holding, tax rate and uniqueness while controlling for firm factors and industry effects. Two measures are used to measure gearing: total debt ratio and long-term debt ratio. Our results have interesting implications for corporate capital structure on other fast developing nations as well.

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1 - Introduction

In a fast developing country like China, the financing requirement for corporates' growth is large. Decisions regarding gearing and capital structure are crucial to the smooth running of operations, the avoidance of insolvency and the long-term sustainability of the business.

Modern studies, recognising the importance of capital structure decisions began with MM theory, a theory first proposed in 1958 by Modigliani and Miller in 1958, which asserted that a company's capital structure is unrelated to its value. Subsequently, finance theorists and economists relaxed their hypothesis of the perfect market in MM theory, and developed several theoretical models by studying companies' capital structure from different perspectives, including the Miller model, the Static Trade-off model and the Dynamic Trade-off model etc. With the development of economic theories, information economics, industrial organization, corporate organization and risk management etc., a large number of schools of thought regarding capital structure subsequently emerged, such as the Signaling theory proposed by Ross (1977), the Pecking Order theory (Myers and Majluf, 1984) and Control Rights, proposed by Harris and Raviv (1991). However, the core question of what the determinants of companies' capital structure are has not reached a consensus amongst theorists (Myers, 2001).

Based on theoretical analysis, numerous scholars have carried out empirical research from diverse perspectives (national, industry, firms' financial indicators and agency theory), largely focusing on the determinants and the impact of the choice of capital structure on a company's value. One such early study into the determinants of capital structure that drew clear conclusions was carried out by Marsh (1982), who found that the choice of a company's financing is affected by the market and history. The study found that companies have a clear explicit target gearing ratio which has a functional relationship with size, bankruptcy risks as well as the asset structure. Another seminal study was by Titman and Wessels (1988) who proposed a theoretical and empirical framework of eight indicators that affect capital structure: non-debt tax shields, profitability, assets structure, growth, size, uniqueness, volatility and industry. Subsequently, increasing numbers of scholars began to study the determinants of capital structure at the company level. Following Harris and Raviv's (1991) investigation, further studies were carried out into the determinants of the capital structure of US listed companies, with some beginning to compare the determinants of capital structure in different countries. Rajan and Zingales (1995) found that listed

companies' financial leverage decisions in developed countries were similar to those of in US companies. The listed companies' debt ratios in Japan, Germany, France, Italy, the UK and Canada etc. are positively related to tangibility and size (apart from Germany), but negatively related to investment opportunities (Tobin Q) and profitability. By contrast, Wald (1999) stressed the differences in the financial leverage decisions of G7-listed companies based on their legal and institutional structure and bankruptcy codes.

This controversy about the applicability of a global theory of capital structure prompted scholars to empirically investigate gearing decisions in emerging countries as well. For example, Booth et al. (2001) studied ten developing countries (including Brazil, Mexico, Korea, Malaysia, Jordan, India, Thai, Pakistan, Turkey and Zimbabwe), and found that the determinants of developing countries' capital structure were similar to those of developed countries and their macroeconomic factors. A recent study by Foster and Young (2013) focused on ten emerging markets from Asia and Latin America. They found that the determinants of emerging markets companies are similar to those in developed markets; however, different effects of determinants apply on companies in different regions, and the relationships in the Asian sample are more consistent with theories than those in Latin America.

However, relatively few studies on capital structure determinants have focused on Chinese listed companies, besides those of Chen (2004), Chen and Strange (2005), Huang and Song (2006), Bhabra et al. (2008), Qian et al. (2009), as well as Yang and Ma (2011) etc. whose sample data was collected before the end of 2007. This was the year that non-tradable share reform in China had almost come to fruition following its introduction in 2005 (CSRC) and thus any study post 2007 merits investigation in its own right.

This paper focuses on the determinants of Chinese listed companies' capital structure, and explores the specific features of companies' financing preferences, using the latest company databases from 2007-2012. Specifically, this paper focuses on answering the following questions: (i) Are there any changes in the effects of the factors on Chinese listed companies' capital structure when compared with previous studies of Chinese listed companies? (ii) Are the impacts of the factors on the capital structure of western countries similar to those on the capital structure of Chinese listed companies? (iii) Do listed companies in China have the same financing preferences as listed companies in other countries (Pecking order theory)?

Our contribution is dual: Firstly, we provide a recent update of the literature on capital structure; and secondly, we also provide a lens into the changing capital structure decisions of the largest emerging market of the world. The latter will allow us to generalise how financial decisions, emerging market development and globalization are interconnected and may provide a point of comparison to the temporal change in financing and development of other emerging nations.

The rest of the paper is organized as follows. A theoretical review and summaries of previous empirical studies will be presented in Section 2, which begins with a discussion of MM theorem and theories of capital structure, along with comparisons of the various findings of previous studies. Section 3 introduces the current situation of both the capital market in China and Chinese listed companies, in preparation for the forthcoming research into Chinese listed companies' capital structure. Section 4 discusses the data. In section 5, methodology is depicted where the variables are defined and the regression model employed as well as the approaches aimed at addressing the research questions are presented. Section 6 discusses the results and the research questions in relation to the findings of previous studies to evaluate the impacts of each explanatory variable. Section 7 presents a summary of the empirical findings and discusses the wider implications.

2 - Literature review

This section reviews literature on capital structure, and is divided into 2 parts. The first part presents the theories related to capital structure, and the second part discusses the main determinants of capital structure.

2.1 - Theories of capital structure

Modigliani and Miller (1958) proposed the MM theorem, a theory which gave rise to modern capital structure theory. This theory is not only considered to be the earliest, most fully elaborated theory of corporate capital structure, but is also recognized as a classical theory in capital structure research. Modigliani and Miller (1963) improved their theory by adding tax to the other assumptions. Miller (1977) proposed the so-called Miller model that considers both corporate income tax and personal income tax to estimate the effect of capital structure on corporate value. The present section reviews literature of the trade-off theory, pecking order theory and agency cost.

2.1.1 – Trade off theory

The Trade-off theory emphasizes the achievement of an optimal capital structure when maximizing the firm's value, based on the balance of the debt tax shield and the cost of financial distress. The company tracks the trade-off theory to set an expected debt-to-value ratio and gradually moves closer to the goal that is the balance of the debt tax shield and bankruptcy costs (Myers, 1984; Frank and Goyal, 2008). This provoked aspects of arguments which included the target being possibly derived from imputed evidence, the tax effect, bankruptcy costs and transaction costs (Frank and Goyal, 2008). Hence, Myers's definition should be divided into two parts: the static trade-off and dynamic trade-off (Frank and Goyal, 2008). After taking the corporate income tax into account, it generated the advantage of debt and offered a tax shield effect to profits after taking into account corporate tax (Javed Iqbal et al., 2012).

2.1.2   - Static trade-off theory

After the MM theorem and the Miller model were introduced, many scholars attempted to make the Miller model consistent with the Equilibrium theory of optimal capital structure, including DeAngelo and Masulis (1980). Bradley et al (1984), on the basis of such investigations, built a single period model of optimal capital structure, integrating such research methods and perspectives. A related investigation by Shyam-Sunder and Myers (1999) provides a meaning to the experience of the Static Trade-off theory:

Static Trade-off theory forecasts the actual leverage follows the target or optimal leverage (optimal debt level), and predicts the cross-sectional correlation between the average leverage and assets risk, profitability, tax status and assets type. Frank and Goyal (2008), think highly of this contribution, pointing out that Bradley et al (1984) provided standard expressions on the Static Trade-off theory. Moreover, the Static Trade-off model provides a solution to leverage without discussing mean reversion, which implies it does not cover any conception of target adjustment (Frank and Goyal, 2008).

2.1.2   - Dynamic trade-off theory

Kane et al (1984) and Brennan and Schwartz (1984) provide the initial two dynamic models that consider tax saving versus bankruptcy cost

trade-off, with both analyzing continuous period models with uncertainty, tax and bankruptcy cost without considering the influence of transaction cost. Leland (1994) constructed the model of Enclosing Solutions of dynamic capital structure with assumptions of time-independence and the level of endogenous bankruptcy, pointing out the agency cost of asset replacement precisely exists and is far less than the debt tax shield effect. Although the agency cost reduces the debt ratio, the risk premiums will increase, while the lower the agency cost the greater the hedging benefits (Leland, 1998).

