

*LEVERAGE AND DEBT MATURITY OF
CHINESE LISTED FIRMS: DETERMINANTS
AND EFFECTS ON CORPORATE
PERFORMANCE*

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LEVERAGE AND DEBT MATURITY OF CHINESE LISTED FIRMS: DETERMINANTS AND EFFECTS ON CORPORATE PERFORMANCE

by

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**A Thesis Submitted for the Degree of Doctor of Philosophy in
Accounting and Finance**

Durham University Business School

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January 2016

Declaration

I hereby declare that the materials contained in this thesis have not been previously submitted for a degree in this or any other university. I further declare that this thesis is solely based on my own research.

Sunitha Vijayakumaran

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Sunitha Vijayakumaran

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Dedication

This work is dedicated to my PARENTS and TEACHERS.

Abstract

This thesis examines the determinants and effects of leverage and debt maturity on corporate performance from corporate governance perspective, making use of a large panel of Chinese listed firms over the period 2003-2010. In order to control for unobserved heterogeneity and the potential endogeneity of regressors, we use the system Generalized Method of Moments (GMM) estimator in our studies. We examine the following three main themes.

First, we examine the impact of managerial ownership and other corporate governance variables on firms' leverage. We document that the ownership structure plays a significant role in determining leverage ratios. More specially, controlling for traditional determinants of leverage, unobserved heterogeneity, endogeneity, and persistency in capital structure decisions, we report that managerial ownership has a positive and significant impact on firms' leverage.

Second empirical chapter is debt maturity and the effects of growth opportunities and liquidity risk on leverage. No single study has focused on this issue in the context of emerging markets. We find that the proportion of short-term debt attenuates the negative effect of growth opportunities on leverage in emerging markets, particularly in China. Additionally, we also report that the proportion of short-term debt negatively affects leverage as predicted by the liquidity risk hypothesis. When we distinguish between state owned firms and private controlled firms, we also find evidence that these effects are only relevant to private controlled firms.

Third, we examine the impact of capital structure on corporate performance. The agency theory suggests that leverage affects agency costs and thereby influences firm performance. We find clear evidence of a positive relationship between leverage and the proportion of long term debt on firms' performance, as measured by ROA, ROS or productivity. Yet, when distinguishing between state and privately controlled firms, we find that leverage and proportion of long-term debt only affects the performance of private firms.

Our research has significant policy implications for managers, owners, potential investors and the government. First, it suggests that the Chinese government's recent policies aimed at reforming ownership structure and encouraging managerial ownership in listed firms have been successful in providing managers with incentive to adopt risky financial choices. Further, our study extend Diamond's liquidity risk hypothesis by showing that institutional factors (e.g. government ownership) have significant influence on the liquidity risk faced by firms when they use more short-term debt in their capital structure. Finally, our research suggests that long term debt is more effective in improving performance of listed private firms in China.

Our study recommends that while managerial ownership should be further encouraged in the state-controlled sector which helps to overcome weak managerial incentive problem faced by them, the government ownership which weakens incentive mechanisms for managers in them should be further reduced so as to enable these firms to make appropriate financial choices. The board of directors, especially independent directors do not seem to influence firms' important decisions such as capital structure choices. Thus, our study recommends that a strong and truly independent board structure should be encouraged in the Chinese listed corporations in order to improve effectiveness of their corporate governance. Further, lenders such as banks may extend more long term credit to private sector which helps to improve performance of these firms.

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Abbreviations

AR	:	Autoregressive
CEO	:	Chief Executive Officer
CIA	:	Central Intelligent Agency
CSMAR	:	China Stock Market Accounting Database
CSRC	:	China Security Regulatory Commission
GMM	:	Generalized Method of Moments
i.i.d	:	Independent and identically distributed
MA	:	Moving average
OLS	:	Ordinary Least Square
R&D	:	Research and Development
RMB	:	Renminbi
SEO	:	Seasoned Equity Offering(s)
SOE(s)	:	State owned enterprises (s)
S&P 500	:	The Standard & Poor's 500 companies
WTO	:	World Trade Organization

Chapter 1

Introduction

1.1. Research background

The choice of debt level and the maturity structure of debt are key elements of corporate financial policy. Although Modigliani and Miller (1958) argue that under perfect capital market conditions, capital structure is irrelevant to the value of a firm, the prevalence of a variety of market frictions (such as taxes, bankruptcy costs, asymmetric information and agency problems) make capital structure decisions relevant to the value of firms. Following the seminal works of Jensen and Meckling (1976) and Myers (1977) on agency costs and asymmetric information problems, the theoretical and empirical finance literature not only recognize debt financing and debt maturity choice as important governance mechanisms to mitigate agency conflict between managers and shareholders, but also analyse issues associated with the use of desired level of debt and maturity structure in corporations.

A unique feature of a modern corporation is that its ownership and controls are separated. This, in turn, creates a principal-agent relationship in the corporation (Jensen and Meckling, 1976). The principal agent relationship offers some benefits: professional managers have specific knowledge or skills, which allow them to fulfil the functions more effectively than the firm's investors; and risk of business can be shared among vast number of minuscule investors. However, corporations often have to meet challenges such as differences in preferences between shareholders and managers, asymmetric information, managers' opportunistic behaviour, and inefficient use of resources (i.e. moral hazard, shirking duties, for example managers may prefer to make investment and financing policy choices that maximise their own wealth at the expenses of shareholders) as well as conflicts of interest between different claimholders such as equity holders and bondholders. An essential role of corporate governance is to mitigate agency problems and resultant agency costs arising from the conflicts of interest between managers and shareholders (Jensen and Mackling, 1976; Fama, 1980, and Fama and Jensen, 1983a) as well as those between

the controlling shareholders and minority shareholders (Shleifer and Vishny 1997 and Gillan 2006), thereby maximizing the value of the firm.

Corporate governance issues pervade almost every area of research in the arenas of economics, business and finance. Scholars with different perspectives have given various definitions for corporate governance. For example, Shleifer and Vishny (1997, p.737) define corporate governance from the perspective of suppliers of capital to corporations as "...the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment". This definition of corporate governance, thus, reflect firms' financing pattern. By contrast, Gillan and Starks (1998) take a broader perspective and define corporate governance as the system of rules, laws, and factors that control operations of a corporation. Yet, the most widely used definition of corporate governance is "the system by which companies are directed and controlled" (Cadbury, 1992). From a broad perspective the Organisation for Economic Co-operation and Development (OECD) (1997: p.7) describes that "corporate governance relates to the internal means by which corporations are operated and controlled, while governments play a central role in shaping the legal, institution and regulatory climate within which individual corporate governance system is developed."

The agency theory is the dominant theory underlying capital structure and corporate governance issues. The foundation of agency theory was laid by Berle and Means (1932) by raising their concern on the separation of ownership and control in a large corporation. They observed two main features of US large modern corporations: (1) a large proportion of corporate assets are controlled by managers with small ownership stakes in their firms; (2) managers pursue self-serving actions that come at the shareholders' expenses as a consequence of separation of ownership and control of the firm. Based on the insight of Berle and Means (1932), Jensen and Meckling (1976) formally developed the agency theory which addresses the conflict of interest between managers and shareholders under dispersed ownership structure.

According to Jensen and Meckling (1976), managers' interest is not fully aligned with shareholders' interest when ownership and control of the firm are separated. The main sources of agency conflict between the management and the shareholders

are: (1) moral hazard; (2) earnings retention; (3) time horizon; and (4) risk aversion. We will next analyse these four sources in turn.

Moral hazard

Managers with minimal ownership stakes of the firm consume more private benefits (i.e. pursue their own self-interest) at the cost of their owners rather than taking value maximizing decisions (i.e. undertaking positive NPV projects). Jensen and Meckling (1976) assume that moral hazard problem between managers and shareholders are likely to arise in a corporation since there is a high level of information asymmetry between managers and shareholders, and managers do not own the corporation's resources. Moral hazard is represented by the lack of effort in management (e.g. shirking duties to enjoy leisure time and hiding inefficiency to avoid loss of rewards). This arises because managers prefer making investment decisions that are best suited to their own personal skills to enhance their own wealth at the expenses of shareholders (Shleifer and Vishny, 1989).

Earnings retention

Different types of conflicts of interest take place between managers and shareholders. For instance, managers focus on increasing the size of the corporation (i.e. empire building) in order to enhance their reputations and compensation rather than maximizing shareholders' wealth (Jensen and Meckling, 1976). Brennan (1995) also expresses the concern that managers focus on increasing firm size than increasing the value of the firm since their compensation is usually tied up with the size of the firm, and not with shareholders' returns. Moreover, shareholders prefer higher dividends, while managers prefer to retain earnings, so as to get a higher remuneration (Jensen 1986, 1993).

Time horizon

With respect to the timing of cash flow, shareholders are concerned with future benefits over a long time horizon, whereas managers are concerned with benefits within their employment terms, often at the expenses of long-term positive projects (Shleifer and Vishny, 1990). For example, McColgan (2001) reports that

shareholders require increasing the investment in R&D while managers prefer the opposite.

Managerial risk aversion

Shareholders and firms' managers bear quite different levels of risk. Typical shareholders usually hold a well-diversified portfolio (i.e. they invest relatively small portion of their wealth in one particular firm's project). The advantage of the diversified portfolio is that if an investment/project fails, there will be relatively small negative effects on their overall wealth.

By contrast, the managers of that firm are unable to minimize their risk of investment since the majority of their human capital (and possibly some of their financial capital as well) is tied up in the firm (Amihud and Lev, 1981). If a project fails, managers lose much more than shareholders. This situation also creates the potential for conflicts of interest between managers and shareholders. Therefore, firms' managers may not be willing to undertake projects that are worthwhile to shareholders (Denis, 2001). One way for reducing the non-diversifiable risk faced by managers is by decreasing the use of debt financing (Friend and Lang, 1988). The use of a high debt ratio increases in fact the bankruptcy or financial distress risk of the firms, resulting in the loss of the managers' employment, and potential impairment of their future employment, and lowering their earning capacity. For these reasons, self-interested managers tend to reduce corporate leverage to a lower level in order to secure their own position.

1.1.1 Corporate governance mechanisms

In essence, good corporate governance consists of a set of governance mechanisms. Corporate governance mechanisms are generally divided into two categories: internal and external governance mechanisms. Internal mechanisms mainly include ownership structure and board structure (board size and composition). Primary external mechanisms consist of takeover market (i.e. the market for corporate control) and the state regulatory system (legal system). Our first empirical investigation in this study mainly focuses on the link between internal governance mechanisms and leverage. A brief description of the two major internal governance mechanisms is as follows.

1.1.1.1 Ownership structure

Ownership and control are two completely separate organs in any corporation. While ownership refers to the attributes of the owners (for example, size of their equity positions), corporations are controlled by professional managers (controllers) who own little or none of the equity of the firms they control. Ownership structure, intended as the size of the owners' equity positions and the identities of the firm's equity holders, represents therefore an important element of corporate governance.

A typical problem in most corporations is that small shareholders have no or little incentive to monitor management in widely dispersed firms since they have very small ownership stakes on the firms. Moreover, the free-rider problem reduces the incentives of these dispersed shareholders to coordinate their actions. Yet, those who have more significant ownership stakes on the corporations (i.e. the largest shareholders/ controlling shareholder) have greater incentives to expend resources and to monitor management effectively. In many countries, including China, the state is a significant owner of corporations and plays an important role in their governance.

The most important internal governance mechanism is direct equity ownership by managers (Jensen and Meckling, 1976). Jensen and Meckling (1976) suggest that the interests of shareholders and managers are better aligned when managers become owners. Increased managerial shareholding therefore not only reduces managers' motive for discretionary spending (excess consumption of perquisite and empire building) but also encourages risky policy choices such as using leverage in the capital structure. Jensen and Meckling (1976) predict a positive relationship between managerial ownership and firms' leverage based on this convergence of interest hypothesis.

1.1.1.2 Board of directors

Fama and Jensen (1983) state that the major responsibility of boards of directors is to minimize the costs that arise from the separation of ownership and control in modern corporations. The functions of the board are to hire, fire, monitor and compensate managers, and ensure that shareholders' wealth is maximized. Jensen (1993) indicates that board size is an important determinant of corporate governance

effectiveness. Since larger boards are able to commit more time and effort to overseeing management, and bring in the skills & expertise needed to operate the company effectively, they can not only increase monitoring effectiveness but also improve the quality of managerial decision-making which lead to better firm performance (Adams and Mehran, 2003). Furthermore, Coles et al. (2008) argue that since large and complex firms (in terms of size and business diversification) need directors' advice, counsel and expertise, they can benefit by having larger number of directors on their boards. However, the boards become less effective when they increase in size because coordination, communication, decision-making and the free rider problem become more severe in large boards (Lipton and Lorsch, 1992; Jensen, 1993).

Another important aspect of boards of director is the presence of independent (non-executive) directors who are considered to be more 'objective' on business policy and the long-term strategic development of the company. The independent directors' participation on the board is an important mechanism since they monitor the action of the executive directors and ensure that the executive directors' decisions are consistent with shareholders' interest (Fama, 1980).

Independent directors are professional directors with experience in business and they are more likely to be effective at monitoring managers' behaviour because of the concern with their reputation (Weisbach, 1998). While executive directors are experts in their field and provide overall strategic guidance, independent directors are more effective at monitoring the board's activities and directing management's choices, among other things, there should be an appropriate balance between independent and executive directors on the board.

1.1.2 Focus of the study

The Chinese corporate governance system has evolved and developed significantly over the last three decades, and especially in the last decade. In addition, China's banking system which is the main source of external debt finance for Chinese listed firms has undergone significant changes during the last decade. However, there is a very limited academic research available to assess how these changes have affected firm behaviour in recent years. This study hopes to fill this gap and contribute to the

understanding of the determinants and effects of debt and its maturity structure on the performance of Chinese listed firms, especially from the agency costs perspective.

Making use of data from Chinese listed firms over the period 2003-2010, we investigate the determinants of capital structure decisions (i.e. debt versus equity choice) and debt maturity decisions (short-term debt versus long term debt) and effects of these financing choices on corporate performance. Among other things, this will enable us to shed light on the linkage between corporate governance and capital structure decisions, on the attenuation (i.e. attenuating the negative effects of growth opportunities on leverage) and liquidity risk effects (potential for bankruptcy and associated costs) of short-term debt on leverage, and finally on the effects of leverage and maturity structure on firm performance. Specifically, making use of a large panel of Chinese listed firms over the period 2003-2010, we investigate three main themes. Our first empirical chapter (Chapter 3) examines the impact of managerial ownership and other corporate governance variables on firms' leverage, which is measured as the ratio of total debt to total assets (i.e. the use of debt financing in the capital structure). The investigation in our second empirical chapter (Chapter 4) focuses on attenuation effects and liquidity risk effects of short-term debt on leverage. The third empirical chapter (Chapter 5) is devoted to analyse the impact of debt financing and debt maturity on corporate performance, which we measure by profitability measures (namely, return on assets (ROA) and return on sales (ROS)) and a labour productivity measure proxied by total real sales divided by number of employees. We next discuss the motivations behind each of the empirical chapters contained in this thesis.