Assuming that market timing does not exist, Baker and Wurgler (2002) found that companies with a higher historical market-to-book ratio tend to choose external equity to avoid financial distress, which also verifies the relationship between the current leverage and historical market-to-book ratio. Hennessy and Whited (2005) constructed a model with an endogenous dividend policy, leverage and real investment to build a dynamic model based on income taxes resulting from financing, financial distress and equity flotation costs, as well as the effects from the interaction of these three presences. In their view, optimal capital structure is path-dependent. Kayhan and Titman (2007) deconstructed the market timing variables proposed by Baker and Wurgler (2002), distinguishing between short-term (one year) and long-term (five-year) effects of market timing. Their results indicate that changes in stock price will influence leverage, but the effect will gradually be reversed after continuing over a period of time. This suggests the company's history has a significant impact on its leverage, and that the capital structure will move towards the expected optimal target in the long term. Mahajan and Tartaroglu (2008), based on the hypothesis of equity market timing, produced a study on the relationship between historical market-to-book ratios and the corporate leverage of G7 countries. The empirical results show that leverage is negatively correlated to the historical market-to-book ratio, but the influence from equity market timing on leverage does not persist, which is consistent with the Dynamic Balance theory. Frank and Goyal (2008) provide a general description of Dynamic Trade-off models as being whatever the optimal structure of next period is (raising funds or making payment, equity financing or debt financing), with current optimal financing decision depending on the predicted optimal capital structure of the next period. Results will be different because of different costs emphasized by different models.

Faulkender et al. (2012) studied the influence of transaction costs on the adjustment of a company's leverage, showing that the characteristics of a company's cash flow affect the company's leverage target and the adjustment speed towards this target. In recent times, several empirical studies on

capital structure via Trade-Off theory have been conducted. Ghazouani's (2013) study on the capital structure with a sample of 20 Tunisian firms' capital structure between 2004 and 2010 via trade-off theory tested static and dynamic models encompassing the variable of transaction costs. The results indicate that, for the static model, profitability and assets structure are the main determinants of Tunisian companies' leverage. Adding the consideration of particular fixed effects helps to enhance the explanation of the static Trade-off theory. For the dynamic model, the speed of adjustment towards the target is slow, and the transaction costs for Tunisian companies are relatively very high.

2.2 – Pecking order theory

Myers (1984) proposed the Pecking Order theory, which challenges the interpretation of the Static Trade- off theory. Myers and Majluf (1984) show that when companies issue shares because of information asymmetry. This may be considered to be a negative sign that managers are willing to finance with equity when they tend to believe the stock is overvalued. Shyam-Sunder and Myers (1999) tested the Pecking Order theory and Static Trade-off theory. Taking into account the default, risk-free companies are less affected by asymmetric information, they selected 157 large, investment grade companies between 1971 and 1989 as a sample. Their results support the Pecking Order theory, in which there is no optimal leverage.

Frank and Goyal (2003) analyzed the financing of all United States listed companies between 1971 and 1998 to test the Pecking Order theory. They doubted the broad applicability of this theory, and found companies facing severe, adverse selection that are considered as companies with highly asymmetric information, did not show a stronger tendency of the Pecking Order. Ni and Yu (2008), in their study that tested the Pecking Order theory, argue that there is no evidence that Chinese companies follow the Pecking Order theory in their sample of 407 Chinese listed companies in 2004. Further subsection analysis indicates that large companies follow Pecking Order theory but small and medium-sized companies do not, which goes against the implications of Pecking Order theory. Qureshi (2009) studied the explanatory power of the Pecking Order theory in Pakistan, using 34 years' worth of balance sheet data between 1972 and 2005. His results indicate that leverage is negatively significant to current and past profitability, but positively significant to dividends, which offers strong support to the Pecking Order theory as regards profitability and dividends.

De Jong et al. (2011) examine the Static Trade-off theory versus

Pecking Order theory for US companies, focusing on a main disparity in notional prediction. Dutta (2013) investigated the Pecking Order theory in 652 Indian companies between 2002 and 2010. However, the results reject the Pecking Order theory, which is consistent with previous studies on India, such as those of Singh (1995), Mahakud (2006), and Singh and Kumar (2012). This suggests that Indian companies do not use the Pecking Order theory when making capital decisions.

2.2.1 – Agency cost

Jensen and Meckling (1976) conducted a pioneering study on agency theory, distinguishing between two kinds of conflicts. One is the conflict between shareholders and managers (equity agency cost) because managers are not the owners of the enterprise; and, second is the conflict between debt holders and shareholders (debt equity costs). They argued that an increase in the proportion of debt financing will reduce the equity agency cost, but raise the debt agency cost. When these two are equal, the corporate agency costs reach their minimum and its value reaches the maximum which is the point of optimal capital structure.

Lee et al. (2008) argued that high wage dispersion (including managerial equity compensation shares) can alleviate the agency problems and eventually develop the company's performance. Fauzi and Locke (2012) explored the relationship between agency cost, ownership structure and the corporate governance mechanisms of 79 New Zealand listed companies. Their results indicate that managerial ownership, the number of board members and the nomination and remuneration committee significantly influence the diminishing of the agency cost. This implies that corporate governance mechanisms and ownership structures are crucial in alleviating the agency cost of the New Zealand listed companies.

Zhang (2013) analyzed the influence of the capital structure of 775 Chinese listed companies between 2010 and 2012 based on their agency cost. Their results indicated that agency cost is slightly negatively related to the debt-asset ratio, and has a positively insignificant correlation to long-term liability. Mo- hammed (2013) tested the correlation between the agency cost and capital structure of Nigeria listed companies from 2000 to 2006 using a dynamic panel model. His study showed that the relationship between the capital structure and agency costs is inverse, which is in accordance with Jensen's (1986) theory that debt can cut the agency cost of free cash flow by cutting the cash flow supplied to man- agers. Nayeri and Salehi (2013) studied the relationship between competition and the agency cost of 67

Iranian listed companies from 2006 to 2011. They found that competition is negatively significant to audit fees, which explains the variability of agency cost. They proposed considering competition as a monitoring tool, which is in accordance with shareholders' interest; the agency costs will be zero if there is no monitoring cost.

2.3 – Review of the determinants of capital structure

The present paper concentrates on Pecking order theory and agency cost and studies the determinants of capital structure. Determinants are profitability, frm size, growth opportunity, asset structure, non-debt tax shield, tax, ownership structure and ownership concentration, among others. The present subsection presents the detailed impact of each factor on a company's capital structure.

2.3.1 - Profitability

Companies with high profitability will take on more internal financing, illustrating that the profitability and debt levels have a negative relationship (Myers and Majfuf, 1984). The majority of empirical research supports the results of Myers and Majtuf (1984), including the studies of Rajan and Zingales (1995), Wald (1999), and the studies of Chinese listed companies by Chen (2004) and Huang and Song (2005), among others. Chen and Strange (2005) showed that profitability is a highly negatively significant to capital structure in their study of Chinese listed companies' capital structure, using a sample of 972 listed companies in 2003.

Alom (2013) confirmed this in his study of Bangladeshi firms' capital structure with a sample of 44 listed companies between 2004 - 2011; he found that profitability is negatively significant to leverage, which is in accordance with the results of Claudiu (2013) and Bayrakdaroğlu et al. (2013). Foster and Young (2013) focused on 10 countries from emerging markets, including India, Indonesia, Korea (Rep), Malaysia, Thailand, Argentina, Brazil, Chile, Mexico and Peru, encompassing more than 1000 firms between 1999 and 2000 in the sample. Their study indicated that leverage has a significant and negative correlation with Profitability yields, regardless of debt measure, for Asian firms, and leverage is negative but insignificant for Latin American firms.

2.3.2 – Size

This is the capacity that companies can take advantage of in terms of

resources and cash flow, which is generally referred to as total assets, total equity or prime operating revenue. Most studies suggest that size is positively correlated to a company's leverage. Rajan and Zingales (1995), in their study of G7 countries' capital structure, argued that it is easier for large companies to take diversified strategies to gain a more stable cash flow. Booth et al. (2001), found that the relationship of size to leverage is positively and highly significant for many of the 10 developing countries that they studied. Degryse et al. (2012) analyzed the capital structure of Dutch SMEs with the help of a static panel data regression model, and found the correlation of size and long-term debt to be significantly positive and economically relevant.