1.2. Motivation of the study

Chinese corporate governance system has undergone many changes during the last decade. In addition to the introduction of a corporate governance code and independent director system, Chinese firms' ownership structures have changed tremendously following the 2005 split share structure reform in which a large part of non- tradable shares have been converted to tradable shares. Furthermore, number of privately controlled listed firms has steady increased (Canyon and He, 2011). As part of these reforms, managerial shareholding has also increased considerably after

2005. See Chapters 2 for a detailed discussion on evolution and development of the Chinese corporate governance system. In the light of these developments, it is increasingly interesting to see how internal governance mechanisms impact on capital structure decisions in the Chinese context. This is the main objective of our first empirical study (Chapter 3). To the best of our knowledge, no study has examined the impact of corporate governance on leverage after the 2005 split share structure reform in China. It is also interesting to examine the extent to which managerial ownership has played a more significant effect on firms' leverage decision during the post reform period (2005-2010).

Using debt financing to deal with the agency costs of equity is not costless: it creates agency costs of debt, which arise from the conflicts of interest between shareholders and debtholders over the growth options of the firm (Myers, 1977). Yet, Myers (1977) suggests that short-maturity debt can mitigate this agency problem. Growth opportunities are therefore an important determinant not only of the firm's leverage decisions but also of its debt maturity choices. A vast body of research which examines the determinants of capital structure decisions has identified a negative relationship between growth opportunities and firm's leverage (Titman and Wessels, 1988; Stulz, 1990; Smith and Watts, 1992; Rajan and Zingales, 1995; Frank and Goyal, 2003), while studies based on debt maturity choices find a positive relationship between short-term debt and growth opportunities (e.g., Barclay and Smith, 1995; Guedes and Opler, 1996). This is consistent with Myers's (1977) prediction. However, Diamond (1991) argues that a greater use of short-term debt leads to rollover/liquidity risk through the threat of premature liquidation. Johnson (2003) empirically shows that while short-maturity debt can mitigate the negative effect of high growth opportunities on leverage, it can also reduce the total level of leverage due to increased rollover risk for the average US firms. In the context of China, previous studies have provided empirical evidence suggesting that listed firms face underinvestment problem, by showing a negative relationship between growth opportunities and leverage (Zou and Xiao, 2006; Haung and Song, 2006; Moosa et al., 2011), as well as a negative relationship between leverage and investment (Firth et al., 2008). Furthermore, even after considerable development in the commercial bank lending environment in China (Firth et al., 2009; Tsai et al., 2014), short-term debt still account for more than 80% of the total debt of listed

firms. To the best of our knowledge, no single study has focused on the attenuation and liquidity risk effects of short-term debt on leverage in China. The main motivation of our second empirical chapter (Chapter 4) is therefore to fill this gap in the literature by examining the attenuation and liquidity risk effects of short-term debt on leverage in the Chinese context. Another motivation for the same empirical study is to see how the attenuation and liquidity risk effects of short-term debt differ between state and privately controlled firms using China's unique institutional environment where a considerable number of listed firms are still controlled by the state or state agents.

Agency theory suggests that debt financing can be an important governance mechanism to mitigate conflicts of interest between shareholders and managers (Jensen and Meckling, 1976; Grossman and Hart, 1982; Fama and Jensen, 1983; Jensen 1986; Stulz, 1990). Following McConnell and Servaes's (1995) empirical contribution to the analysis of effects of leverage on corporate performance, a handful of studies have developed empirical evidence on the relationship between capital structure and firms' performance in developed countries (e.g., Dessi and Robertson, 2003; Berger and Bonaccorsi di Patti, 2006; Margaritis and Psillaki, 2010). Additionally, studies based on debt maturity choices suggest that long-term debt helps improve firms' total factor productivity (TFP) because it may allow firms access to better and more productive technologies, which the firm may be reluctant to finance with short-term debt because of fears of liquidation (e.g., Schiantarelli and Sembenelli, 1996; Schiantarelli and Jaramillo, 1996; Schiantarelli and Srivastava, 1996).¹ Even though there is no systemic study focused on the effects of debt and maturity structure on firm performance of Chinese companies, Tian and Estrin (2007) and Firth et al. (2008) provide evidence on the impact of debt financing on agency costs faced by firms, and conclude that the Chinese government's ownership of both banks and firms, and the resultant soft budget constraints make debt an ineffective governance mechanism in reducing agency costs particularly for state owned enterprises (SOEs). However, following a series of reforms of the banking system (which we discuss in the Chapter 2), the governance of the Chinese financial sector has

¹Total-factor productivity (TFP) is a variable which measure effects in total output growth relative to the growth in traditionally measured inputs of labor and capital.

significantly improved and banks now use more and more commercial judgment and prudence in their lending decisions (Cull and Xu, 2005; Ayyagari et al., 2008; Firth et al. 2009). Loan officers in banks and other financial institutions are now held responsible for their poor lending decisions (Allen et al., 2012). In light of these developments, recent research using data on Chinese listed firms suggests that bank financing no longer facilitates unwise investment and the overconsumption of perquisites in SOEs. By contrast, it now acts as a governance mechanism that constrains managers' misconduct and thus help improve investment efficiency in both state controlled and privately controlled firms (Chan et al., 2012; Lin and Bo, 2012; Tsai et al., 2014). Yet, to the best of our knowledge, no study has focused on examining the direct effects of debt and maturity structure on firm performance of Chinese companies in recent years. It is also interesting to assess the extent to which the effects of leverage and maturity structure on firm performance differ between privately-controlled and state-controlled firms. These considerations motivate our third empirical study (Chapter 5).

1.3. Potential contributions

This thesis contributes to the existing literature in a number of ways. Our empirical studies contribute to the agency and information asymmetry literature. Our first study (Chapter 3) examines the impact of managerial ownership and other corporate governance variables on firms' capital structure decisions. Although a limited number of empirical studies have examined the relationship between corporate governance variables and firms' leverage in the context of Western countries, such as the US and the UK, there is lack of research in this area in China. By integrating the corporate governance and capital structure literatures, this study documents for the first-time a linear relationship between managerial ownership and leverage in China.

Our second empirical study (Chapter 4) examines debt maturity and the effects of growth opportunities and liquidity risk on leverage. Firstly, we test whether the short maturity of debt can attenuate the negative effect of growth opportunities on leverage. Secondly, this study advances existing literature by providing the first

empirical evidence on the attenuation effect of short-term debt in a dynamic framework in the context of China. Using a recent data set, our study documents that the proportion of short-term debt in total debt helps mitigate the negative effect of growth opportunities on leverage. More importantly, our study shows that even though Chinese listed firms use a large proportion of short-term debt, the liquidity risk faced by these firms seems to be economically less important than that reported for US firms due to the unique institutional setting (characterized by state ownership and personal networks) in which they operate.

Our third empirical study (Chapter 5) contributes to the existing literature by providing the first evidence for China of a direct relationship between leverage and the proportion of long-term debt to total debt on the one hand, and firms' performance, measured by return on assets (ROA), on the other. Although previous studies have looked at the effect of capital structure on performance in the context of developed markets (McConnell and Servaes, 1995; Dessi and Robertson, 2003), to the best of our knowledge, no single study has focused on this issue in China. Our findings suggest that debt financing works as an effective mechanism through which Chinese listed firms can alleviate agency problems, and concludes that leverage and the proportion of long-term debt in total debt are an important determinant of firms' performance in China. Our study also addresses endogeneity problem through the use of a system GMM estimator in the empirical analysis.

Our research contributes to the literature along following additional dimensions. First, it contributes to the growing literature on the effects of managerial incentives, and in particular managerial ownership, on firms' capital structure decisions in the context of emerging and transition economies (Kato and Long, 2011).

Second, it distinguishes itself from previous studies by differentiating the effects of managerial ownership on firms' leverage, between the pre- and post- reform period, and thus contributes to the research on the effects of the split share structure reform in China. Recent empirical studies examine the direct effects of the reform on firms' behaviour (Lin 2009; Chen et al., 2012), ignoring how corporate governance mechanisms can differently affect firm behaviour in the pre- and post-reform period. We show that the increased managerial ownership which followed the reform, is associated with increased usage of leverage in Chinese listed firms.

Finally, our research help to disentangle for the first time not only the impact of managerial ownership on the leverage of privately- and state-controlled firms, but also the effects of leverage and maturity structure on these firms' performance. We provide evidence that managerial ownership and debt financing work as effective governance mechanisms only for privately-controlled firms. These results are consistent with the argument that private ownership is superior to state ownership (Alchian, 1965; Shleifer, 1998; Green, 2004; Chen et al., 2010). Our research therefore also contributes to the literature that favours privatisation (see Megginson and Netter, 2001, for a survey).

Overall, our research examines the determinants and effects of leverage and debt maturity on corporate performance with a special emphasis on the prospective of corporate governance. It also provides an opportunity for the comparison of the efficacy of different governance mechanisms in the pre- and post-reform periods, as well as between state- and privately-controlled firms. By integrating the corporate governance and capital structure literatures, our research contributes to further our knowledge on the effectiveness of managerial ownership, debt financing and other internal corporate governance mechanisms for Chinese listed firms. The outcomes of the research will help policy makers and government agencies, economists, as well as local and foreign investors to improve the corporate governance of Chinese listed firms.

1.4. Structure of the thesis

This thesis mainly consists of three empirical studies examining the determinants of leverage and debt maturity and their effects on corporate performance from a corporate governance perspective. The rest of the thesis is organized as follows. Chapter 2 provides a general overview of the institutional reforms in China. It first describes the ownership structure of the corporations and other internal governance mechanisms. It then provides a historical background of corporations and financial markets in China. Chapter 3 presents our first empirical study, which examines the impact of managerial ownership and other corporate governance mechanisms on firms' leverage. Chapter 4 represents our second empirical study, which examines debt maturity and the effects of growth opportunities and liquidity risk on leverage. Chapter 5 presents our third empirical study. It examines the impact of capital

structure decisions and maturity structure on corporate performance, measured using ROA, ROS, and labour productivity. Finally, Chapter 6 presents concluding remarks, identifies some potential limitations of our research, and suggests some potential avenues for future research.

Chapter 2

Overview of China's corporate governance and financial system

2.1. Introduction

The objective of this chapter is to provide an institutional background of the Chinese Listed firms which underpins each of our empirical chapters that follows. Understanding how Chinese corporate governance system and financial system have evolved and developed is important to our understanding of the behaviour of the firms in China.

2.2. Corporate governance system in China

In this section, we briefly discuss the evolution of stock markets and corporate governance of Chinese listed corporations

2.2.1. Evolution of stock markets and modern corporations

Chinese financial market began to emerge in the early 1990s with the establishment of two stock exchanges, namely Shanghai Stock Exchange (established in December 1990, SHSE), and the Shenzhen Stock Exchange (established in July 1991, SZSE). This was one of the most significant economic reforms. Since then, both stock exchanges have been growing rapidly in terms of the number of listed companies, trading volume, total market capitalization and fund raising capability. In China, the history of modern listed corporations which began with the inception and growth of these two stock markets is very short as compared to other developing countries. The objective of establishing and developing stock market was to raise capital for financing. Chen (2005) notes that more than 480 billion Yuan new equity was issued in 2000. By early 2004, China's stock markets emerged as the eighth largest emerging market in the world with about 1300 listed firms and a market capitalization of over \$550 billion (Liu, 2009). As can be seen in Table 2.1, total number of listed companies has been increasing continuously every year since 2000 and at the end of 2010, a total of 2063 companies were listed on the two Chinese

stock exchanges. The total market capitalization of these companies was 26.54 trillion RMB. The combined market capitalization of these two stock exchanges in 2010 accounted for about 66.69 % of China's GDP (CSRC, 2010). At the end of 2013, a total of 2489 companies were listed on the two Chinese stock exchanges. Now China is the world's third largest stock market after the US and Japan in terms of combined market capitalization. Furthermore, China's securities market is open to foreign investors. China Securities Regulatory Commission (CSRC) is responsible for monitoring stock exchange activities. The Chinese stock markets exhibit some prominent characteristics when compared to mature financial markets (Gordon and Li, 1999). For example, the state or government plays a dual role as an owner of firms (dominance owners) and regulatory agency. While dividend income in China is subject to graduated tax rates based on the length of time the shares have been held, capital gains are generally taxed at the corporate income rate.

Table 2.1 Important features of Chinese stock markets

Year	No. of listed companies	No. of foreign-invested companies (B-shares)	No. of overseas listed companies	Total outstanding shares (100 mn shares)	Total Market capitalization (100 million Yuan)	Total Turnover (100 million Yuan)
2000	1088	114	52	3792	48091	60827
2001	1160	112	60	5218	43522	38305
2002	1224	111	75	5875	38329	27990
2003	1287	111	93	6428	42458	32115
2004	1377	110	111	7149	37056	42334
2005	1381	109	122	7630	32430	31663
2006	1434	109	143	14926	89404	90487
2007	1550	109	148	22417	327141	460556
2008	1625	109	153	24523	121366	267113
2009	1718	108	159	26163	243939	535987
2010	2063	108	165	33184	265423	545634
2011	2342	108	171	36096	214758	421650
2012	2494	107	179	38395	230358	314667
2013	2498	106	185	40569	239077	468729

Sources: Annual reports of CSRC

China's corporate governance mainly draws from both the 1994 Company Law of the People's Republic of China and the guidelines and codes issued by Chinese

Securities Regulations Commission (CSRC). The 1994 Company Law improved property rights by establishing the firm as a legal entity that owns assets. It also defines the functions and responsibilities of shareholders, board of directors, and board of supervisors. A fundamental review of Chinese company law was enacted in 2006 and this generated two types of limited companies: the Limited Liability Companies (LLC private companies) and the Joint Stock Company (JSC public companies). This brought the legal context much in accordance with the company law of other countries.

To achieve its main objective of protecting investors, the CSRC, along with other authorities, has issued supplemental regulations, administrative rules, guidelines and codes (e.g. the Provisional Regulations on Public Offering and Trading, and the Measures on the Administration of Futures Exchanges). A corporate governance Code for listed companies was formulated for the first time by the CSRC in 2002. While the guideline and code require a listed company to appoint independent directors to its boards, it discourages the combination of the positions of chairperson of the board of directors and general manager (CEO duality). The code also prescribed basic principles for the protection of investors' rights, as well as basic rules and standards for directors, supervisors, and senior management. The code was intended to be the major measuring standard for the evaluation of listed companies' corporate governance structure.

2.2.2. Ownership structure of Chinese listed companies

China has unique ownership and governance structure (Chen, 2005; Bhabra et al., 2008). Before mid-2005, A-shares were classified into tradable shares and non-tradable shares. The non-tradable shares were mostly owned by the SOEs and other state owned legal person. Non-tradable shares were not allowed for public trading at two exchanges, but it could be transferred via negotiation or auction to domestic institutions upon approval from the CSRC.² Tradable A-shares were mainly offered to domestic individual investors only in Chinese currency, Chinese Yuan, by the SHSE, and the SZSE after the IPOs. Foreigners have also been allowed to invest in

² After 2005 split-share reforms non-tradable shares can be converted into tradable shares.

the A-shares through the Qualified Foreign Institutional Investors (QFII) scheme regulated by CSRC since December 2002.

The B-shares are held exclusively by foreign investors and are traded in foreign currency, (U.S. dollars), but, national individual investors have also been allowed to invest in B-shares since February 2001. In addition to the A-shares and B-shares, Chinese listed companies have also H-shares and N-shares. H-shares and N-shares are similar to B-share in nature, but they are listed and traded on the Hong Kong Stock Exchange and the New York Stock (NYSE), respectively³. Chinese listed firms thus have issued mainly four types of tradable shares; each with its own unique. All shares, in spite of the different currencies and different shareholder types, are entitled to the same cash flow rights (i.e. dividend) and voting rights.

As explained above, a typical listed company in China has a mixed ownership characteristic. Before the 2005 reform, the government held the majority of non-tradable A shares (approximately a two-thirds of total shares) in the corporations by direct and/or indirect shareholding through state-owned institutions (such as state assets management agencies, investment companies, and state holding companies) and this significantly affected the liquidity of the China's stock market. The rest of shares (i.e. only one third of total shares) issued by the companies were tradable A-shares and they had little power for decision-making.

2.2.2.1. The 2005 split share structure reform

In April 2005, the CSRC and Chinese government initiated the reforms of non-tradable shares. The Chinese's government recognizes that removing the non-tradable share structure is vital to the future development of China's capital market due to the following reasons (Li et al., 2011): Firstly, split-share structure induces a severe incentive conflicts between non-tradable and tradable shareholders. The main agency problem in Asian emerging markets is the expropriation of small investors by the largest shareholders (Shlifer and Vishny, 1997). Secondly, the market for corporate control is a major external governance mechanism for improving corporate governance system. In China, since the state is as predominance shareholders, any

³ The shares of companies in Singapore are called S-shares.

other owners cannot acquire controlling interest through open market transaction and this situation creates the market for corporate control an inefficient mechanism. Thirdly, a small public float (only one-third of total tradable shares) for a listed company in the stock market made shares illiquid. Finally, the rights of minority shareholders are frequently violated.

Thus, the main aim of the split share reform is to eliminate the differences between non-tradable and tradable shares, and to balance the interest between the two types of shareholders in a market-oriented way.

In June 2001, non-tradable shares were sold at market price. However, this first attempt did not provide any positive market reaction since extra supply of tradable shares in the market created a severe bear market and this led to a significant decline in the share prices. For example, share prices felled by more than 30% (Kim et al., 2003). In light of these strong adverse reactions, Chinese government had to withdraw from the reform system in October 2002. Then, on April 29, 2005, the CSRC and Chinese government launched another attempt to implement the split-share reforms with introducing a compensation scheme by inviting four companies.⁴ This required that non-tradable shareholders had to negotiate a suitable compensation plan with tradable shareholders who held shares of the same company and implemented that plan before the non-tradable shares could be traded on the market.⁵ The reform is completed when the proposal of each listed companies is approved by at least two thirds of the tradable shareholders and two-thirds of all shareholders at shareholders' meeting. If the first proposal is not accepted then the non-tradable shareholders have to come up with another proposal and negotiations begin afresh. The first official document, 'Measures on the Administration of split-share Structure Reforms of Listed Companies' provides guideline for the implementation of the reforms issued by the CSRC on September 5, 2005.

Initially the split-share reform program was launched with four companies. Three of the four companies successfully accomplished the program in 35 days. The second group comprised 42 firms (28 from Shanghai and 14 from Shenzhen Stock

⁴ They were: Tsinghua Tongfang, Hebei Jinniu Energy Resources, Shanghai Zijiang Enterprises Group and Sany Heavy Industry.

⁵ Compensation can be a one-time cash payment and warrants.

Exchanges), that took 47 days to finalize the process.⁶ Then, the reform program was to be extended to all remaining listed companies. By the end of 2007, 1,298 listed companies, representing 98% of the total listed companies, had either initiated or completed the process of non-tradable share reform (Li et al., 2011). In addition, all new IPOs taking place since mid-2006 no longer have non-tradable shares.

As can be seen Table 2.2, as a consequence of 2005- split share ownership reform state ownership and legal person ownership of Chinese listed firms decreased significantly after 2005, while they show a decreasing trend throughout the sample period of 2003 to 2010.

Table 2.2 Ownership structure and board structure of Chinese listed firms over the period 2003 to 2010

Year	2003	2004	2005	2006	2007	2008	2009	2010
State ownership	0.362	0.353	0.336	0.286	0.254	0.217	0.118	0.081
Legal person ownership	0.218	0.218	0.216	0.182	0.145	0.122	0.089	0.091
Foreign ownership	0.041	0.038	0.038	0.039	0.038	0.034	0.030	0.029
Managerial ownership	0.005	0.012	0.014	0.018	0.029	0.037	0.049	0.081
Board size	9.799	9.677	9.556	9.446	9.414	9.234	9.173	9.108
Proportion of independent directors	0.334	0.344	0.348	0.351	0.356	0.358	0.360	0.360

Source: Compiled by researcher from the data collected from the China Stock Market and Accounting Research (CSMAR) database.

Note: See appendix A3.1 for definition of variables

2.2.2.2. Managerial ownership

Another important feature of ownership structure related to the 2005 reform is a significant increase in managerial ownership in Chinese listed firms. In January 2006, the CSRC issued “The Administrative Rules of Equity Compensation of Listed Companies”, which allow the listed companies those who have successfully completed their split-share-reforms adopt equity based compensation plans with restricted stocks and stock options for their managers. In order to maintain true independence of independent directors, they were not included from any stock incentive scheme; instead, they were asked to provide independent opinions on the fairness and effect of proposed stock incentive schemes. It is expected that equity based compensation plans not only help to increase the income standards of the

⁶ This group includes some large firms and comprises around 10% of market capitalization.

management, but also align their interest with shareholders' interest and with the long-term development of the enterprise. As we can observe from Table 2.2, in contrast to state and legal person ownership, shares owned by top management increased from 0.5% in 2003 to 8.1% in 2010. This shows that after series of ownership reforms, equity ownership by managers has emerged as an important governance tool in Chinese listed companies as discussed in Conyon and He (2011) and Walder (2011).

2.2.3. Board of directors

Another important internal governance mechanism that has undergone significant changes during the last decade in China is board of directors. In accordance with 1994 Chinese company law, companies have adopted a two-tier board structure, a board of directors and a board of supervisors.

Like in the Western countries such as the US and the UK China's company law also identifies the board of directors as the top level decision-making body of a company and thus the board is responsible for the strategic operations of the firm. Directors are appointed by shareholders at general shareholders' meetings. The board of directors is mainly expected to implement resolutions passed at the shareholders' meeting. However, unlike in the Western countries where the boards of directors with majority of outside directors have enormous power in appropriating and dismissing top executives and in determining their compensation, the board of directors of Chinese company has fewer powers and less prestige (Chen 2005; Su, 2005). This is due to the fact that the government is the major shareholder of the majority of listed and thus almost 90% of the board members of these firms were government officials who lacked the necessary knowledge or experience (Su, 2005).

In order to improve the corporate governance of listed firms and ensure better investors protection, the CSRC issued Guidelines for introducing independent directors in the boards of listed companies in 2002. The guidelines are mandatory and required all listed companies to have at least two independent directors on their boards by 30 June 2002, and at least one-third of the board members had to be made up by independent directors (including at least one professional in accounting) by June 2003. Independent directors are appointed by the board of directors, the board

of supervisors, or any shareholder holding 5 percent of the shares. According to the Guidelines, the independent directors are not allowed to “hold posts in the company other than the position of director” and were asked to “maintain no relations with the listed company and its major shareholders that might prevent them from making objective judgment independently.” While the independent directors are entitled to vote on managerial and financial decisions, they are required to provide independent opinions on substantial decisions and connected transactions. These decisions and transactions can relate to merger and acquisition activities, the nomination, appointment or removal of directors, the appointment or removal of senior managers, the compensation of directors and senior managers, related party transactions, major investments, information disclosure, and financial statements. Yet, many empirical studies show that independent directors are an effective corporate governance mechanism in developed countries (e.g. Weisbaeh, 1988), it has been argued that in China, many independent directors are, however, appointed by controlling shareholders and are politically connected and therefore, their independence from the management is not certain (Clarke, 2003; Su, 2005; Liao et al., 2009).

Table 2.2 shows that there is a slight decrease in the number of board of directors of listed firms over the period 2003–2010. The number of board of directors declined from 9.8 in 2003 to 9.1 in 2010. On the other hand, we can see a steady increase in the proportion of independent directors of the companies which increased from about 0.33% in 2003 to about 0.36% in 2010.

2.2.4. Board of supervisors

According to the Company Law, Chinese companies should have a board of supervisors to oversee finances, ensure diligent actions of the directors and senior management, and report any impropriety, abuse of discretionary power, or action that affects the firm. The Company Law requires that at least a third should be worker representatives on the board of supervisors but does not specify the proportion of representatives of shareholders or employees. Clarke (2006) points out that the board of supervisors lacks powers to effectively carry out its monitoring activities in Chinese listed companies. Unlike in the German corporate governance model where the supervisory board sits between the shareholders and the board of directors and can appoint board of directors, in the Chinese corporate governance

model, the supervisory board does not have the power to hire and fire directors. Thus, the supervisory power of Chinese supervisory boards is relatively soft and seeks to act through influence. Research suggests that Chinese supervisory boards are often ineffective; their meetings are not well attended and have little influence on firms' decisions such as capital structure decisions, since most of their members are politically connected, and lack professional qualification or experience (Dahya et al., 2003; Tricker, 2009). Furthermore, since board of supervisors do not usually involve in the management of the business, the supervisory committee is more decorative than functional (Yang et al., 2011). Therefore, in our study, we do not include supervisory board characteristics in the analysis of capital structure decisions of Chinese listed firms.

2.3. Public debt (bond) market

China's public debt market is still under-developed and lags far behind the development of the equity market. In China, bond market is dominated by government bonds and by bonds issued by policy banks. Corporate bonds issued by non-financial corporations in China account for a mere 1% of Chinese GDP, compared to an average of about 50% in other emerging markets. This undeveloped corporate bond market is mainly attributed to the lack of sound accounting and auditing systems and high-quality bond-rating agencies in China (Allen et al., 2012). Although bonds were first issued in 1986, the bond market has only begun to expand after 2000, when new rules governing issuance were implemented. Apart from the giant SOEs, local firms are also encouraged to issue corporate bonds and market forces increasingly determine the spread on bonds. Yet, China's bond market is still very small compared to its huge banking sector.

2.4. The banking system in China

Chinese firms mainly rely on banks for their external financing (Allen et al., 2005; Cull and Xu, 2005). Recent studies suggest that following the liberalization of China's financial system and the improvement in the corporate governance of the banking sector, Chinese banks play a significant role in monitoring corporate activities and improving the efficiency of corporations. It is, therefore, important to

understand the Chinese banking system, and its development in order to understand its implications for firm behaviour.

Prior to economic reform in 1978, China's financial system had only one bank namely the People's Bank of China (PBOC), which played both the role of central bank and commercial bank. China launched significant structural changes in its banking sector from the late 1970s though it was gradual in line with its economic reforms. As a first step, to take over all the commercial banking functions from the People's Bank of China (the central bank), the government established four wholly state-owned banks (known as the Big Four)⁷.

Aiming to make the Big Four real enterprises, a sequence of further reforms have been undertaken by Chinese government: (i) allowing them engage in business outside of their designated economic sector since 1985, (ii) three specialized "policy banks" were established in 1994 to take over the policy lending functions from the four state owned banks,⁸ (iii) they have also been subject to reform in terms of managerial and mechanistic aspects⁹. From that point onwards, the Big Four, known as commercial banks, were expected to operate in accordance with market principles. Other subsequent developments made in the reform process during the 1990s include (i) the transformation of urban credit cooperatives into commercial banks (ii) permitting to establish non-state commercial banks in order to provide competition to state banks, (iii) introduction of standard accounting and prudential norms. (iv) to resolve the problem of the accumulated large non-performing loans (NPLs) of the Big Four, the government injected RMB 27 billion of capital into the four state-owned banks and transferred the NPLs to four newly established asset management companies.

⁷ The Big Four are: the Bank of China (BOC) which took over the transactions related to foreign trade and investment; the People's Construction Bank of China (PCBC) which specialized in transactions related to fixed investment; and the Agriculture Bank of China (ABC) which specialized in all banking business in rural area and finally, the Industrial and Commercial Bank of China (ICBC) was established to take over all commercial transactions (deposit-taking and lending business) of the PBOC.

⁸ These include State Development Banks, the Agricultural Development Bank of China and the Export and Import Bank of China. These banks are responsible for financing economic and trade development and state-invested projects, and promoting export and food productions.

⁹ For instance, the importance of risk management has been reinforced and their managers are held responsible for their lending decisions (Allen et al., 2012)

Furthermore, in 1995, the Central Bank Law and the Commercial Bank Law were promulgated, in an effort to improve bank lending standards and make bank managers accountable for bank performance. The Chinese government also began to establish joint stock commercial banks and city banks.

After these reforms, the Chinese banking system comprises the central bank, four large state-owned commercial banks, three policy banks, then national joint-stock commercial banks, regional commercial banks, and urban and rural credit cooperatives. During the 1990s these banks were the type of financial institutions in the market and as such were actively involved in providing capital for corporate sector growth, but under supervision from the People's Bank of China. Yet, since the largest shareholders in most of joint-equity banks are usually SOEs, almost all the banks were directly or indirectly controlled by the Chinese government. The key issues that the Chinese banking sector still faced were: the state control of banks, more loans going to unproductive SOEs (i.e. poor lending decisions made for SOEs), and the larger amount of nonperforming loans (NPLs) within the four largest state-owned banks due to political or other non-economic reasons (Cull and Xu, 2003; Allen et al., 2005).