However, studies on the capital structure of Chinese listed companies produce different results due to the different dependent variables employed. Chen (2004) sets dependent variables such as book value leverage, and found that the relationship of size to total debt is positive but not significant, with size being negatively and highly significant to long-term debt. Contrastingly, Chen & Strange (2005) utilised dependent variables such as the total debt ratio of book value and the total debt ratio of market value; they argued that size is positively related only to the market value debt ratio. Huang and Song (2005) found a positive relationship between size and leverage. Alom (2013) found there is no significant relationship between the size and capital structure of Bangladeshi companies.

2.3.3 – Growth opportunity

Theoretical studies, like Myers (1977), indicated that there is a negative correlation between the growth and leverage of a company. As regards companies with low-growth or fewer investment opportunities, Jensen (1986) argued that debt financing plays a role that lowers the agency cost caused by limiting the managers' right of disposal. From the perspective of empirical results, Rajan and Zingales (1995), Moh'd et al. (1998), Wald (1999), Črnigoj and Mramor (2009), Degryse et al. (2012) found that the correlation of growth to leverage is negative.

Furthermore, in a study of Indian companies' capital structure, Bhaduri (2002) found there is positive correlation between growth opportunity and the debt ratio. In studies focusing on China, Chen (2004), and Chen & Strange (2005) found no relationship between the rate of growth and capital structure. However, Huang and Song (2006), using a sample of 1,200 Chinese-listed companies from 1994 to 2003 document the determinants of Chinese companies' capital structure, and found that companies with higher growth opportunities tend to lower leverage.

Noulas and Genimakis (2011) probe the determinants of Greek listed companies' capital structure using a sample of 259 firms between 1998 and 2006. They found a significant positive correlation with leverage and growth. Bayrakdaroğlu et al. (2013) analyzed the capital structure of Turkish companies using a sample of 242 firms from 2000 to 2009. They found a significant positive correlation with leverage and growth, consistent with the foundings of Noulas and Genimakis (2011). Foster and Young (2013) show that growth constitutes an insignificant coefficient for leverage in both Asian and Latin American companies.

2.3.4 – Asset structure

When a company declares it is bankrupt, it will lose its intangible assets. Thus, to maintain their own benefits, the debt holder will require companies to provide certain tangible assets as collateral in order to reduce the information asymmetry caused by moral hazard and adverse selection. Companies with higher tangibility can acquire loan funds more easily. There is a positive coefficient of tangibility to leverage, which has been confirmed by Harris and Raviv (1991), Chen (2004), Huang and Song (2006), Qiu and La (2010), and Noulas and Genimakis (2011).

However, Črnigoj and Mramor (2009), in their study of Slovenian companies' capital structure, pro- vided empirical evidence that tangibility is negative to leverage. Degryse et al. (2012) found a positive correlation of collateral to leverage and intangible assets to leverage in Dutch companies. Saarani and Shah opportunityadan (2013) also found a positive relationship between the long-term debt ratio and tangibility, with a negative relationship between the short-term debt ratio and tangibility.

2.3.5 – Non-debt tax shield effects

This is usually measured by depreciation / total assets. After reviewing the effects of corporate income tax, personal income tax and non-debt tax shields, DeAngelo and Masulis (1980) argued that non-debt tax shields including depreciation, investment tax incentives and deferred tax losses can be used as an effective alternative to the tax benefits of debt financing. Bradley et al. (1984) using the sum of depreciation and tax incentives divided by profits before tax and interest proxy as a non-debt tax shield found a negative relationship with leverage, which is consistent with the results of Wald (1999), and Huang and Song (2006).

However Degryse et al. (2012) found that depreciation is positively

significant to short-term debt, and has a negative relationship with long-term debt, although there is no significance for total debt. In addition, Bayrakdaroğlu et al. (2013), in their study on a sample of 242 Turkish companies from 2000 to 2009, revealed a significant and positive correlation of depreciation to leverage, which is consistent with the findings of Noulas and Genimakis (2011).

2.3.6 - Tax

According to the analysis of Miller and Modigliani (1966), the relationship of corporate value to leverage is positive. As the interest of debt has a tax shield effect, the higher the tax rate, the bigger profits gained via offsetting by a tax shield, thus the company tends to debt financing (higher leverage). Although most of researchers believe tax has an important impact on firms' capital structure, many empirical studies find no significant relationship between tax and capital structure, including Foster and Young (2013). MacKie-Mason (1990) explained that gearing ratios are the accumulative outcome of years of distinct decisions, and most tax shields have a tiny impact on the marginal tax rate for most companies.

Huang and Song (2006) found tax negatively affects long-term financing, while Chen & Strange (2005) found no significant correlation of tax to leverage. Degryse et al. (2012), in their study of capital structure in the Netherlands between 2002 and 2005, found that tax is negatively significant to capital structure. Zare et al. (2013), in their study of 259 Iranian companies from 1998 to 2006, indicated a positive and significant correlation of tax to capital structure, which is consistent with the results of Eldomiaty (2007), who studied the capital structure of 99 Egyptian companies in 2004.

2.3.7 – Onwnership structure

Currently, most studies on the influence of ownership structure on capital structure focus on the impact of management ownership on capital structure. Jensen and Meckling (1976) believe the interest conflict between management and shareholders will result in management taking a suboptimal investment at the expense of the shareholders' interests in order to pursue their own welfare improvement. Thus, this study on the Chinese ownership structure will mainly focus on the proportion of tradable shares and ownership concentration.

2.3.8 - Uniqueness

Company uniqueness can also be understood as an asset of the company. Bradley et al. (1984) suggested that the sum of annual adverting and research and development expense to annual net sales of the same period over 10 years is significant and negative to firm leverage. In their study of capital structure, Titman and Wessels (1988) found that if the company's products are highly original and it is difficult to find alternative products and corresponding technology in the market, employees, then suppliers and customers face higher costs when the company is in bankruptcy/liquidation. Bhaduri (2002) in a study of Indian companies' capital structure applied R&D expense accounting for sales revenues and the proportion of selling expense occupying sales revenues to measure this characteristic.

From the above, we infer that relatively little recent has focused on China. The next section explains the development of the Chinese capital market.

3 – Chinese listed companies

The emergence of two capital markets, the Shenzhen Stock Exchange (SZSE) and the Shanghai Stock Exchange (SHSE) in Mainland China in the early 1990s marked the rapid development of the Chinese stock market. There were 2,342 companies listed in these two exchanges on December 31st, 2011. In the Chinese stock market, there are: (i) shares issued by domestic companies for domestic investors (denominated as 'A' shares); (ii) shares issued by companies that are registered and listed in mainland China for overseas investors and domestic individual investors ('B' shares); and (iii) shares registered in mainland China and listed in Hong Kong ('C' shares).

After decades of development, the Chinese stock market has experienced a severe equity division, with an unbalanced distribution of the same shares with different rights and with different benefits. Chen (2013) describes and analyses the capital market evolution in China in more detail. It is important to grasp the notion of the financing structure, which includes internal financing and external financing, before understanding the capital structure of listed companies. While internal financing is the process of turning retained earnings and depreciations into investment, external financing is the process whereby companies finance from outside sources, comprising of equity financing and debt financing. According to the Pecking Order theory, the cost of internal financing is generally lower than that of

external financing. Thus, compared with external financing, companies prefer internal financing, and moreover they prefer debt financing to equity financing. However, China's listed companies perform differently in terms of financing preferences.

The data from 2011 published by the China Securities Regulatory Commission (CSRC) indicates that, omitting government bonds and policy financial bonds, the growth of direct financing has been relatively slow. Funds raised from the stock market accounts for 20%, indicating a decline compared to 2010. The total balance of loans was RMB 56 trillion, with a total market value of shares and the balance of corporate bonds of RMB 26 trillion. The Banking sector occupied 92% of the assets of financial institutions, while insurance and securities and funds industries only accounted for about 8%. The imbalance in financing structure indicates the riskiness of the Chinese financial system concentrating overly on the banking system. This is not conducive to the efficient allocation of financial resources and the stability of the financial system, and limits companies' financing options.