Yet, many additional changes were introduced after China's entry into the World Trade Organization (WTO) in 2001. These include further liberalization of interest rates, fewer restrictions on ownership, increased operational freedom and partial privatization. In line with commitments of the WTO agreement, China has further opened up its banking sector to foreign banks in full scale in the following five-year period. From 2003 onwards, foreign banks in 13 cities were allowed to conduct local-currency business with domestic firms. Large foreign banks were allowed to acquire significant stake and become strategic partners of major state-owned banks.¹⁰ By 2006, there were over 300 foreign bank branches in China (Lin, 2011).

The China Banking Regulatory Commission (CBRC) and the Central Huijin Investment Company were set up in 2002 in order to provide closer scrutiny and better monitoring of banking activities, and to facilitate restructuring, reform, and

¹⁰ For example, the Hongkong and Shanghai Banking Corporation (HSBC) acquired a 19.9% stake of the Bank of Communication. The Bank of America and the Royal Bank of Scotland have become strategic partners of the China Construction Bank and the Bank of China, respectively.

initial public offerings of state-owned banks, respectively. Until 2004, the Big Four were SOEs solely owned by the Chinese government. However, in 2005, the government started to privatize these banks through the recruitment of strategic investors (by providing minority foreign ownership stakes) and by listing them on the stock exchange¹¹. Qin (2007) points out that China's accession to WTO has institutionalized the process of China's domestic reform externally through the force of WTO obligations.

In light of these developments, more recent research suggests that participation of foreign capital and management in Big Four state banks, listing of these banks and many other city commercial banks on stock exchanges from mid-2000, has exerted external market pressure on banks to follow commercial judgment and prudence in their lending practices and thus becoming more efficient in allocating credit to private firms (i.e. Chinese banks' traditional lending bias in favor of state-owned enterprises is less likely to prevail) (Jia, 2009 and Lin, 2011 Lin and Bo, 2012; Tsai et al. 2014). Allen et al. (2012) note that now loan officers in banks and other financial institutions are held responsible for their poor lending decisions. Consistent with these developments, Firth et al. (2009) provide evidence that Chinese banks provide loans to financially healthier and better-governed firms. Ayyagari et al. (2008) suggest that unlike financing from alternative channels, financing from China's formal financial system (e.g., bank financing) is associated with faster firm growth.

Finally, it is worth noting that, as Allen et al. (2012) point out, although Chinese banking system has become efficient in allocating resources, it is still mainly controlled by the 'Big Four' banks which have become publicly listed and traded companies in recent years, with the government being the largest shareholder and retaining control.

¹¹ The CBC which went public through IPO in Hong Kong in October 2005, followed by the BOC in June 2006; the ICBC in October 2006 (both in Hong Kong); finally ABC took an IPO in Shanghai and Hong Kong in July 2010.

2. 5. Conclusion

The above analysis shows that China has made significant progress in introducing a formal corporate governance system for listed firms, and in liberalizing its financial sector, improving governance of state owned banks. However, Chinese government still prefers to retain its ownership and control in listed firms and banking sector.

Chapter 3

Capital structure decisions and corporate governance: Evidence from Chinese Listed companies

3.1. Introduction

Corporate capital structure decisions are not only important for firms to maximize their value but also for the growth and stability of firms and the corporate economy as a whole (Jensen and Meckling, 1976). Firm financing patterns have long been the object of study in the corporate finance literature (Haris and Raviv, 1991). Capital structure choices of corporations have traditionally been analysed in the Modigliani-Miller (1958) framework, expanded to incorporate taxes, bankruptcy costs, agency cost, and asymmetric information issues (such as signalling, adverse selection). Early studies use the trade-off theory, pecking order theory (Myers and Majluf, 1984; Myers, 1984), and agency theory (Jensen and Meckling, 1976) to explain the use of leverage. Many recent studies have also related financing patterns to product market structure, firm performance, market timing, ownership structure, corporate governance, and financial crises (Baker and Wurgler, 2001; Dessi and Robertson, 2003; Deesomsak et al., 2004; Data et al., 2005; Pandey, 2006; Baum et al., 2007; Florackis and Ozkan, 2009; Guney et al., 2011, Sun et al., 2015).

A large number of studies, for example Titman and Wessels (1988), and Wald (1999), have empirically examined determinants of capital structure in the context of developed economies. Most early papers examine the case of US companies (see Haris and Raviv, 1991, for a detailed review), whilst Rajan and Zingales (1995) test the theoretical and empirical lessons learnt from the US studies for the G7 countries. These authors find a similar behaviour of leverage across countries, thus refuting the idea that firms in bank-oriented countries are more leveraged than those in market-oriented countries.¹² Rajan and Zingales (1995) also find that the determinants of capital structure that have been reported for the USA (size, growth opportunities, profitability, and tangible assets) are important in other countries as

¹² Market-oriented countries include the UK and the USA. Bank-oriented countries include Japan, France and Germany.

well. They show that a good understanding of the relevant institutional context (bankruptcy law, fiscal treatment, ownership concentration, and accounting standards) is required when identifying the fundamental determinants of capital structure.¹³ Recently, there has been a growing body of literature on capital structure decisions from developing countries, for example Wiwattanakantang (1999), Booth et al. (2001), Deesomsak et al. (2004), Kim et al. (2006), and Črnigoj and Mramor (2009).

In the context of China, a handful of empirical studies examine capital structure decisions (for example, Chen, 2004; Huang and Song, 2006; Zou and Xiao, 2006; Qian et al., 2009; Moosa et al., 2011). A common feature of all these studies based on Chinese listed companies is that they use data before 2005¹⁴. Therefore, these studies do not consider changes occurred after the major split-share reform initiated by Chinese Securities Regulatory Committee (CSRC hereafter) and Chinese government in 2005. The aim of the 2005 split-share structure reform is to convert non-tradable shares into tradable shares in order to facilitate the liquidity in the secondary market. Before implementing the reform, the non-tradable shareholders of a firm have to negotiate with tradable shareholders to ensure that they get a suitable compensation package before trading occurs.¹⁵ Moreover, they do not consider the possible effects of agency conflicts between managers and shareholders or governance mechanisms on the capital structure in a unified framework and they have failed to consider potential endogeneity and the dynamic nature of firm's capital structure decisions.¹⁶

In recent years, much of the attention of academics and practitioners has been focused on corporate governance issues, in particular, the impact of corporate governance issues on several important decisions (primarily investment and financing decisions) made by managers and the resultant performance and valuation of firms (See Shleifer and Vishny, 1997; Brown et al., 2011; Wintoki et al., 2012). The significance of research

¹³ Note that capital structure, leverage and debt capital or debt financing are used interchangeable throughout the paper.

¹⁴ One exception is Chang et al. (2014) who use data from 1998 to 2009, however, they do not take into account differences in the pre- and post-reform periods.

¹⁵ The compensation package/ plan should be approved by 2/3 of the total voting shareholders and the voting tradable shareholders.

¹⁶ One exception is Qian et al. (2009) who use of 650 Chinese publicly listed companies over the period 1999 to 2004 to examine the dynamic nature of capital structure model of Chinese listed companies.

on corporate governance has its origins in the work of Jensen and Meckling (1976). They argue that there is potential for substantial agency costs resulting from the conflict of interest between managers and shareholders when the ownership and control of the firm are separated.¹⁷ One of the important agency problems discussed by Jensen and Meckling (1976) is professional managers' tendency for excess consumption of perquisites and empire building (i.e. rather than maximising shareholders wealth, undertaking negative net present value (NPV) investments on the expansion of the firm to enhance their reputation and compensation).

Jensen and Meckling (1976) show that agency problem between managers and shareholders can be reduced by the use of debt capital as a governance mechanism, since this can help to prevent dilution of equity ownership of insiders and provides additional monitoring from the debt holders, resulting in reduced the agency costs of outside equity. Therefore, Jensen and Meckling (1976) argue that even in the absence of a tax shield advantage, debt financing increases firm value by reducing agency costs of equity. The subsequent theoretical development in the agency theory (Grossman and Hart, 1982; Jensen 1986; Stulz, 1990), suggests that leverage indeed can be an effective corporate governance mechanism that mitigates the agency problem between managers and shareholders by disciplining managers (i.e. debt is an effective mechanism in curbing the self-interested behaviour of managers). The rationale behind this is threefold (1) managers are closely monitored by debt-holders and the financial market (Jensen and Meckling, 1976; Rajan and Winton, 1995; Stulz, 2000) (2) fixed interest payment to the debt holders disgorges the free cash flow available to the managers' discretionary spending (Jensen, 1986) and (3) potential for risk of bankruptcy and the resulting loss of reputation and jobs for managers (Fama, 1980; Grossman and Hard, 1982; Williams, 1987). However, the crucial empirical question is how to encourage managers who consider leverage as constraining their discretionary power, to choose the optimal level of leverage that maximizes shareholders' wealth. That is, the leverage choice itself is an agency problem: managers may deviate from value –maximising capital structure choices and thus make themselves comfortable to

¹⁷ The main reason is that the conflict of interest between shareholders and managers arises when managers have very small ownership stakes in the firm, while a large proportion of corporate assets are controlled by them (Berle and Means, 1932). This situation may create moral hazard issues in corporations. Another reason is that high level of information asymmetries between managers and shareholders (Myers, 1977)

pursue their own self-interest.

Several empirical studies provide evidence that corporate governance mechanisms are associated with the use of debt capital in the capital structure. For example, Friend and Lang (1988) use data of 984 NYSE firms over the period 1979 to 1983 to show that the level of leverage is negatively related to management's shareholding, implying that managers who have large stakes in the corporation use less corporate debt in order to reduce their non-diversifiable firm specific risk associated with their human capital vested in the firm. That is the use of higher debt ratios results in greater agency costs to management than to public investors.¹⁸ In contrast, using data of 124 manufacturing firms from COMPUSTAT annual industrial files over the period 1979 to 1980, Mehran (1992), reports a positive relationship between equity owned by managers and firms' leverage, meaning that equity ownership provides managers with the incentive to use more debt capital so as to maximise their own wealth and outside shareholders' wealth.

In addition, many empirical studies (e.g., Kim and Sorensen, 1986; Merhan, 1992; Berger et al., 1997; Brailsford et al., 2002) show that other governance mechanisms such as the monitoring by outside block-holders and independent directors are positively associated with the increased use of debt-equity ratios in firms. A positive relation between external block holders and leverage suggest that large shareholders have greater incentives to monitor the management, resulting in decreased managerial opportunistic behaviour and thus lower agency costs.

Taken together, theoretical and empirical studies from western countries suggest that conflicts of interest between managers and shareholders and the corporate governance mechanisms devised to solve them have impact on the use of debt in firms' capital structure.

Additionally, research based on emerging markets where minority shareholders' protection is rather weak suggests that leverage can be used by controlling shareholders to fund resources to expropriate without diluting his or her control over

¹⁸ This is consistent with an argument by Amihud and Lev (1981). According to which managers are unable to minimise their risk of investment since their investment ties up with un-diversifiable human capital vested in the firm whereas public investors can diversify their investment through investing in a well-diversified portfolio.

the corporation (Ellul, 2008; Faccio et al., 2010).¹⁹ Faccio et al. (2010) investigate controlling shareholders' expropriation of outside shareholders' interests in East Asian and European economies. They argue that the governance role of leverage depends on the structure of firm ownership and control. That is leverage could constrain managers' expropriation of the resources owned by diffused shareholders like in Western countries, but it could facilitate the expropriation of minority shareholders' rights by controlling shareholders of firms that are prevalent in Europe and Asia. Their findings also suggest that Asian institutions appear ineffective because they allow controlling shareholders of firms lower down a pyramid to increase leverage to acquire more resources for their expropriation. These arguments predict a positive relationship between controlling/largest shareholders and leverage of the firms. Conversely, a counter argument is that concentrated ownership may substitute for the disciplinary role of debt financing, suggesting a negative relationship between them (Grier and Zychowicz, 1994; Deesomsak et al., 2004).

In sum, theoretical and empirical studies using agency theory as a theoretical framework suggest that managerial incentives, controlling shareholders' motives and the existing corporate governance structure in the firm have significant influence on the capital structure choices made by managers (Jensen and Meckling, 1976; Berger et al., 1997; Faccio et al., 2010). Therefore, a firm's observed capital structure is the result of the combination of managers' incentive, controlling shareholders' objectives and the robustness of the governance mechanisms in place to ensure the interest of outside shareholders or minority shareholders as well as the traditional financial determinants that have been typically used to explain capital structure choices.

Yet, empirical studies on the impact of corporate governance on corporate financing decisions of Chinese listed firms are very limited. As an early study on the topic, Wen et al. (2002) use a sample of 60 Chinese listed firms over the period 1996 to 1998 and show that there is a lower leverage level when the percentage of outside directors on the board is higher and the tenure of the CEO is longer. Huang and Song (2006) show that while leverage decreases with managerial shareholding,

¹⁹ For example, state agencies raise debt capital using firms under their control to pursue their political and social objectives at the expenses of minority shareholders interest of maximising their wealth.

institutional ownership has no significant impact on capital structure. Zou and Xiao (2006) use a panel of 216 Chinese PLCs over the period 1993-2000 to show that the various type of ownership (i.e., state, domestic legal person and foreign ownership) do not have any important impact on capital structure choices.

However, the proceeding analysis suggests the existing empirical studies in the context of Chinese corporations are incomplete. For example, Huang and Song (2006) include only managerial and institutional ownership in their capital structure model and do not include other corporate governance variables such as board size and board composition. Similarly, Zou and Xiao (2006) and Shen (2008) also only include some of the ownership variables but not other corporate governance variables such as managerial ownership and the board structure variables. In contrast, Wen et al. (2002) include board structure and fixed compensation of managers but not the shareholdings by managers or other ownership variables. Their analysis of the effects of independent directors was before a formal corporate governance code for the independent directors system has been introduced in China. Furthermore, Qian et al. (2009) only include state ownership in addition to other determinants in their dynamic capital structure model of Chinese listed companies.

While Marhan (1992) shows that the capital structure models that ignore agency costs are incomplete, Moh'd et al. (1998) argue that dynamic nature of adjustment of the firms' capital structure are influenced by the changes in the ownership structure through time. Moreover, other empirical studies from developed countries (for example Berger et al., 1997) employ a wide range of corporate governance variables to study the linkages between corporate governance and capital structure decisions. Therefore, it is clear that existing studies on the link between capital structure decisions and corporate governance in the context of Chinese financial market are incomplete, and that there has been significant changes in the ownership structure after 2005 split share reform especially the increase in the private and managerial ownership. Hence, clearly, it is increasingly interesting to see how evolving ownership and corporate governance structures of Chinese listed corporations affect their financing behaviours.

In this study, using a sample of 1844 Chinese non-financial firms over the period 2003 to 2010, we examine the link between ownership and corporate governance

structures, on the one hand and capital structure decisions, on the other. Controlling for traditional determinants of leverage, endogeneity, and persistency in capital structure decisions using the system GMM (Blundell and Bond, 1998) estimator, we find that firms adjust their leverage towards target leverage at a moderate speed (12%)²⁰. Furthermore, the ownership structure plays a significant role in determining leverage ratios. More importantly, we document a strong positive relationship between managerial shareholding and total leverage, consistent with the incentive alignment hypothesis of Jensen and Meckling (1976). We also find that managerial ownership only affects the leverage decisions of private firms in the post-2005 split share reform period. We also find that state ownership negatively influence leverage decisions. We explain this by the fact that state banks have become semi-commercial banks and started to act indiscriminately towards all the firms, regardless of the state involvements in them (Lin and Bo, 2011) and thus, managers in state controlled firms no longer enjoy easy access of finance from state owned banks. Therefore, the risk averse managers in the state owned firms with weak incentives (Kato and Long, 2006a, b, c, and 2011) are more likely to pursue a lower level of leverage. This result may also imply that SOEs not only may face fewer restrictions in equity issuance but also might receive favourable treatments when applying for seasoned equity financing, thus use less debt. Furthermore, our empirical results also reveal that while foreign ownership negatively influence leverage decisions, legal person shareholding does not influence firms' leverage decisions. Finally, we also find that the board structure variables (board size and board composition/proportion of independent directors) do not influence firms' capital structure decisions.

The remainder of the chapter is organized as follows. Section 2 describes the theoretical background on corporate governance and capital structure decisions. Section 3 reviews empirical studies on the link between corporate governance and capital structure decisions. Section 4 develops testable hypotheses. Section 5 presents baseline models and discusses our estimation methodology. Section 6

²⁰ The target leverage means the ideal value for a company's financial leverage. Managers attempt to calculate target leverage ratio for a company by determining the level of debt they are comfortable at, and attempt to reach or maintain that level. See Section 3.5.1.1 for detailed discussion.

describes data and presents some descriptive statistics. In Section 7, we discuss our empirical results, before drawing some conclusions in section 8.

3.2. Theoretical framework on corporate governance and capital structure decisions

This section presents the main capital structure theories: the static trade-off theory, the pecking order theory and the agency theory. The aim of reviewing the capital structure theories is to develop a theoretical framework for predicting the effects of the determinants of capital structure. In addition, we also discuss theoretical concepts of corporate governance.

For a long time, the issue of capital structure choices and the resulting effect on the value of the firm has been a controversial and much disputed area. The main issue of debate revolve primarily around the optimal capital structure that maximizes the value of the firm (Modigliani and Miller, 1958 and 1963; Miller, 1977). Capital structure means the mix of different sources of financing such as equity and debt (Panday, 2006). In fact, the debate on the modern theory of capital structure began with the seminal paper of Modigliani and Miller (1958) which shows that subject to some conditions, the impact of debt financing on the value of the firm is irrelevant.²¹ They contend in their first proposition that the market value of any firm is independent to its capital structure, and is given by capitalizing its expected return at the rate appropriate to the risk class (i.e. the levels of risk of the firm) (Modigliani and Miller 1958). This first proposition has been criticized and the main argument is that it is theoretically very sound but is based on the assumptions of perfect capital market, no taxes (personal or corporate), no distress costs and equal access to information which are not valid in reality.

Following the work of Modigliani and Miller (1958), the literature on capital structure has been expanded through many theoretical and empirical contributions. Scholars have placed much emphasis on releasing the assumptions made by

²¹ Modigliani and Miller (1958) proposition I states that the total market value of the firm's securities is equal to the market value of its assets, independent on whether the firm is unlevered or levered.

Modigliani and Miller (1958), in particular by taking into account corporate taxes (Modigliani and Miller, 1963), bankruptcy costs (Stiglitz, 1972; Titman, 1984), agency costs (Jensen and Meckling, 1976), information asymmetries (Myers and Majluf, 1984; Myers, 1984), and imperfect capital markets (Baker and Jeffrey, 2002). The alternative theories that currently dominate the empirical studies include the trade-off theory, the pecking order theory and, the agency theory.

3.2.1 The trade-off theory

This theory is a result of releasing assumptions of ‘no corporate taxes’ and ‘no financial distress costs’ (i.e. bankruptcy costs). For example, Modigliani and Miller (1963) relaxed their assumptions by incorporating the effect of taxes on the cost of capital and thus value of the firm, and contend that, in the presence of corporate tax, the value of the firm varies with the variation of the use of debt due to tax shield advantages. Tax shields occur when firms use debt financing in their capital structure, as firms have to pay interest on debt which is generally tax deductible. Thus, interest payments act as a tax shield and allow the firm to increase its value.

However, when considering the financial distress costs that arise from maintaining high levels of debt (e.g., bankruptcy costs) (Stiglitz, 1972), the value of the firm is determined by its net benefits (i.e. tax shield benefits minus costs). Therefore, the total value of the levered firm (VL) is now calculated by the value of the firm without leverage (VU) plus interest tax shield (ITS) benefits minus present values (PV) of costs.

$$VL = VU + (PV \text{ of ITS}) - (PV \text{ of financial distress costs}) - (PV \text{ of agency cost of debt}) + PV \text{ (agency benefits of debt)}$$

Therefore, the trade-off theory posits that firms maximise their value when the benefits that stem from debt (e.g. the tax shield and reduced costs of informational asymmetry attached to debt compared to outside equity) outweigh or equal the marginal cost of debt (e.g. bankruptcy costs, and agency costs) (Modigliani and Miller, 1963; Stiglitz, 1972; Jensen and Meckling, 1976; Myers, 1977; Titman, 1984). Adding debt to a firm’s capital structure lowers its (corporate) tax liability and increases the after-tax cash flow available to the residual owners of the firm. Thus,

there is a positive relationship between the (corporate) tax shield and the value of the firm. However, when a firm raises excessive debt to finance its operations, it may default on this debt. The firm's continuous failure to make payments to debtholders can ultimately lead to insolvency of the firm (Stiglitz, 1972; Titman, 1984). Therefore, the trade-off theory suggests that there is an optimum level of capital structure that maximizes the value of the firm.

According to the static trade-off theory, firm size, profitability, and tangibility are positively related to leverage whereas growth opportunities, volatility and non-debt tax shields are negatively related to leverage. Larger firms are more diversified than smaller firms and less prone to bankruptcy (Titman and Wessels, 1988). In addition, larger firms with better reputation in capital markets face lower agency cost of debt. Thus, they are expected to have a higher debt capacity compared to smaller firms.

When a profitable firm employs debt, the greater the profitability, the greater will be the tax shield benefits, and the lower the financial distress cost and agency cost of the debt. Therefore, the theory predicts a positive relationship between profitability and leverage.

When tangible assets are used as collateral for debt, the firm is restricted to use funds for a specified investment by collateralized debt, resulting in lenders being offered more favourable terms with a lower level of risk (Titman and Wessels, 1988; Harris and Raviv, 1997). Therefore, the theory predicts that a larger proportion of tangible assets are expected to be associated with a higher level of leverage.

Growth opportunities are intangible in nature and cannot be collateralized. If the firms with high growth opportunities face bankruptcy, their value will fall, implying that they are likely to face higher-expected bankruptcy costs. Therefore, the trade-off-theory predicts an opposite relationship between growth opportunities and leverage.

Firms with higher earnings volatility are more likely to face higher expected cost of financial distress and should use less leverage (Frank and Goyal, 2009). The theory therefore predicts a negative relationship between the volatility of earnings and firm's leverage.

A major motivation for using debt is to get a tax shield benefit. Firms can also use non-debt financing (such as depreciation) to reduce the tax payments. DeAngelo and Masulis (1980) show that non-debt tax shields may substitute for the tax shield benefits of debt. Therefore, the theory predicts a firm with higher non-debt tax shield are expected to have lower levels of leverage, *ceteris paribus*.

3.2.2 The pecking order theory

The pecking order theory, which was developed by Myers and Majluf (1984) and Myers (1984) is linked to information asymmetries existing between insiders of the firm and outsiders (i.e. the capital market). The theory suggests that managers adapt their financing policies to minimise the cost of information asymmetries. Managers therefore prefer internal financing to external financing, and risky debt to equity since debt capital suffers less from information asymmetries than equity. That is debt is the first source of external finance on the pecking order and equity is issued only as a last resort, when the debt capacity is fully utilised. In contrast to the trade-off theory, there is no well-defined target leverage ratio in the pecking-order theory. Tax benefits of debt are a second-order effect and the debt ratio changes when there is an imbalance between internal funds and real investment opportunities. Myers and Majluf (1984) state that the more profitable firms will use retained earnings first as investment funds and then move to debt and finally to equity as only if necessary. Thus, this theory predicts a negative relationship between leverage ratio and profitability/availability of internal funds.

Furthermore, according to the pecking-order theory, firm size is negatively related to leverage but growth opportunities and tangibility are positively related to leverage. Rajan and Zingales (1995) show that larger firms may use less debt in their capital structure since they may face lower levels of information asymmetry due to the fact that as they have been around longer, they are well established in the markets and thus are capable of issuing equity, in addition to using internal financial slack. Therefore, the theory predicts a negative relationship between firm size and leverage.

In their model, Myers and Majluf (1984) demonstrate that issuing equity is costly due to the asymmetric information problem between managers and outside investors. For this reason, firms with more tangible assets (i.e., properties with known values)

can use more secured debt to take advantage of this opportunity. Therefore, the theory predicts a positive relationship between tangibility and leverage.

Finally, firms with high growth opportunities are likely to use more debt than equity because they face higher information asymmetries. Furthermore, since firms with more investment means their future profitability is fixed, they should be able to accumulate more debt over time (Fank and Goyal, 2009). Therefore, the pecking order theory predicts a positive relationship between growth opportunities and leverage.

3.2.3 The agency theory

The above two theories (i.e. the static trade-off and pecking order theories) are based on the assumption that the interest of the managers of a corporation with dispersed ownership is always aligned with that of shareholders. That is, managers take only value maximising financing decisions. In contrast, the agency theory assumes that self-interested managers always pursue their own objectives at the expenses of shareholders (Jensen and Meckling, 1976).

Jensen and Meckling (1976) formally model the agency costs of equity and debt capital in a modern corporation. They identify two types of agency conflicts namely, conflicts between managers and shareholders, and conflicts between shareholders and bond holders, and the related agency costs in a firm. Moreover, Jensen and Meckling (1976, p.308) defined the agency costs as “the sum of monitoring costs, bonding costs and residual loss”. The first type of cost is the monitoring cost, which is the cost of establishing some appropriate incentives for the managers, and to carry out oversight of the manager’s activities. These expenditures are paid by the principal. The second type of cost is bonding costs. These costs arise when managers reveal additional information to the shareholders that they are acting in order to satisfy their shareholders’ interests. These expenditures are paid by agent. The final type of cost is residual loss as the reduction in welfare experienced by the shareholders due to the conflict of interest between managers and shareholders.

3.2.3.1 Agency costs of outside equity

The agency cost of outside equity (i.e. equity shares held by anyone outside of the firm) arises from the conflicts between shareholders and managers because managers do not hold total residual claims in a large corporation with diffuse ownership, thus cannot gain entirely from their value maximizing activities. Therefore, managers may exert less effort in managing the firm's resources and may have tendency to transfer the firm's resources for their own personal benefits. The managers bear the entire costs of refraining from these activities, but capture only a fraction of the gain. As a result, they do not pursue their activities in a manner to maximize shareholders wealth, meaning that they consume more perquisites and invest in unrelated businesses to build empires (such as corporate jets, luxurious offices etc.).

This inefficiency can be mitigated if a larger ownership share is being held by managers (insider ownership), and if the fraction of firm is financed with debt (Jensen and Meckling, 1976). As argued in Jensen and Meckling (1976) and Jensen (1986), debt capital not only brings in additional monitoring from outsiders (i.e. creditors) but also make managers commit to pay out cash, thus it reduces the amount available to managers to overinvest.

3.2.3.2 Agency cost of debt

Although Jensen and Meckling (1976) recommend debt financing as an important governance mechanism, in their paper, they also identified a cost of debt. The use of debt capital in the capital structure leads to conflicts between debt-holders and equity holders because debt contracts give equity holders an incentive to invest sub-optimally (Jensen and Meckling, 1976). If the investment goes well, shareholders (existing) will capture the benefits of debt financing. Yet, debt-holders (creditors) will bear the entire costs because of limited liability of shareholders if the investment fails. Moreover, shareholders know that debt can be an effective corporate governance mechanism to discipline managers. That is why equity holders may benefit from investing in riskier projects even if they are value decreasing. Such investments (also known as assets substitution effect) decrease the value of debt, while the loss in the value of equity due to poor investment is more than offset by the gain in equity value transferred from debt holders. However, if this assets

substitution effect is anticipated by debt-holders, and the cost of debt will be increased accordingly.

Myers (1977) identifies another agency cost of debt. He argues that when firms are likely to go bankrupt in the near future, equity holders have no incentive to contribute new capital, even to invest in value-increasing projects because they bear the entire cost of the investment, while the returns may be captured mainly by debt-holders (i.e. the debt overhang problem). Therefore, the firm may undesirably forego positive NPV projects due to the conflicts of interest between equity holders and debt holders. This is well documented as “underinvest problem” in the agency literature.

In sum, in asset substitution problem, equity holders will have incentives to increase the risk of the firm so as to increase the equity value at the expense of debt holders whereas in under investment problem, equity holders may forgo positive net-present-value projects because they bear the full costs of the projects while debt holders enjoy most of the benefits.

3.2.3.3 The trade-off between agency costs of outside equity and agency cost of debt

Does a high leverage ratio always reduce the agency costs of outside equity? And how can firms decide the desired level of capital structure? Using a high debt ratio may initially reduce the agency cost of outside equity but, the opposite effect may occur for the agency cost of debt due to the conflicts between debt holders and shareholders. When leverage is relatively high, further borrowings may lead to conflicts between shareholders and debt holders and resulting agency costs of debt due to higher expected financial distress or bankruptcy costs. Jensen and Meckling (1976) suggest a non-monotonic relationship between leverage and total agency costs: when firm increases debt gradually from the initial level, this motivates managers to act in the interest of the shareholders (decreasing the agency costs of outside equity), reducing the total agency costs which will happen up to a certain point. Thereafter, a further increase in leverage will lead to higher total agency costs of outside debt than the agency costs of outside equity due to the higher expected bankruptcy costs and financial distress costs. Therefore, an optimal capital structure

can be reached by minimizing total agency costs at optimal fraction of outside financing (Jensen and Meckling, 1976).

According to the agency theory, firm size, profitability and, tangibility are positively related to leverage, whereas growth opportunities are inversely related to leverage. Larger firms tend to provide more information to outsiders in the market, resulting in lower levels of agency cost of debt (Fama and Jensen, 1983). Therefore, the theory predicts a positive relationship between firm size and leverage.