Table 1 shows the equity structure of Chinese listed companies from 2001 to 2011. Non-tradable shares occupy over 60% of the total capitalization before 2007. The equity structures of listed companies were extremely illiquid, while shareholders with non-tradable shares largely controlled the companies. In addition, among non-tradable shares, state-owned shares and state-owned legal individual's shares constitute the largest component, while the percentage of staff shares in non-tradable shares can be considered as 0.

Table 1

Year	TC	TS		NTS		SOS		SS	
2001	5,218	1,813	35%	3,400	65%	2,411	71%	24	1%
2002	5,875	2,037	35%	3,830	65%	2,773	72%	16	0%
2003	6,428	2,268	35%	4,161	65%	3,047	73%	11	0%
2004	7,149	2,577	36%	4,572	64%	3,344	73%	9	0%
2005	7,630	2,915	38%	4,745	62%	3,433	72%	4	0%
2006	14,926	5,638	38%	9,309	62%	45,588	49%	2	0%
2007	22,470	10,331	46%	12,138	54%	6,034	50%	1	0%
2008	24,323	24,189	99%	134	1%	75	56%	1	0%
2009	20,650	20,542	99%	107	1%	62	58%	0	0%
2010	27,056	26,960	100%	96	0%	61	64%	0	0%
2011	29,769,893	2,968,051	100%	8,843	0%	5,856	66%	0	0%

Notes. Table 1 reports values of parameters regarding the equity structure of Chinese listed companies. Tradable shares (TS) indicates the number of shares available to be traded in an open market. Non-tradable shares (NTS) indicates the number of shares non-available to stock market participants. Stated-owned shares (SOS) is the number of shares owned by the state. Staff shares (SS) is the shares owned by the staff of companies. Source: China Securities and Futures Statistical Yearbook 2008-2012. TC refers to Total Capitalization.

The reform of non-tradable shares began when the related regulation came into force in 2005, bringing non-tradable shares into the stock market. However, the total shares remained unchanged, which indicates the shares of non-tradable shareholders fell after the reform, reducing the proportion of state-owned shares. The market for A-shares becomes more buoyant with all tradable shares, marking a successful ending of the reform of non-tradable shares. The effectiveness of the stock market gradually increased after the reform of non-tradable shares, not only solving the problems of the market illiquidity itself, but also improving corporate governance, as this prevented majority shareholders abusing their rights under the dominance structure, and balancing the benefits between non-tradable shareholders and tradable shareholders.

4 - Data

4.1 – Listed companies

The financial data of listed companies between 2007 and 2012 in the stock markets of Shenzhen and Shanghai stock exchanges were collected from the CSMAR. In order to ensure the quality of the data, the following filtering principles were applied:

- Companies that were publicly listed before January 01, 2007 were selected as original samples,

because of explanatory variables' calculation.
- To guarantee the comparability of data, listed firms that have issued B shares or H shares were omitted.
- Listed companies that had received special treatment, or particular transfers which indicated losses appearing for over two years, were also omitted.

- Financial institutions were omitted due to their particularity of asset structure.
- Listed firms with incomplete data or data exception, such as leverage> 1 or <0; tangibility>1; tax rate>1 or < -1; non-debt tax shield>1, etc. were also omitted.
- Listed firms in those industries with less than 5 companies were omitted.

Finally, a valid sample of 558 listed companies was obtained, consisting of companies from 12 industries.

4.2 – Explanatory variables

Based on the discussion above about the determinants of capital structure, these indicators are selected as explanatory variables, following these principles: (i) They refer to many previous studies into the determinants of capital structure; (ii) reflect the value of listed companies; and (iii) consider the quantification of indicators and the feasibility of data acquisition. Although all the previously mentioned studies deal with the same subject, i.e. capital structure, different studies use different definitions of capital structure. As regards empirical studies, Bradley et al (1984) added up the book value of long-term liabilities over 20 years from 1962 to 1981, divided by the sum of long-term debt and market value of equity to obtain the ratio of debt to value. Titman and Wessels (1988) used short-term, long-term and convertible bonds divided by the market value and the book value of equity as a measure for capital structure.

Rajan and Zingales (1995) used several of the following leverage ratios to describe capital structure: (1) Non-equity debt to total assets ratio: that is, the sum of all liabilities divided by the value of the assets; (2) Ratio of debt to total assets: short-term and long-term debts divided by the total assets; (3) debt to equity ratio: the book value of debt divided by the net assets; (4) debt to capital ratio: the book value of long-term debt divided by the sum of the long-term debt and book value of the equity. They also used the ratio of adjusted debt to the sum of adjusted debt and book value of equity as the indicator of capital structure. The definitions of leverage and most measurements of appropriate indicators depend on the object of analysis. As in the case of Chen (2004), two indicators are selected to measure a company's capital structure in this study, which are the total debt ratio and long-term debt ratio. The total debt ratio is equal to the total debt / total assets; the long-term debt is equal to long-term debt/ total assets.

Therefore, based on the literature review, the following variables have been selected as explanatory variables of capital structure in the empirical model, in tandem with theories of capital structure and the results of previous research, as well as taking into China-specific factors. Table 2 shows the summary of the key variables, their measures and the predicted relation with capital structure used in the study.

Table 2

	Dependent Variables	Measurement	Prediction
	Total Debt ratio (TD)	Total debt / Total assets	N/A
	Long-term Debt ratio (LTD)	Long-term debt / Total assets	N/A
	Profitability (PROF)	Net Profit / Total assets	-
	Size (SIZE)	ln(Total assets)	+
	Growth opportunity (GROWTH)	(Final TA - Initial TA) / Initial TA	+
Asset	Tangibility (TANG)	(Fixed assets + Inventory) / TA	+
Structure	Liquidity (LIQ)	Current assets / Current liabilities	-
	Non-debt tax shield effects (NDTS)	Depreciation / Total assets	-
Ownership	Tradable shares % (TSHARES)	Negotiable shares / Total shares	?
Structure	Top ten shareholders % (TOP10)	Percentage of top 10 shareholders' shareholding	?
	Income Tax rate (TAX)	Income tax / Income before tax	+
	Uniqueness (UNI)	Selling expenses / Operating Income	-
Control variable	Industry (Di)	When sample company belongs to i-th industry	N/A

Notes. Table 2 provides the definition of variables with a prediction. + indicates that the changes of variable and debt ratio are in the same direction; - indicates that the changes of variable and debt ratio are on the contrary changes; N/A indicates that in the predictions of changes in the relation between the variable and debt ratio may either be in the same direction or the reverse; and, ? indicates that there is no clear conclusion in empirical research.

4.2.1 - Profitability

Based on the Pecking Order theory and Agency Cost theory, it can be taken that profitability is negatively related to capital structure. In this study, ROA (net profit to total asset) is employed to measure a company's profitability.

4.2.2.1 - Size

Most previous studies found that there is positive correlation between size and debt ratio, including Booth et al. (2001), Huang and Song (2006) and Degryse et al. (2012) among others. In the context of Chinese national conditions, corporate borrowing is mainly dominated by bank loans, with banks tending to favor larger companies. These companies can obtain credit more easily with the help of the government. Therefore, the company size is positively related to capital structure. This paper uses the natural logarithm of total assets to measure a company's size.

4.2.1.2 – Growth opportunity

Companies that belong to an emerging industry generally have a higher business risk and bankruptcy risk; hence, they may usually give preference to equity financing. Hence, there is a negative correlation between growth opportunity and debt ratio. The total assets growth rate is used in this paper to measure growth opportunity.

4.2.1.3 - Tangibility

Tangible assets can be considered as collateral. Thus, the greater the proportion of tangible assets, the stronger the company's credit; it is easier to increase debt ratio. As shown in previous studies, there is positive correlation between tangibility and debt ratio. The sum of tangible assets and inventory divided by total assets is used to measure tangibility.

4.2.1.4 - Liquidity

Some scholars argued that, with high liquid assets, companies often prefer to use these assets for internal financing, which indicates that liquidity is negative to debt ratio. The current ratio (current assets/ current liabilities) is selected to measure this variable.

4.2.1.5 – Non-debt tax shield

This paper uses the accumulated depreciation to the total assets ratio to measure the non-debt tax shield; based on theoretical analysis, it predicts that the non-debt tax shield is negative to the debt ratio.

4.2.1.6 – Ownership structure

When studying the effects of ownership structure on capital structure, the usual indicators include internal shareholding proportion and institutional investors holding and equity dispersion. Nevertheless, taking into account the characteristics of China's characteristic ownership structure, this study uses the proportion of tradable shares and the top ten major shareholders holding to specify the company's ownership structure in this paper.

4.2.1.7 - Tax

This paper considers the effect of income tax on the capital structure of the company, selecting the indicator of income tax divided by profit before tax to measure the average tax rate of the company.

4.2.1.8 - Uniqueness

Because Chinese companies' financial statements do not specify R&D costs, selling expense accounting for operating income will be employed for the variable of uniqueness in this paper. In studies on capital structure, most scholars have concluded that the uniqueness of the product is negative to the debt ratio.

4.2.1.9 – Industry effect

To test the role of industry in capital structure, the industry factor is introduced as a control variable. Dummy variables Di are created to represent the company's industry. When the sample company belongs to i-th industry, $H_i = 1$, otherwise $H_i = 0$. It is predicted that the industry factor is significant to capital structure in this paper. The 558 companies investigated in this study come from 11 industries as Table 3 shows. In order to prevent the collinearity of dummy variables themselves, this paper selected 11 industry dummy variables, omitting manufacturing industry. As the sample data for manufacturing industry accounts for over 50% of the total sample data, it is a method to prevent the collinearitiy of dummy variables, but may also reduce the impact of the large sample data on the results.

Table 3

Dummy	Industry	Companies
D1	Agriculture, forestry, animal husbandry & fishery	8
D2	Mining	21
D3	Electric power, heat, gas & water production/supply	25
D4	Constructions	15
D5	Wholesale & retail	66
D6	Transport, storage & postal services	18
D7	Information transmission, software & technology services	16
D8	Real estate	61
D9	Leasing & commercial services	5
D10	Water, environment & public facility management	6
D11	Diversified industries	11
	Total	252

Notes. Table 3 reports the classifications of industries (dummy variables).

4.3 – Descriptive analysis of variables

This subsection analyzes the descriptive statistics and correlations of variables.

Table 4

	N	Min	Max	Mean	St. Deviation
TD	3,348	0.0071	0.9731	0.5116	0.1749
LTD	3,348	0.0001	0.6129	0.1017	0.1046
PROF	3,348	2.70E-04	0.3999	0.0533	0.0439
SIZE	3,348	18.83	26.97	22.13	1.11
GROWTH	3,348	-0.5096	7.61	0.1904	0.3237
TANG LIQ	3,348	0.0052	1.00	0.4513	0.1774
NDTS	3,348	0.0385	204.74	1.70	4.03
TSHARES	3,348	-0.0192	0.1498	0.0219	0.0171
TOP10	3,348	0.1074	1.00	0.7776	0.2335
TAX	3,348	0.1119	0.9104	0.5291	0.1491
UNI	3,348	-0.8603	0.9482	0.2052	0.1333
VALID N	3,348	1.00E-05	0.4805	0.0586	0.067

Notes. Table 4 presents the descriptive statistics of the explanatory variables.

The average debt ratio of the Chinese listed companies between 2007 and 2012 is 51.16%, excluding financial industries. In addition, the range of maximum and minimum is 96.60%, which shows the great difference in the companies' leverage. This shows a big difference in the variables of different companies over these 6 years. However, as the above table illustrates, the mean value of the long-term debt ratio is only 10.172%, indicating that China's listed companies' average short-term debt ratio is about 40%, which is much higher than the long-term debt ratio.

Table 5

Year	Total debt ratio	Long-term debt ratio
2007	50.05%	8.04%
2008	49.86%	8.25%
2009	50.57%	10.56%
2010	51.38%	11.11%
2011	52.29%	11.12%
2012	52.80%	11.95%
Total	51.16%	10.17%

Notes. Table 5 presents the mean value of the Total debt ratio and Long-term debt ratio.

Table 5 shows the average overall debt ratios and the long-term debt ratios over 6 years. Besides a slight fall in 2008, the overall debt ratio continued to rise from 2007 to 2012, while the long-term debt ratio maintained a steady increase over 6 years, although it rarely accounted for the overall debt ratio.

5 - Methodology

In this section, we present the methodology to study the determinants of Chinese listed companies' capital structures. In previous studies, there have been three approaches employed to conduct the study of the determinants of capital structure: (i) regression analysis for studying the determinants of capital structure by using leverage to conduct empirical regression analysis (Bradley et al., 1984, Rajan and Zingales, 1995, and

Wald, 1999); (ii) the Logit or Probit model employed to analyze whether the company chooses debt or equity financing in decision-making (Marsh, 1982, and Titman, 2002); and (iii) Factor Analysis.

Regression analysis is used in this paper mainly with the help of panel data to build an econometric approach to study the effects of the industry factor and the firm factors on companies' capital structure:

$$y_{i,t} = a_i + b_i \cdot x_{i,t} + c_i \cdot d_{i,t} + u_{i,t} \tag{1}$$

where i is the company (between 1 and 558), t is the time dimension, $y_{i,t}$ denotes leverage or long-term leverage, $x_{i,t}$ is a 1*k vector of explanatory variables for the i–th in the t–th period; $b_{i,t}$ is a k*1 vector of parameters while k is the number of explanatory variables, a_i denotes the constant coefficient, $d_{i,t}$ stands for industry dummy variables (d_1 to d_{12}); c_i is the coefficient of each dummy variable; $y_{i,t}$ is random error.

There are three models that can be employed for the panel data regression approach: Fixed Effects model, Random Effects model and Pooled-OLS model. The results of these three models are different (see Appendix). The first step towards building a Panel data model is to test in which model the sample data is consistent with, avoiding the error of model setting and improving the validity of the parameter estimation. Identification of the Fixed Effects model and the Pooled model can be done by building an F-test. The Breusch and Pagan Lagrangian multiplier test judges the significance of individual effects to discriminate between the Random Effects or Pooled OLS model. The Hausman test with the Random Effects model as an original assumption can be used to identify the choice of the Fixed Effects model or the Random Effects model. The difference between the Fixed Effects and Random Effects model primarily reflects dealing with the 'individual effect'. The individual effect of the Fixed Effects model assumes that each individual has a specific intercept, while the Random Effects model assumes that every individual has the same intercept, and individual differences mainly reflect random interference. Because the Random Effects model sets the individual effect as a part of a distractor, it assumes there is no relevance between explanatory variables and individual effects, but the Fixed Effects model does not require this assumption. The following table (Table 6) shows results of 3 tests identifying a model towards determinants of overall debt ratio and long-term debt ratio.

Table 6

Panel A. Test of panel data model of overall debt ratio			
Null hypothesis (H0)	Pooled OLS	Pooled OLS	Random Effects
Alternative hypothesis (H1)	Fixed Effects	Random Effects	Fixed Effects
Test	F(557,278)=17.64	X^2(01)=3,937.41	X^2(10)=219.15
	Prob>F=0	Prob>X^2=0	Prob>X^2=0
Results	H0 rejected	H0 rejected	H0 rejected
Panel B. Test of panel data model of long-term debt ratio			
Null hypothesis (H0)	Pooled OLS	Pooled OLS	Random Effects
Alternative hypothesis (H1)	Fixed Effects	Random Effects	Fixed Effects
Test	F(557,278)=10.75	X^2(01)=3,026.92	X^2(10)=96.98
	Prob>F=0	Prob>X^2=0	Prob>X^2=0
Results	H0 rejected	H0 rejected	H0 rejected

Notes. Table 6 reveals the evidence of the test of the panel data models of the Total debt ratio (panel A) and the Long-term debt ratio (panel B).

As table 6 shows, both results of the F test reject the original assumption, and the B-P tests reject the pooled model. The results of the Hausman test reject the Random Effects model. After these three tests, the Fixed Effects model should be employed to both overall debt ratio and long-term debt ratio.

6 – Empirical Findings

In this section, the Least Square Dummy Variable (LSDV) method is employed to estimate the Fixed Effects model of the overall debt ratio and long-term debt ratio. The regression results of both the Fixed Effects model of the overall debt ratio and the long-term debt ratio suggest that, apart from liquidity and ownership structure, the coefficients of profitability, size, growth opportunity, tangibility, tax rate and the uniqueness of product are significant to the overall debt ratio. The coefficients of profitability, size, growth opportunity, tangibility, ownership structure and uniqueness of product are significant to the long-term debt ratio.