There are conflicting theoretical predictions on the effects of profitability on firms' leverage. On the one hand, the agency theory suggests that the disciplinary role of debt financing is more valuable for profitable firms since (1) it reduces free cash flow available to managers' discretionary spending (i.e. empire building) and (2) it also helps avoid threat of takeover in the presence of an active market for corporate control (Jensen, 1986; Stulz, 1990). Therefore, Jensen (1986) predicts a positive relationship between profitability and leverage. On the other hand, in the absence of an effective market for corporate control (such as is the case in China), managers of profitable firms use a lower level of leverage in order to avoid the disciplinary role of debt (Rajan and Singales, 1995), which suggests a negative relationship between profitability and firms' leverage.

Jensen and Meckling (1976) suggest that high-levered firms tend to invest sub-optimally in order to expropriate wealth from firms' debt-holders. If the debt is collateralized by tangible assets, the borrowers will be restricted to use the fund for a specified project. Moreover, the agency theory therefore predicts a positive relationship between leverage and the capacity of firms to collateralize their debt.

The agency theory does not give a clear prediction for growth opportunities. It, on the one hand, predicts a negative relationship between growth opportunities and leverage due to the following reasons (i.e., to avoid costs of debt): (1) managers of high growth firms have tendency for expropriation of debt-holders' wealth in favour of equity holders through asset substitution effects: managers (who act on behalf of shareholders) have incentive to shift funds from low-risk investment projects to high-risk ones in order to earn higher profit in the short term period. This strategy

allows equity holders to increase their benefit at the expenses of debtholders (Jensen and Meckling 1976); (2) Myers (1977) suggests that if a firm is highly leveraged, excessive leverage may force shareholders to pass up profitable investment opportunities (under-investment problem) since returns to investment will mostly benefit debt-holders rather than shareholders. Furthermore, managers may forego positive NPV projects to avoid excess risk arising from the higher level of leverage, since their investment is tied up with un-diversifiable human capital vested in the firm (Myers, 1995). Thus, in order to mitigate the asset substitution and under-investment problems, firms with higher growth opportunities would use lower level of leverage. On the other hand, a greater potential for free cash flow problem (i.e., managers can indulge and build empires) in high growth firms can be manifested in the form of higher leverage ratio (Jensen, 1986). Moreover, as Jensen (1986) notes, managers may use debt financing as a defensive tool against corporate raiders who are attracted by the growth prospects of the firm (market for corporate control). This suggests a positive effect of growth on the leverage of the firm.

3.3. Review of empirical studies on capital structure decisions and corporate governance

In this section we review in detail the empirical studies which examine the linkages between capital structure decisions and corporate governance. We analyze these studies on three main categories, namely studies based on Western countries, studies based on developing countries and finally studies based on the Chinese context.

3.3.1 Empirical studies based on developed countries

A large number of studies from developed capital markets provide strong empirical evidence that corporate governance characteristics affect corporate financing decision. One of the early empirical studies is by Friend and Lang (1988). Using data of 984 NYSE firms over the period 1979 to 1983, they examine whether capital structure decisions are at least in part motivated by managerial self-interest. They find that managerial shareholding is negatively related to leverage, and they interpret this finding as evidence supporting the view that the use of a higher debt ratio results in greater non-diversifiable risk of debt to management than to public or outside

investors. This is due to the fact that managers are unable to minimize their risk of investment since their investment is tied up with un-diversifiable human capital vested in the firm (Amihud and Lev, 1981). If a project fails, managers lose much more than shareholders. In this situation, if they use higher debt ratio, the cost of bankruptcy and financial distress will increase, resulting in loss of managers' employment and their future employment. Therefore, when managerial ownership increases they prefer lower levels of leverage. Moreover, they find that large non-managerial shareholding is positively related to firms' leverage, implying that they have higher ability to monitor the management. In the case of traditional determinants, their results show that leverage is negatively associated with profitability and volatility while leverage is positively related to size and tangibility.

In a similar vein, Mehran (1992) uses a cross section of 124 manufacturing firms from COMPUSTAT annual industrial files over the period 1979 to 1980 to examine the relationship between corporate control and capital structure decisions. Mehran (1992) finds a positive relationship between the firms' leverage and equity owned by managers, consistent with the notion that equity ownership provides managers with the incentive to use more leverage so as to maximise their own wealth and outside shareholders' wealth. Yet, he does not find evidence of a non-linear relationship between managerial ownership and leverage (i.e. the squared term of managerial ownership is not inversely related to leverage). Thus, there is a monotonic relationship between managerial ownership and leverage. He also reports a positive relationship between independent directors, in particular investment bankers on the board, and leverage, implying that firm can borrow more easily from the banks without releasing too much information to outsiders in the market. Therefore, he concludes that the firm's capital structure is related to agency costs between managers and shareholders and the capital structure models that ignore agency costs are incomplete. In the case of traditional determinants, growth opportunities have a negative impact on leverage, while collateral value of assets has no significant effect.

Different from the previous studies, Berger et al. (1997) focus on the effect of managerial entrenchment on firm's leverage choices. In their static models, they include CEO tenure, CEO's ownership of stock and options and various measures of board monitoring, as well as the standard financial control variables. Focusing on a

panel made up of 3085 firm-year observations over the period 1984 to 1991, they find a positive relationship between managerial ownership and leverage, implying that managers whose financial incentives are closely tied to outside shareholders' wealth recognize the benefits of leverage (both tax and monitoring) and pursue more debt in order to pursue the value maximization objective of the firm. However, they find that levels of leverage are lower when CEOs do not face pressure from either large shareholders and compensation incentives or active monitoring. Furthermore, they find that leverage increases in the aftermath of entrenchment-reducing shocks to managerial security, including unsuccessful tender offers, involuntary CEO replacements, and the addition of representatives of major stockholders to the board. Therefore, Berger et al. (1997) conclude that their latter results provide support for their contention that entrenched CEOs choose lower leverage. Additionally, they find that board size is inversely related to leverage, meaning that large boards are ineffective in preventing entrenched CEOs from pursuing lower leverage. Consistent with their expectation that more outside directors on the board monitor management (CEOs) actively, outside directors on the board are positively associated with leverage.

Motivated by the findings of the empirical studies from the US, Brailsford et al. (2002), using a sample of the 49 firms listed on the Australian Stock Exchange over the period 1989 to 1995, examine whether there exists a non-linear relationship between managerial ownership and capital structure decisions in Australia. Consistent with their hypothesis, they find a non-linear relationship (inverted U-shaped) between the level of managerial ownership and leverage, and interpret their results as evidence for that at a low level of managerial ownership, due to convergence of interest between managers and shareholders, managers pursue higher degree of leverage. Yet at high levels of managerial shareholding, managers become more entrenched and use lower leverage in order to reduce their personal risk.²² Furthermore, their results show that there is a positive relationship between external blockholders and leverage, consistent with the view that large shareholders have greater incentives to monitor the management, resulting in decreased managerial opportunistic behaviour, and leading to lower agency costs (Shleifer and Vishny,

²² The entrenchment effect of managerial shareholding occurs after the threshold of 49 percent of managerial shareholding.

1986). Furthermore, they find that the relationship between external block ownership and leverage varies across the level of managerial share ownership. At a low level of managerial share ownership, external blockholders play an effective role in monitoring manager's actions, leading to a positive correlation with leverage. In contrast, the relationship between external block ownership and leverage is weakened at high levels of managerial shareholding. As for control variables, while size and tangibility are positively related to leverage, volatility, growth opportunities and profitability are negatively correlated with it.

Similarly, in a study based on a sample of 959 non-financial UK listed firms for the period 1999 to 2004, Florackis and Ozkan (2009) examine the effect of managerial incentives and corporate governance on firms' financial decisions, using a dynamic model of capital structure decisions. Like Brailsford et al. (2002), they also find a significant non-monotonic relationship between insider ownership and leverage, consistent with the alignment and entrenchment effects of managerial shareholding. Additionally, in line with the previous empirical findings for US firms, their result also shows that ownership concentration is positively related to firms' leverage, resulting from the greater incentive of large shareholders to supervise management more effectively than small shareholders. They also find that board size and board composition are inversely associated with leverage. Their result on the board size is consistent with the findings of previous studies that large boards are associated with coordination, communication and decision-making problems and thus are less effective. However, their finding for the board compositions is in contrast to the evidence documented for the US firms. They interpret this result as evidence that non-executive directors do have lack of information about the firm and hence do not add much to the governance of the firm. As for traditional determinants, assets tangibility and size are positively related to leverage, while profitability and growth opportunities are inversely associated with leverage. Moreover, their dynamic capital structure model (estimated using the GMM estimator of Arellano and Bond, 1991), indicates that UK firms adjust only partially (closer to 0.6) towards an optimal leverage ratio.

Finally, most recently, using a sample of UK firms over the period 1998 to 2012, Sun et al. (2015) examine the effects of agency conflicts in ownership structure on firm

leverage ratios and external financing decisions. First, consistent with previous findings (e.g. Brailsford et al. (2002) for Australian firms and Florackis and Ozkan (2009) for UK firms), they find a non-monotonic relation between managerial share ownership and the debt ratio. They also report that institutional ownership is positively associated with firm leverage levels. Further, Sun et al. (2015) find that firms with concentrated managerial shareholdings prefer issuing equity to bonds and thus, decrease their leverage in order to avoid the risk of bankruptcy and maintain their corporate control. This effect is also strengthened during hot market periods. Finally, they find that consistent with the market timing theory and the risk aversion hypothesis, UK firms choose equity over bonds during the financial crisis.

3.3.2 Empirical studies based on developing countries

Compared to the studies based on developed capital market, a very limited number of empirical studies have been conducted to investigate the link between leverage and corporate governance variables in developing countries.

Wiwattanakantang (1999) use a sample of 270 non-financial Thai companies listed in 1996 to examine the determinants of their capital structure. Results show that in addition to the tax effect, the signalling effect, and the agency costs, ownership structure also plays a significant role in financing decisions in Thailand. Although managerial ownership (CEOs and directors' ownership) has no significant effect on debt ratio, managerial ownership of single-family owned firms does have a positive influence on firms' leverage. She gives two potential explanations for this finding: (1) managers may use high level of leverage in order to protect their voting power; (2) managers of the single-family owned firms take on a higher level of leverage to signal their commitment to not divert excess cash-flows for perquisite consumption. Moreover, the study finds a negative relationship between large shareholding and leverage, implying that these shareholders may closely monitor the managers' self-interested behaviour. Board size is negatively associated with leverage. In addition, the author finds that tangibility and firm size are positively related to leverage, while profitability and non-debt tax shields are inversely related to leverage.

In a similar vein, expanding their sample to the Asia Pacific region, particularly using a sample of 294 Thai, 669 Malaysian, 345 Singaporean, and 219 Australian firms over the period 1993 to 2001, Deesomsak et al. (2004) examine the determinants of the capital structure of firms in this region. They find that the capital structure decisions of firms are influenced by the environment in which they operate, as well as firm-specific factors identified in the extent literature. Moreover, they point out that the financial crisis of 1997 is found to have had a significant but different impact on firm's capital structure decisions across the Asia Pacific region. Ownership concentration is positively related to firms' leverage for both the whole sample period and the post-crisis period. Yet, it is negatively related to leverage before the crisis, suggesting that higher ownership concentration encourages higher levels of monitoring, which in turn reduces management's discretion. The pre-crisis result is also consistent to the finding of Wiwattanakantang (1999).

Using a sample of 22 firms listed on the Ghana Stock Exchange (GSE) over the period 1998 to 2003, Abor (2007) examines the link between corporate governance characteristics and corporate financing decisions. The results show that in contrast to the findings of prior research, leverage is positively related to board size, suggesting that larger boards follow a stringent monitoring, pursuing high debt ratios in order to raise the firm value. Yet, Abor (2007) finds that when board size increases beyond a certain level, further increase in board size could lead to lack of consensus resulting in weaker corporate governance and lower leverage. He finds a positive relationship between board composition and leverage, implying that firm with more non-executive directors on the board pursues high leverage. This result supports the finding of Berger et al. (1997) for US firms, but diverges from those of Wen et al. (2002) for Chinese firms. As for the traditional determinants of capital structure, consistent with the empirical results for the Western countries, size is positively related to leverage while growth opportunities and profitability are negatively associated with leverage.

Focusing on a panel of 41 Jordanian industrial firms listed on the Amman Stock Exchange (ASE) over the period 2001 to 2005, Al-Fayoumi and Abuzayed (2009) examine the effect of ownership structure on corporate financing decisions using a dynamic framework. They find that the debt ratio is negatively related to managerial

ownership²³, consistent with the view that when managerial ownership increases, managers prefer lower leverage in order to reduce the non-diversifiable risk associated with their personal wealth. In addition, there is no significant relationship between leverage and institutional ownership.²⁴ They suggest that this is due to the fact that developed mutual funds or investment companies do not exist in Jordan, resulting in institutional investors having a weak ability (passive monitoring) to influence managerial behaviour. Moreover, the dynamic adjustment in the leverage shifts (about 41%) in the ownership structure through time. As for control variables, profitability is negatively related to leverage while size and tangibility are positively associated with the debt ratio.

Focusing on a comprehensive panel data of 806 Latin American firms covering seven countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela) over the period 1996 to 2005, Cespedes et al. (2010) examine the relationship between ownership concentration and capital structure decisions. Their study reveals Latin American firms have high ownership concentration, and leverage is positively related to ownership concentration (measured by Herfindahl index). This is consistent with the argument that firms with high ownership concentration avoid using equity finance in their capital structure, since owners do not want to share or lose control rights. In the case of traditional determinants of capital structure, leverage is positively related to size and tangibility, while profitability is inversely associated with leverage.

Finally, Haque et al. (2011) use a questionnaire-based survey to create a Corporate Governance Index (CGI) for Bangladesh' listed firms. Based on their governance index and financial data on debt finance and other firms characteristics collected from the annual reports of the sample firms (98 nonfinancial listed firms) over the period 2004 to 2005, they study the effect of firm-level corporate governance on the financing decisions of these firms. They find that there is an inverse relationship between corporate governance quality and leverage. Leverage is positively related to

²³They define managerial ownership as shares owned by officers and directors.

²⁴Institutional ownership only includes Jordanian Social Securities Corporation and financial institution.

ownership concentration²⁵. They interpret this as suggestive that large shareholders prefer a capital structure with more debt in order to maintain their control rights (i.e. raising more debt will not dilute their controlling position among equity holders in the corporation.). As for the control variables, leverage is positively associated with size while profitability and non-debt tax shields are inversely related to leverage.