Table 7

Explanatory	Total debt ratio			Long-term debt ratio		
Variables	Coeff.	N.W. S.E.	t-test	Coeff.	N.W. S.E.	t-test
PROF	-1.19***	0.0540	-22.16	-0.3410***	0.0370	-9.21
SIZE	0.0517***	0.0021	24.29	0.0262***	0.0015	17.94
GROWTH	0.0293***	0.0070	4.21	0.0285***	0.0048	5.97
TANG	0.2270***	0.0147	15.42	0.0676***	0.0101	6.70
LIQ NDTS	-0.0068***	5.00E-03	-12.60	2.00E-04	4.00E-04	0.5900
TSHARES	-1.75***	0.1603	-10.94	0.0121	0.1098	0.1100
TOP10	3.00E-04	0.0106	0.0324	0.0308***	0.0073	4.25
TAX	0.0520**	0.0171	3.04	0.0461***	0.0117	3.93
UNI	0.1100***	0.0177	6.23	-0.0098	0.0121	-0.8100
D1	-0.2180*	0.0354	-6.16	-0.0764**	0.0243	-3.15
D2	-0.0585**	0.0184	-3.17	-0.0257*	0.0126	-2.04
D3	-0.0031	0.0123	-0.2489	0.0383***	0.0084	4.54
D4	-0.0545***	0.0108	-5.03	0.1260***	0.0074	16.93
D5	0.1390***	0.0139	9.99	0.0029	0.0095	0.3100
D6	0.0588***	0.0073	8.08	-0.0066	0.0050	-1.32
D7	-0.0956***	0.0125	-7.63	0.0229**	0.0086	2.67
D8	-0.0267*	0.0134	-2.00	0.0044	0.0092	0.4800
D9	-0.0051	0.0086	-0.5900	0.0699***	0.0059	11.84
D10	0.0234	0.0230	1.02	0.0249	0.0158	1.58
D11	-0.0921	0.0211	-4.37	0.0377**	0.0144	2.61
	0.0211	0.0158	1.39	0.0604***	0.0108	5.58
No. of obs.	3,348			3,348		
R^2	0.4984			0.3414		
F-statistic	157.35			82.11		
Prob>F	0			0		
RMSE	0.1243			0.0852		

Notes. Table 7 reports the coefficient, their Newey Standard errors, and t-values. Moreover, it is mentionedthe number of observations, R^2 , *F*- statistic, Probability> *F,* and Root MSE. *, ** and *** denotes significance in 10%, 5% and 1% significance level, respectively. Heteroscedasticity and autocorrelation consistent (Newey-West) standard errors are employed.

After further verifying the significant relationship between the independent variables and dependent variables, there is clear-cut empirical evidence. Profitability, liquidity, non-debt tax shield and uniqueness of product are significantly negative to debt. Size, growth opportunity, tangibility as well as ownership structure and concentration are significantly positive to debt. There is a significantly negative relationship between the non-debt tax shield and overall debt.   A positive relationship exists between ownership structure and long-term debt, while the top ten shareholders holding factor is significantly positive to the overall debt ratio. Moreover, a positive relationship exists between the tax rate and overall debt.

Table 8

	Variables	Measurement	Empirical results	Prediction	Previous studies
	Profitability (PROF)	Total debt / Total assets	-	-	-
	Size (SIZE)	Long-term debt / Total assets	+	+	+ / -
	Growth opportunity (GROWTH)	Net profits / Total assets	+	+	+ / -
Asset	Tangibility (TANG)	ln(Total assets)	+	+	+
Structure	Liquidity (LIQ)	(Final TA - Initial TA) / Initial TA	-	-	
	Non-debt tax shield effects (NDTS)	(Fixed assets + Inventory) / TA	-	-	
Ownership	Tradable shares % (TSHARES)	Current assets / Current liabilities	+	?	-
Structure	Top ten shareholders % (TOP10)	Depreciation / Total assets	+	?	
	Income tax rate (TAX)	Negotiable shares / Total shares	+	+	
	Uniqueness (UNI)	Percentage of top 10 shareholders' shareholding	-	-	-
Control variable	Industry (Di)	Income tax / Income before tax	Sign.	N/A	
		Selling expenses / Opening Income			
		Sample company belongs to *i*-th industry			

Notes. Table 8 compares the present paper's empirical results with predictions and results of previous empirical studies. + indicates that the changes of variable and debt ratio are in the same direction; - indicates that the changes of variable and debt ratio are on the contrary changes; +/- indicates that in the predictions of changes in the relation between the variable and debt ratio may either be in the same direction or the reverse; N/A indicates no previous empirical evidence; and, ? indicates that there is no clear conclusion in empirical research.

Overall, the empirical results for Chinese listed companies are in essence consistent with the empirical findings of literature on developed countries' listed companies, with some differences though. This section also discusses each explanatory variable's impact on Chinese listed companies' capital structure, based on empirical results.

6.1 - Profitability

There always has been a great deal of controversy over the impact of profitability on capital structure, with theoretical and empirical views reaching no consensus. The empirical results of this research support the Pecking Order theory, in which profitability has a significant negative correlation with the debt ratio. The higher the profitability of a company, the more the retained earnings are to meet the company's demand, which reduces the demand for debt financing. Conversely, when the company's profitability is poor, external financing will increase the debt ratios. In addition, as China's capital market has its own specific characteristics, profitable companies can meet the conditions of the rights issue, which means it is relatively cheaper to get funds by equity financing. Higher profitability shows better business performance. Compared to other companies, it is easier to obtain approval to raise equity capital in the stock market. Furthermore, due to the Chinese stock market's imperfect development, a higher profitability of a company, indicating lower operating risk, will attract the attention of investors with regards to its equity investments. Thus, it is easier for profitable companies to raise money from the stock market. This means profitable companies finance either through retained earnings or equity financing, which is 'cheap' and relatively easy to access, but seldom via debt financing. Thus, companies' debt ratios will be accordingly lower

6.2 - Size

The effect of a company's size on capital structure is still open to debate. This study has found there is a significantly positive correlation between size and capital structure. This is consistent with the Agency Cost theory and many empirical studies (Booth et al., 2001). The result of this correlation between long-term debt and size is also consistent with the study of Degryse et al. (2012) that a company's size plays a signal role on capital structure is indicative of its strength and credibility. A larger company tends to expose more information to outside investors than a smaller one (Fama and Jensen, 1983). As a larger company has asymmetric information, its

bankruptcy risk is smaller and its credibility is higher, which means it has a strong capacity for debt financing. Furthermore, given the economics of scale, a larger company will try to continually reduce operating costs so as to bring greater benefits. Furthermore, a larger company is more likely to have the capability to diversify, which disperses business risks effectively and improves the stability of the company's development. This in turn decreases the probability of bankruptcy, and the company is capable of taking on more debt in order to obtain greater financial leverage benefits.

6.3 – Growth opportunity

Our results are consistent with the study of Bhaduri (2002), Huang and Song (2005), Noulas and Gen- imakis (2011) and Bayrakdaroğlu et al. (2013), that there is a significant positive correlation between growth opportunity and the debt ratio. Based on Signaling theory, companies with more growth oppor- tunities tend to use more debt financing, while delivering information of companies with more growth opportunities and higher expected returns to outside investors, tend to raise more funds for companies and decrease the probability of bankruptcy. Moreover, based on the Pecking Order theory, when the company is growing, the increase in the operating income and the expansion of assets require substantial funding support. However, the speed of investment at this period is higher than the increase of profit. Thus, simply financing with internal earning returns is insufficient. The company will choose external financing in order to grow steadily. In addition, the conditions of listed companies allocating and issuing new shares are time costing and strict gradually. In order not to miss out on a good investment oppor- tunity, growing companies tend to be financed with fast long or short-term loans. As growing companies have good investment value, it is easy for them to attract investors in order to borrow money.