3.3.3 Empirical studies based in the Chinese context

In this section we focus on the empirical studies that have investigated the link between corporate governance variables and corporate financing decisions and its dynamic nature in China. Since it is important to understand the findings of previous studies on the effects of traditional determinants of the capital structure that have been suggested by the main stream capital structure theories, we briefly discuss them as well. Additionally, we summarize the findings of most of the prior studies based on Chinese listed companies in Tables 3.1A and 3.1B in the Appendix.

In early studies, Chen (2004) uses a sample of 77 Chinese public-listed companies over the period 1995-2000 to examine the determinants of capital structure in Chinese firms. He indicates that certain firm-specific factors that are relevant for explaining capital structure in the Western countries are also relevant in the context of China. However, neither the trade-off theory nor pecking order theory originated from the developed economies provides convincing explanations for the capital structure choices of the Chinese firms. Instead, capital structure decisions of Chinese firms are based on a different theory: firms follow a ‘new pecking order’ using retained profits first, equity, next and debt as a last resort. He suggests that this is because the fundamental institutional assumptions (such as the legal system, banking and securities market, corporate governance structure, and financial constraints) underpinning the developed economic models are not valid in the context of Chinese firms. Moreover, Chen (2004) finds that tangibility is positively related to the leverage ratio, and profitability is inversely related to it.

Yan (2008) uses a panel of 722 Chinese listed Small and Medium Enterprises (SMEs) in the manufacturing industry over the period 2004 to 2007 and show that

²⁵ A proxy for the ownership concentration is a percentage of ownership by the top 10 shareholders.

profitability and liquidity are negatively related to the leverage ratio, while size and asset structure are positively associated with it.

Moosa et al. (2011) use data on 344 publicly listed shareholding companies and differentiate between fragile (i.e. the sign and/or significance of the coefficients on these variables change depending on model specification) and robust firm-specific determinants of the capital structure of Chinese firms. They find that size, liquidity, profitability and growth opportunities are robust variables, while tangibility and stock price performance are fragile. Other variables (pay-out ratio and age of the firm) are insignificant.

Turning to the studies, which consider effects of governance variables, the first and only empirical study examining the relationship between board structure and leverage is Wen et al. (2002). Using a very small sample of 180 observations for 60 Chinese listed firms over the period 1996 to 1998, they find that there are lower leverage levels when the percentage of outside directors on the boards is higher. They interpret their results as outside directors monitoring the management more actively in order to make better financing decisions. Thus, outside directors may act as substitutes for the disciplinary role of debt in the capital structure. This result is inconsistent with the finding of Berger et al. (1997) for US firms, who find that the board size does not have any significant impact on leverage. Yet, Wen et al. (2002) do not examine the effect of ownership structure on corporate financing decisions, and they do not control for firm fixed effects and potential endogeneity in their study.

Contrary to Wen et al.'s study (2002), Huang and Song (2006) use data for 1200 Chinese PLCs over the period 1994-2003 and examine the effects of ownership structure in addition to traditional factors on capital structure decisions. They find that leverage in Chinese firms decreases with managerial shareholding. According to them, the reason for this is that Chinese managers are generally risk-averse and thus, they prefer to pursue a capital structure with lower leverage. They also show that state ownership or Institutional ownership has no significant impact on capital structure decisions. As for traditional determinants, they report that leverage increases with firm size and fixed assets but decreases with profitability, non-debt tax shields, and growth opportunities. However, they do not examine the impact of

other corporate governance factors such as board size and composition on the capital structure choices.

Similarly, Zou and Xiao (2006) use a panel made up of 1424 firm-year observation over the period 1993-2000 and examine the effect of ownership structure (including state, domestic legal person and foreign ownership) in addition to the traditional factors on the debt financing behaviour. They show that firm size, tangible assets, growth opportunities, and profitability are important determinants of firm leverage in China. In particular, leverage is positively related to firm size and tangibility but it is negatively related to growth opportunities and profitability. Their results are consistent with the findings of Rajan and Zingales (1995) for G7 countries while they are very different from the findings of Booth et al. (2001) for ten developing countries. In the case of ownership structure variables, none of them does have any impact on the capital structure choices of Chinese listed companies.

In a similar vein, using a sample of firms over the period from 2000 to 2006, Su (2010) investigates effects of corporate diversification, ownership and board characteristics on capital structure decisions. He finds that corporate diversification (in to related or unrelated industries) and state ownership are negatively associated with leverage. Furthermore, while the study finds some evidence for larger boards being associated with less debt financing, other board characteristics such as the number of independent directors and CEO duality do not affect capital structure. Additionally Su (2010) finds that larger and older firms use more leverage in the capital structure,

Different from the all the previous studies in the context of Chinese listed companies, Qian et al. (2009) employ a dynamic capital structure model to study the determinants of capital structure for 650 Chinese publicly listed companies over the period 1999 to 2004. Their results show that Chinese firms adjust towards an equilibrium level of debt ratio in a given year at a very slow rate: for a firm experiencing a large reduction in its leverage ratio, only about 11% of the discrepancy between its desired and actual leverage levels is eliminated within a year. They also find that leverage is positively related to state shareholding. This finding is consistent with their explanation that state controlled firms have better access to bank loans from the state-controlled banking sector since government

provides a guaranty for bank loans. As for the traditional factors, firm size and tangibility are positively related to the leverage whereas profitability, non-debt tax shields, and volatility are negatively associated with it. However, the authors do not include other ownership structure variables (in addition to state ownership) and board structure variables in their dynamic capital structure model.

Most recently, using a panel of 13,107 firm-year observations for Chinese publicly listed companies over the period 1998 to 2009, Cheng et al. (2009) identify seven determinants of leverage that are statistically significant and have coefficients of consistent signs across various models. They find that leverage is negatively related to state shareholding and the largest shareholding of state-controlled listed firms. They interpret this finding as being evidence for that SOEs not only may face fewer restrictions in equity issuance but also might receive favourable treatments when applying for seasoned equity financing. As for the traditional factors, firm size, tangibility, industry average, asset growth are positively related to the leverage whereas profitability is negatively associated with it. However, the authors do not include board structure variables in their study.

In summary, these studies show that in addition to the traditional factors, ownership and other corporate governance factors have a significant impact on the capital structure decisions of Chinese firms. Yet, most studies use a small sub-set of corporate governance variables and are based on data before 2005. Given the tremendous changes in the corporate governance system, it becomes therefore imperative to investigate the impact of recent changes in ownership structure and the corporate governance system on Chinese firms' financing decisions. This is the objective of our study.

3.3.4 Contributions of the study

This study contributes to the literature on the linkage between corporate governance and capital structure decisions in many ways. First, so far, only a very limited number of studies have investigated the impact of corporate governance on the use of leverage in the capital structure in the context of emerging markets and particularly in China, the largest emerging economy in the world. Furthermore, the existing studies have examined subset of governance mechanisms, usually using

only one or two governance variables. For example, Huang and Song (2006) include only two governance variables (managerial and institutional ownership) in their capital structure model. Similarly, Qian et al. (2009) use only one ownership variable (state ownership) in their dynamic capital structure model. Furthermore, Zou and Xiao (2006) do not include managerial ownership and board structure variables. In this study, for the first time we include all the ownership structure, and board structure variables as well as other control variables (size, profitability, tangibility, growth opportunities, non-debt tax shields, volatility and firm age) in a unified framework in an attempt to develop a better capital structure model that could explain leverage ratio in the context of Chinese listed firms.

Second, corporate governance practices have evolved considerably over the last decade, focusing much of the attention on the ownership structure and composition of board of directors. CSRC published codes of best corporate governance practice for Chinese listed corporations in 2002 and 1/3 of independent director system was introduced in 2003 along the lines of best corporate governance practices around the world. Through their monitoring of managers' actions and bringing their expertise and network with other institutions, boards of directors could pave the ways for optimal capital structure decisions in the firms they represent. Yet, so far, to the best of our knowledge no single study has examined the impact of board structure on leverage choices in China after 2003.²⁶

Third, almost all the existing empirical studies on the capital structure decisions of Chinese listed companies (e.g., Huang and Song, 2006; Wen et al., 2002) use data before 2005. Therefore, these studies do not have opportunities to examine whether the 2005-split-share reform has any impact on leverage choices of Chinese listed companies. We use data from 2003 to 2010²⁷ to examine whether ownership structure variables, in particular managerial ownership²⁸ have significant impact on firm's leverage decisions after the split-share reform. This study, therefore, provides first empirical evidence using a longer period of latest Chinese listed company data on the effects of ownership reform as well as corporate governance variables on the

²⁶ Though Wen et al. (2002) include board structure variables (board size and composition), they use data before 2000 (including the period 1996 to 1998).

²⁷ Our sample ending period is in year 2010 that the latest year for which data was available when the study was carried out.

²⁸ Managerial ownership has considerably increased after split-share structure reform.

corporate financing decisions. More importantly, our study suggests that share ownership by managers provide them with necessary incentives to pursue risky policy choices such as using more debt in firms that operate in unique institutional environment where state still retain considerable control over firms; firms rely heavily on bank for debt financing; and minority shareholder protection and other legal system are not well developed.

Fourth, all the previous studies on the capital structure decisions of Chinese listed companies, except Qian et al. (2009), have failed to shed light on the dynamic nature of firm's capital structure decisions. Therefore, we provide empirical evidence on the dynamic nature of firm's capital structure, especially adjustment speed towards target leverage ratio using the system GMM in the context of Chinese listed firms.

Finally, previous studies on the link between corporate governance and capital structure in the Chinese context do not control for potential bias arising from the endogeneity of governance variables (for example Wen et al., 2002; Huang and Song, 2006; Shen, 2008). However, research has shown that most of the governance variables are likely to be endogenously determined (Aggarwal and Mandelker, 1987; Himmelberg, 1999; Wintoki, et al., 2012). For instance, an external shock like the 2007-2009 credit crunch may affect both leverage and firm characteristics as well as governance characteristics. Moreover, debt financing is itself a governance mechanism that can reduce agency conflicts (Jensen, 1986; Aggarwal and Mandelker, 1987; Stulz, 2000) and thus it can potentially act as a substitute for other governance mechanisms such as ownership concentration, insider ownership, and board composition. We use the system Generalised Method of Moments (GMM) (Blundell and Bond, 1998) to control for, the presence of unobservable fixed effects, endogeneity of all regressors and for leverage being highly persistent.

3.4. Hypothesis development

In this section, in order to answer the research questions, we develop the following hypotheses based on relevant theories and previous empirical studies that have been so far carried out in Western countries as well as in the Chinese context.

3.4.1 Ownership structure

Ownership structure of Chinese listed companies is very unique and arguably the government dominates in their governance structure (Chen, 2005; Bhabra et al., 2008). There are three main types of ownership in Chinese PLCs, namely, state ownership, legal-person ownership (i.e. institutional investors), and domestic individual ownership (tradable A-shares). In addition foreign and managerial ownership also play important role in the decisions of firms (Bhabra et al., 2008; Chen et al., 2011). Since these different ownership groups have different objectives, capabilities and incentives, they are likely to have an important influence in the capital structure choices of firms in China. Before the split-share structure reform in April 2005, non-tradable shares (which include both state and legal-person shareholding) represented about two-third of total outstanding shares (Bhabra et al., 2008). Only one-third of total outstanding shares were tradable in the stock exchanges for outside individual investors. However, after the 2005 split-share reform, the picture has changed for the reverse, state, legal person and A-shareholders held about 9%, 10% and 66% respectively by the end of 2010. In case of managerial ownership (i.e. shares owned by CEOs, directors, supervisors and top management), the share was less than 1% before 2005 but it has increased to about 8% by the end of 2010. This shows that Chinese listed firms' ownership structure is becoming more similar to what is observed in Western countries.

3.4.1.1 Managerial ownership

As we discussed earlier, managerial direct incentives are an important determinant of corporate financial decisions (Jensen and Meckling, 1976). Managerial ownership (*dstmshare*) is defined as the percentage of total shares held by top management including CEOs and chairman, directors and supervisors.²⁹ Previous empirical studies based on US firms (Ikeo and Hirota, 1992; Mehran, 1992; Berger et al., 1997) document a positive relationship between managerial ownership and leverage. Their findings suggest that managers whose financial incentives are more closely related to outsiders' wealth will pursue more leverage in order to inflate the value of the firm. From another perspective (i.e. entrenchment motives), it is also shown that managers might increase leverage beyond the optimal point in order to raise their

²⁹ The position of the CEO is equivalent to that of general manager in China.

own voting power and reduce the possibility of takeover (Stulz, 1988; Harris and Raviv, 1988).

A counter-argument is provided by Friend and Lang (1988), who show that managerial shareholding is negatively related to debt ratios, implying that managers prefer less leverage since their wealth is largely tied up in non-diversifiable human capital and personal investment vested in the firm. Al-Fayoumi and Abuzayed (2009) find a similar relationship between managerial ownership and leverage in Jordanian industrial firms. Furthermore, other studies such as Brailsford et al. (2002) and Florackis and Ozkan (2009) report a significant non-monotonic relationship (inverted U shaped) between managerial ownership and leverage for the sample of Australian and UK firms, respectively, consistent with the alignment and entrenchment effects. Yet, Mehran (1992) does not find evidence to support the non-linear relationship between managerial ownership and leverage for US firms. He concludes that the precise relationship between leverage and managerial ownership is complex.

In the context of China, only a paper by Huang and Song (2006) examines the effects of managerial ownership (with a definition similar to ours) on capital structure decisions and find a negative relationship with leverage. Therefore, they conclude that Chinese managers are generally risk averse, thus leading to pursue less leverage.³⁰ However, their results should be cautiously interpreted since they do not control for unobserved heterogeneity or endogeneity which may create a spurious correlation between managerial shareholdings and leverage.³¹

We expect to observe a significant positive relationship between managerial shareholding and the level of leverage, consistent with the incentive effect, as Chinese managers' shareholdings have increased considerably after the 2005 split-share reform. Therefore, we hypothesise that:

³⁰ Most of the previous studies that examine capital structure decisions of Chinese listed firms, do not include managerial ownership as a main variable in their studies (Wen et al, 2002; Zou and Xiao, 2006; Qian et al., 2009), since managerial share ownership was significantly lower in the listed firms' ownership structure. However, we include managerial ownership as it is about 8% by the end of 2010.

³¹ They use simple OLS to run the regression.

H₁: There is a significant positive relationship between managerial shareholding and the level of leverage

3.4.1.2 Legal-person ownership (institutional shareholding)

Arguments based on agency theory predict that institutional shareholders (in Chinese terminology these are known as legal-person shareholders) can reduce agency costs by closely monitoring managerial opportunistic behaviour. This is because both the benefits of monitoring cash flow and the ability to access various sources of information and resources provide institutional investors necessary incentives and capabilities to bear the costs of monitoring management of the firms where they have large ownership stake (Coffee, 1991; Sun et al., 2015). Therefore, leverage should increase in the presence of institutional shareholders. A counter argument suggests that institutional shareholders may substitute for the disciplinary role of leverage in the capital structure (Grier and Zychowicz, 1994). That is, increasing ownership by institutional shareholders makes their interests more aligned with those of shareholders. Consequently, they are more likely to monitor the managers in order to maximize shareholders' wealth.