6.4 – Assets structure

6.4.1 - Tangibility

This empirical study shows that tangibility is significantly positive to capital structure. It is prin- cipally based on the value of collateralizable assets. Given the special nature of intangible assets, the company will lose them once they have declared bankruptcy. Because they can provide more collateral, it is easier for companies with higher tangible assets to obtain loans from banks, especially long-term loans. The Agency theory as proposed

by Jensen and Meckling (1976) states that, after obtaining debt financing, the company has an impetus to turn to riskier investments, and the owner has the urge to steer wealth from debtors to shareholders by using equity rights. If the collateral value of a company's assets is high, the agency costs that debtors suffer will fall. Thus, the more tangibility the company holds, the more likely it is to use debt financing. In addition, the collateral value of assets can effectively reduce debtors' losses after bankruptcy. This is consistent with the findings of Marsh (1982) and Harris and Raviv (1991), Rajan and Zingales (1995), Wald (1999), Chen (2004) and Huang and Song (2006).

6.4.2 - Liquidity

The results of this empirical study show that liquidity is not significant to long-term debt ratio, but that there is a significant and negative correlation between liquidity and overall debt, which is consistent with the Pecking Order theory. Myers and Majluf (1984) argue that only when profitability is good and the company has sufficient funds to invest in current positive net value projects, will managers choose to repay debt to accumulate liquidity. Thus, the company's capital structure will be lower when it holds more liquidity. A company with high liquidity prefers to use these assets for internal financing, which demonstrates the negative correlation between liquidity and the debt ratio (Prowse, 1990). What is more, as the majority of debt financing consists of short-term debts in China, the capability to repay short-term debt decides the capability to repay all the debts of a listed company. The ability to make short-term debts repayment for companies with higher liquidity is superior to that of companies with lower liquidity, which indicates that the higher its liquidity, the more the company is capable of repaying all its debts and lowering the debt ratio. This empirical study shows that liquidity is positive to long-term debt, but its coefficient is 0.000218, so small that it can be ignored.

6.5 – Non-debt tax shield

Drawing on the experience of previous studies (Wald, 1999), this study adds the non-debt tax shield to the model. The results here are consistent with others in that there is a significantly negative correlation between non-debt tax shields and the overall debt ratio. The above table shows the corresponding t- statistic of the non-debt tax shields of the overall debt ratio is -10.94, which indicates this variable has a great impact on Chinese listed companies' capital structure. Although no detailed explanation

for this exists in the theoretical field, this could be interpreted as being connected with the motive for holding debt financing, which includes obtaining interest from financial leverage, reducing agency costs, addressing capital shortage, maintaining control, deducting capital cost and monitoring managers etc. Sometimes companies will carry out more debt financing to obtain more benefits of financial leverage. Nevertheless, when companies' non-debt tax shields, such as depreciation and investment tax credits, are high, the motive for reducing the tax burden with high debt will be reduced, decreasing the capital structure. The empirical result that a non-debt tax shield is significantly negative to the debt ratio is consistent with the findings of Wald (1999) and those of the study of China's listed companies by Huang and Song (2006).

6.6 – Ownership structure and concentration

The present paper analyzes the ownership structure regarding ownership concentration and proportion of tradable shares. Based on the empirical results, both the factors of tradable shares and the top ten shareholders' holding are significantly and positively affect the long-term debt ratio; but, only the top ten shareholders' holding significantly and positively relates to the overall debt ratio. In addition, their coefficients are low, which indicates that the influence of ownership structure on the capital structure is not obvious. The ownership structure is the key to company governance. Previously, most Chinese listed companies were reorganized from state-owned companies, whose state shares had absolute predominance, and furthermore governmental intervention influenced their financing. In China, total equity includes non-tradable shares and tradable shares, with non-tradable shares consisting of state-owned shares and legal person shares. Before the reform in non-tradable shares, non-tradable shares accounted for over

2/3 of total equity; among many listed companies, the state was majority shareholder. This distortion significantly restricted the function of listed companies in the capital market. However, following the reform in non-tradable shares in 2007, the structure has gradually been subverted. As the table below shows, the percentage of tradable shares has increased yearly since 2007, reaching a peak of 92.68% in

2012. With the increase in a company's tradable shares,

its debt ratios have risen.

Table 9

Year	Tradable shares %	TOP 10%
2007	55.98%	55.37%
2008	63.60%	54.27%
2009	79.51%	53.22%
2010	84.76%	52.15%
2011	90.00%	51.43%
2012	92.68%	50.99%
Total	77.76%	52.91%

Notes. Table 9 reports the mean value of tradable shares and TOP 10 shareholders holding as percentages.

Major shareholders of companies basically hold rights in terms of decision-making. With an increase of major shareholders' ownership, their profits will increase. Equity financing will result in the dilution of major shareholders' control, damaging their interests. Meanwhile, debt is a good governance mechanism to control agency cost. Therefore, as major shareholders' ownership increases, debt ratios are more likely to rise. This empirical result supports the Agency theory. Based on the arrangement of "majority rule",
major shareholders may use their own equity in a holding position to obtain directly or indirectly the effective control of a company, while other shareholders can only accept the agent relationship that major shareholders exercise effective control over the company. The study of Berger et al. (1997) reached the same conclusion that Chinese companies' governance systems tend to be based on internalization.

6.7 – Tax

The empirical results show that there is significantly positive relation between the tax rate and overall debt, but there is no significance between it and long-term debt. Generally, this is the result of the tax deductibility effect.

As interest from debt can be deducted before paying income tax, it provides a tax subsidy. Therefore, a company with a high income tax rate may use more debt to obtain more tax deductions. According to Chinese tax law, different tax incentives and treatments of tax relief for different companies vary across industries and areas. Additionally, industries are in different development periods, and the previous year's profit and loss accounts of companies are not the same. In addition, the tax system in China is imperfect. All of these factors make for great differences in the actual tax burden of each company, which are thereby not comparable. The results of this paper are consistent with those of Gordon and Lee (2001), Eldomiaty (2007) and Zare et al. (2013), who found that the tax rate is significantly positive to the debt ratio.

6.8 - Uniqueness

The empirical results show that uniqueness is significantly negative to the capital structure, which is consistent with in the findings of previous studies of developed countries' listed companies. Specific assets cannot easily be transferred and disposed of, leading to the creditors' security role being very small. Thus, debt financing will suppress corporate investment in specific assets, which indicates it will be more convenient for a company to invest in specific assets via equity financing. Then, the high asset specificity will result in lower debt financing capacity. Moreover, the higher the degree of the asset specificity, the more the investors' asset investing into specific assets, which will pointedly increase the investors' risk. Investors will be reluctant to purchase stocks with a higher proportion of specific assets because of the increased risk without a corresponding increase of corporate control or negotiating power to settle business disputes, which make the companies use more retained earnings to finance, and the debt ratio will be reduced. Particularly in the case of high-tech industry, in the start-up phase, high-tech companies mainly prefer to use internal financing. They use equity financing, which is more flexible, rather than debt financing, if obtaining external financing. As it continues to expand and it becomes increasingly easy to obtain a stable cash flow, the company will use debt financing more actively. Therefore, it is remarkable if the company obtains some preferential policies which help to increase profitability in the start-up phase.

6.9 – Industry effect

The average debt ratios of listed companies are quite different across industries, as indicated in Table 10.

Table 10

	N	Total debt ratio			Long-term debt ratio		
		Mean	Min	Max	Mean	Min	Max
D1	48	0.4079	0.2000	0.6300	0.0455	0.0014	0.3000
D2	126	0.4777	0.1000	0.8100	0.1316	0.0070	0.4200
D3	150	0.5110	0.0300	0.8600	0.2373	0.0015	0.6100
D4	90	0.7229	0.4000	0.9700	0.1094	3.00E-04	0.5100
D5	396	0.5678	0.0400	0.9100	0.0689	2.00E-04	0.3600
D6	108	0.4099	0.0700	0.7900	0.1125	2.00E-04	0.5500
D7	96	0.3784	0.0900	0.6300	0.0672	4.00E-04	0.3700
D8	366	0.6207	0.1200	0.9000	0.1854	7.00E-04	0.5000
D9	30	0.5062	0.2900	0.7100	0.0957	2.00E-04	0.3700
D10	36	0.4119	0.1800	0.7100	0.1210	0.0051	0.3300
D11	66	0.5168	0.0300	0.7800	0.1342	4.00E-04	0.4300
Total	1,512	0.5116	0.0100	0.9700	0.1017	1.00E-04	0.6100

Notes. Table 10 reports descriptive statistics (number of observations, mean, minimum and maximum) for the regression coefficients of industry dummy variables across Chinese listed companies. Panels A and B concern desctptives of industry coefficients for Total debt ratio and Long-term debt ratio, accordingly.

Apart from the financial industry, the highest mean of debt ratio over 6 years is in the construction industry (72.29%). Next comes the real estate industry, wholesale and retail industry, diversified industry and the industry of electric power, heat, gas, and water production and supply, whose mean values of debt ratio are over 50%. The lowest mean is in the information technology industry (37.84%). This not only shows that the industry factor has a certain impact on listed companies' capital structure, but also indicates the phenomenon of the prevailing low level of debt financing of listed companies in China. However, the highest mean value of the long-term debt ratio is in the industry of electric power, heat, gas, and water production and supply, at 23.73%, while the lowest one is agriculture (4.55%).

Designing industry dummy variables and combining them with an analysis of the regression model indicate that the impact of different industries on capital structure is significantly different. From the regression results, the industries of electricity, construction, wholesale and retail and transport are significant

to the overall debt ratio, while the industries of mining, electricity, real estate and diversified industry are significant to the long-term debt ratio. Having further corroborated the correlations between the significant industries and the dependent variables, it is found that the impact of the construction industry on overall debt is greatest in all these industries as regards the coefficients, while the impact of the electricity industry on long-term debt is the greatest. From the above, debt financing needs in different industries are quite different. For example, the industries of wholesale and retail, real estate, construction are industries with a fast cash flow, and temporary shortage of funds is a common phenomenon, which makes these companies use debt financing. These industries tend to have higher debt ratios, while the industries of information technology, agriculture and transportation tend to have lower debt ratios. Moreover, the industry factor is significant to the capital structure, but the level of influence of different industries on capital structure is different, which is mainly due to different competition, operating cycles, operating characteristics, culture and national policy priorities of different industries. All of these factors cause companies in different industries to have differences in debt financing and use of leverage.

7 – Concluding remarks and wider issues

7.1 – Concluding remarks

The results of the empirical analysis clearly reflect the current situation in the capital market in China via econometric analysis and discussion. Firstly, Chinese listed companies' capital structure does not match with the Pecking Order theory, evident in other countries. Compared to listed companies in developed countries, the average long-term debt ratio of Chinese listed companies is low (Table 5). In addition, the proportion of current liabilities is high, but the long-term liability ratio is low. Furthermore, listed companies are increasingly based on external financing (Table 1). Chinese listed companies have a great preference for equity financing rather than debt financing. Secondly, using the panel data Fixed effects model, it was found that firms' own factors have a significant effect on the gearing[1] of listed companies.

The analysed results of the determinants of listed companies' capital

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[1] Gearing is measured as Total debt ratio and Long-term debt ratio.

structure (Table 7) are as follows: The coefficient of profitability and capital structure is negative and highly significant. The stronger the profitability, the lower the gearing is; this is consistent with the results of the majority of previous studies. The results show that the proportion of debt financing of a large company is greater than that of a small company. This is consistent with the literature which states that the company size and capital structure are positively correlated. The growth opportunity is positive significant to the gearing. This supports the literature which states that debt is available quicker when needed to match the demands of growth in comparison to equity which may be a slower and more cumbersome process. There is a significantly positive correlation between tangibility and gearing. As hypothesized and confirmed by previous literature, the more collateralised the assets, the easier it is for the company to gain access to debt financing, thereby increasing the gearing in the capital structure. However, there is no significant relationship between liquidity and long-term gearing in the capital structure. In terms of total debt ratio, however, liquidity is negatively related but strongly significant, although the size of the coefficient is small. This shows that companies using short-term debt are influenced by the reassurance of adequate liquidity. Given that Chinese firms use more short term debt than long-term debt (as evidenced by the difference in the two debt ratios), this is important for Chinese companies to note that if they want to borrow more short-term debt, they will need to demonstrate their liquidity. The non-debt tax shield is significant and highly negative to overall debt ratio as predicted and demonstrated by previous studies, while the ownership structure is significant and positive to the long-term debt ratio. The ownership structure is measured by two variables: traded shares as a percent of total shares which is significant to long-term debt ratio but not total debt ratio. Also, the percent of top 10% shareholders' holdings which is significant and positively related to both debt ratios. Both these are a measure of corporate governance and may suggest that debt financing is available easily when there is confidence in the market. The coefficient of the tax rate and the overall debt ratio is significant and highly positive as hypothesized by previous literature. The uniqueness of the product is negatively significant to both variables, suggesting that such firms prefer equity finance. This is again consistent with previous literature.

The study reveals great differences of gearing across the various industries of Chinese listed companies through descriptive statistics (Table 10). The debt ratios of the industries of electric power, constructions,

wholesale & retail, real estate, leasing & commercial services and diversified industries are high[2].

However, the transportation, mining, agriculture, information transmission and water concervancy industries demand lower funds compared with other industries and other than long-term debt funds can meet their needs. Thus, the debt ratios of companies in these industries are lower. The analysis with the panel data Regression Model (Table 7), adding the dummy variable, shows that the significance and degree of effect of different industries on gearing are different. We conclude that not all industries use debt to the same degree to grow. However, most of industry dummy variables significantly and positively affect both debt ratios. In specific, total debt ratio is negatively affected by agriculture, electric power, wholesale & retail, information transmission and water conservancy industries; and positively explained by constructions and wholesale & retail. Moreover, long-term debt ratio is positively explained by mining, electric power, transportation, real estate, water conservancy and diversified industries; and negatively affected only by agriculture.

7.2 – Wider issues

Corporate governance is achieved through a series of reasonable systems that the company deploys to balance the rights and responsibilities between different shareholders. The incentive and restriction mechanisms of China's listed companies do not play a very effective role; the companies will still be in pursuit of expansion, ignoring the risks of short-term debt. Only through the company improving its internal governance structure can managers work hard for shareholders' benefits. They can take the following measures: (i) establish and improve an effective system of professional managers, (ii) establish and improve the long-term market-based dynamic incentive mechanism, (iii) establish an effective internal constraint mechanism to ensure managers work for the shareholders' benefits. Additionally, two recommendations for the Chinese government to help companies optimize their capital structure are the need to take steps in law enforcement efforts and protect the benefits of debt holders through building an effective debt paying security system, such as revising the bankruptcy law to maintain its operability. The government could optimize the mechanism of information disclosure to establish a powerful mechanism of signal transmission. This would firstly improve the relevant regulation of

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[2] Debt ratios for any industry are high (low) if the ratio is higher (lower) than 50%.

information disclosure to a standardized information agency such as accounting firms, audit evidence, etc. Secondly, inspired by other countries, it should build a complete information system including an information disclosure system, a rating system, an examination and verification system and a punishment system.According to the theories and the empirical results of the determinants of China listed companies' capital structure, this study notes the following aspectsof firms' capital structure:

There is still a high degree of state ownership and intervention although there have been attempts to improve the efficiency of the market made in 2007 (Table 1). This indicates conflicts of interest. The Chinese capital market is a nascent stage and plagued by problems of illiquidity, corporate governance and agency problems as multiple types of ownership (state, tradable, non-tradable) can contribute to agency problems related to risk and return exposure (Chen, 2013).

Assets are financed primarily through retained earnings, equity finance or other means[3]. Use of long-term debt is relatively small when compared to other countries and there is greater reliance on short-term debt to fund needs (Table 5). Normally, short-term debt is expensive and unreliable for long-term needs but in the case of China, it may be possible that due to the presence of state ownership, access to short-term debt is the norm. This finding supports the results of Provy and Maury (2010) who studied the capital structure of Russian listed companies in another large emerging market with high state ownership.

Results for all explanatory variables (Table 8) are consistent with prior literature. It is interesting that most other studies on capital structure of emerging markets have found that profitability, size, tangibility, use of tax and non-debt tax shields, liquidity as well as uniquness support the theorized relation to capital structure. Thus, they demonstrate that despite culture and institutional characteristics, capital markets follow common economic norms.

Industry characteristics also appear to be important in the choice of capital structure, as the type of capital needs type significantly affects the choice of capital structure. When optimizing its capital structure, a company should strive for a suitably mature structure of capital and debt, based on a consideration of the industry's characteristics, including the cycle of industry, the degree of competition, the management risk and investment characteristics, etc.

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[3] Entrusted loans and shadow banking seem to start becoming a major source of finance in China and other emerging countries.

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