Using a sample of 41 Jordanian industrial firms over the period of 2001 to 2005, Al-Fayoumi and Abuzayed (2009) document an insignificant relationship between leverage and institutional ownership, which they explain by the fact that there are no developed mutual funds or investment companies in Jordan and institutional investors do not exercise active monitoring to influence managerial behaviour. In Chinese context, some studies find no significant role for legal person shareholders in capital structure decisions (Huang and Song, 2006; Zou and Xiao, 2006; Chen and Strange, 2005). Yet, using a sample of Chinese listed firms over the period 1992 to 2001, Bhabra et al. (2008) find that legal person shareholding in entrepreneurial private firms has a positive impact on leverage. In line with previous empirical studies in the context of Chinese firms, we measure legal-person shareholding (*lpos*) as shares owned by legal person divided by total number of outstanding shares. We test the following hypothesis:

H₂: There is a positive significant relationship between legal-person ownership and leverage.

3.4.1.2 State ownership

When the state is a shareholder in a firm, the firm may obtain necessary resources without much problem. In general, research suggests that due to the following reasons, state owned firms are more likely to have a higher leverage ratio than other firms. Firstly, as the government provides a guaranty for loans and most of the banks in China are state-owned, the direct and indirect presence of the state in firms reduces the financial distress costs of the firms (Bhabra et al., 2008). Secondly, leverage can be used by state agents (as a controlling shareholder) to fund resources in order to pursue their own economic and/or social objectives at the expense of minority shareholders without diluting state control over the corporations (Stulz, 1988; Xu and Wang, 1999; Tian, 2001; Ellul, 2008; Faccio et al., 2010). Finally, as state controlled firms face severe agency problems due to the lack of direct residual claims (Berkman et al., 2002), they should benefit more than other firms from the disciplining role of debt capital (Jensen and Meckling, 1976; Jensen 1986).

However, the Chinese evidence remains controversial. For example, Qian et al. (2009) and Shen (2008) find a positive relationship between state shareholding and leverage. By contrast, others, for example Zou and Xiao (2006), Bhabra et al. (2008), find that state ownership has no impact on leverage. Bhabra et al. (2008) interpret this result as evidence for that the State's protectionist role does not affect the financial distress costs of their sample firms. More recently, using a sample of 1325 Chinese listed firms over the period 1999 to 2008, Lin and Bo (2011) find a negative relationship between state shareholding and leverage, but the relationship is not significant. This finding is consistent with their explanation that state banks have become semi-commercial banks and they have started to act indiscriminately towards all the firms and thus, state ownership in firms no longer facilitates easy access of finance from state owned banks. Therefore, the risk averse managers in the state owned firms with weak managerial incentives (Kato and Long, 2006a, b, c, and 2011) are more likely to prefer a low level of leverage. Similarly, using a sample of firms over the period from 2000 to 2006, Su (2010) provides evidence for negative relationship between state ownership and leverage. Finally, Chang, Chen and Liao (2014) also find a negative association between state ownership and leverage, suggesting that SOEs not only may face fewer restrictions in equity issuance but also

might receive favorable treatments when applying for seasoned equity financing. In line with these reasoning, we would expect that state ownership should be negatively associated with leverage. We measure the state shareholding (*sos*) as state owned shares normalized by total number of outstanding shares, and hypothesize that:

H₃: There is a significant negative relationship between state ownership and leverage.

3.4.1.3 Foreign investors

In Chinese listed firms, foreign investors are either founder shareholders (e.g., Hong Kong incorporated industrial firms) or shareholders of B-shares (e.g., foreign banks or mutual funds). Following Bhabra et al. (2008), we measure foreign ownership (*focap*) as the percentage of shares owned by foreign investors to total outstanding shares. In the case of Chinese listed firms, foreign investors (who are often large institutional investors with diversified portfolios) normally have low ownership stakes in them and thus they may find debt as a preferable monitoring mechanism to constrain managerial self-interested behaviour of managers in their portfolio firms (Zou and Xiao, 2006). Furthermore, foreign investors in nascent markets like China may face severe asymmetric information problems compared to domestic investors (Wiwattanakantang, 1999), implying that they are likely to rely on debt as a mechanism for monitoring managers' opportunistic behaviour.

In the context of China, while Zou and Xiao (2006) find that foreign ownership does not have any significant impact on leverage, Bhabra et al. (2008) find that there is a positive relationship between foreign ownership and leverage. In line with these reasoning, we expect that:

H₄: There is a significant positive relationship between foreign shareholding and leverage.

3.4.2 Board structure

3.4.2.1 Board size

The major functions of the board are to hire, fire, and evaluate the top management's (including CEO) performance as well as to compensate the CEO, and to act as a counselor (Jensen, 1993). A well-functioning board of directors is an important internal governance mechanism which may affect agency costs and firms' decisions such as capital structure decisions. In their theoretical articles, Jensen (1986) suggests that a larger board should be associated with higher leverage since debt is an effective mechanism to constraint agency costs of free cash flow. By contrast, Lipton and Lorsch (1992) and Jensen (1993) argue that boards become less effective as they increase in size and more susceptible to the influence of CEOs because: (1) coordination problems become more significant with size (2) the free rider problem becomes more severe as the board size increases. Therefore, the decision-making problems become more severe with large boards. Debt financing, which constrains managers' ability to use free cash flow for the consumption of perquisites and empire building, may not be easily accepted. Therefore, larger boards are more likely to be negatively related to leverage.

Using a sample of US and UK firms respectively, Berger et al. (2007) and Florackis and Ozkan (2009) find that board size is inversely related to leverage, meaning that large boards are associated with coordination, communication and decision-making problems and thus, ineffective in preventing entrenched CEOs from pursuing lower leverage. In addition, Wiwattanakantang (1999) and Abor (2007) also provide evidence suggesting that larger boards are ineffective in encouraging CEO to pursue high level of leverage for firms in emerging markets. By contrast, Ghosh et al. (2010) report a significant positive relationship between large boards and leverage. They attribute this finding to the fact that most of their sample firms (in the Real Estate Investment Trusts-REITs) are operating within an effective range of board size (i.e. an average of 8.5 members compared with an average of more than twelve members for a sample of industrial firms used by Berger et al. (1997)). Using a small sample of Chinese listed firms, Wen et al. (2002) find an insignificant relationship between board size and leverage. Consistent with most of the empirical findings, if

small boards are indeed more effective at monitoring and directing managers to high level of leverage, then we would expect a negative relationship between board size and leverage. Following Berger et al. (1997), we measure the board size (*lnbodsize*) as log of total number of directors on the board. Our hypothesis is that:

H₅: There is a significant negative relationship between board size and leverage.

3.4.2.2 Board composition/ proportion of independent directors

The agency theory suggests that since independent directors who are generally concerned about their reputations and social status, have incentives to monitor management, the top managers generally face more careful monitoring (Fama and Jensen, 1983a; Hermalin and Weisbach, 1991; Weisbach, 1998). Therefore, Jensen (1986) argues that firms whose boards are dominated by outside directors have higher levels of leverage which is an effective mechanism for restricting managerial control of free cash flow. The resource dependence perspective developed by Pfeffer and Salancick (1978) highlights, on the other hand, that external directors boost a firm's ability to protect itself against the external environment, reduce uncertainty, or co-opt resources that increase the firm's ability to raise funds or increase its status and recognition. A high proportion of outside directors are therefore believed to be associated with higher levels of leverage.

Consistent with the above arguments, Berger et al. (1997) find a positive association between the proportion of outside directors and leverage. In contrast, Wen et al. (2002) find a significant negative relationship between number of outside directors on the board and leverage using the Chinese listed firms' data over the period 1996-1998. They suggest that outside directors monitor the management more actively and hence outside directors may act as substitute for the disciplinary role of debt in the capital structure. However, after decades of improvement in the corporate governance of Chinese listed companies, if independent members are more effective at monitoring and directing management's choices, we would expect a positive relationship between the proportion of independent directors and level of leverage. Following Berger et al. (1997), we measure the board composition (*indes*) as a proportion of independent directors on the board. Hence, we hypothesise that:

H₆: There is a significant positive relationship between the percentage of outside directors on the board and leverage.

3.5. Model specification and estimation methodology

In this section, we first present our model specifications: static baseline model and dynamic model. Following the model specification, the control variables that are used in the study are described lengthily with reference to relevant theories and prior empirical studies. Finally, estimation methodologies are discussed.

3.5.1 Model specification

$$\text{lev}_{it} = \beta_0 + \beta_1 \text{size}_{it} + \beta_2 \text{profit}_{it} + \beta_3 \text{tang}_{it} + \beta_4 \text{growth}_{it} + \beta_5 \text{nontaxshd}_{it} + \beta_6 \text{vol}_{it} + \beta_7 \text{firmage}_{it} + v_i + v_t + v_j + v_k + e_{it} \quad (3.1)$$

In order to test our hypotheses and motivated by the recent literature on the link between corporate governance and capital structure decisions (Merhan, 1992; Berger et al., 1997; Bhabra et al., 2008), we first estimate the following equation (static baseline model):

$$\text{lev}_{it} = \beta_0 + \beta_1 \text{pos}_{it} (\text{sos}_{it}) + \beta_2 \text{dstmshare}_{it} + \beta_3 \text{fcap}_{it} + \beta_4 \text{lnbodsiz}_{it} + \beta_5 \text{indes}_{it} + \beta_6 \text{size}_{it} + \beta_7 \text{profit}_{it} + \beta_8 \text{tang}_{it} + \beta_9 \text{growth}_{it} + \beta_{10} \text{nontaxshd}_{it} + \beta_{11} \text{vol}_{it} + \beta_{12} \text{firmage}_{it} + v_i + v_t + v_j + v_k + e_{it} \quad (3.2)$$

where i indexes firm, t years. The term v_i , v_t , v_j , and v_k represent time-invariant firm specific fixed effects, time-specific effects, industry effects, and effects of regional differences, respectively; e_{it} is a random/ idiosyncratic error term. Lemmon et al. (2008) provide strong evidence that firm-specific effect (v_i) unobservable characteristics of the firm have a significant impact on firms' capital structure decisions. They vary across firms but are assumed to remain constant for each firm through time. They include variables such as the quality of management, managers' attitudes towards risk, and market reputation, etc. On the other hand, time-specific effects (v_t), which we control for by including time dummies, vary through time but are the same for all the firms at a given point in time. Furthermore, v_t captures

macroeconomic factors such as interest rates, inflation and business cycle effects, which are outside the control of firms.

On the left hand side of the Equation (3.2), our dependent variable is the leverage ratio (the ratio of the book value of total debt to the book value of the firm's total assets) of firm i in year t . On the right hand side a set of ownership and corporate governance variables are included as explanatory variables in addition to a set of control variables (the traditional variables). The list of variables used in the paper, their definition and expected sign are summarized in Appendix A3.1.

Recent studies (for example, Flannery and Rangan, 2006; Lommon et al., 2008; Florakis and Ozkan, 2009) emphasize that capital structure is more likely to be highly persistent due to the adjustment costs and other market imperfections. Thus, we next estimate the following dynamic equation:

$$\begin{aligned} \text{lev}_{it} = & \beta_0 + \beta_1 \text{lev}_{it-1} + \beta_2 \text{lpos}_{it} (\text{sos}_{it}) + \beta_3 \text{dstmshare}_{it} + \beta_4 \text{fcap}_{it} + \beta_5 \text{nbodsize}_{it} + \\ & \beta_6 \text{indes}_{it} + \beta_7 \text{size}_{it} + \beta_8 \text{profit}_{it} + \beta_9 \text{tang}_{it} + \beta_{10} \text{growth}_{it} + \beta_{11} \text{nontaxshd}_{it} + \\ & \beta_{12} \text{vol}_{it} + \beta_{13} \text{firmage}_{it} + v_i + v_t + v_j + v_k + e_{it}. \end{aligned} \quad (3.3)$$

where all abbreviations are the same as in Equation (3.2). In Equation (3.3) we include the lagged dependent variable amongst the explanatory variables to capture the dynamic effects in the capital structure decisions (Florakis and Ozkan, 2009). A dynamic specification recognizes that firms cannot reach the target level of leverage immediately due to adjustment and other costs.

3.5.1.1 Target leverage structure and speed of adjustment

The use of a dynamic modelling strategy considers the fact that firms have a target level of leverage in their capital structure and that it may take time to reach this target leverage following changes in firm-specific characteristics or random economic shocks due to adjustment and other costs (Flannery and Rangan, 2006). Therefore, firms make a partial adjustment towards the desired leverage ratio (Ozkan, 2001; Flannery and Rangan, 2006). Firms' speed of adjustment towards its target leverage ratio is calculated by one minus the value of the coefficient of the lagged dependent variable. As in our equation 3.3, $(1-\beta_1)$ takes values between 0 and 1: value 0 indicates that there is no adjustment at all towards the target leverage ratio

and value 1 indicates that there is an instantaneous adjustment towards the target leverage ratio. Our dynamic specification assumes that the speed of adjustment depends on the parameter β_1 in Equation (3.3) which gives the fraction of the desired change [i.e. $lev_{it} - lev_{i(t-1)} = \beta_1(lev_{it}^* - lev_{i(t-1)})$] that managers can achieve.³² The coefficient associated with the lagged dependent variable, β_1 , is expected to be positive, and $(1 - \beta_1)$ represents the speed by which firms adjust toward their target leverage ratio.

A dynamic panel data framework is useful for the following two main reasons: (1) it allows us to control for the endogeneity problem and the persistency in capital structure decisions (2) It enables us to analyse the dynamic nature (dynamic relationship) of the capital structure decisions of firms (for example, Florackis and Ozkan, 2009).

3.5.1.2 Control variables

Following Rajan and Zingales (1995), Titman and Wessels (1988), and Frank and Goyal (2009), the study uses seven important firm characteristics as control variables. Additionally, we include year, industry and regional dummies to control for year-specific, industry-specific and geographic effects. The expected relationship between control variables and leverage are primarily guided by relevant theories as well as previous empirical studies.

3.5.1.2.1 Firm size

As discussed in Rajan and Zingales (1995), the theoretical prediction for the effect of size on leverage is ambiguous. It is argued that larger firms tend to be more diversified and have more tangible assets, stable cash flows and better reputations. The trade-off theory therefore postulates that compared to smaller ones, *ceteris paribus*, larger firms are expected to have a higher debt capacity due to a lower risk of bankruptcy (bankruptcy cost).

³² lev_{it} is the actual leverage ratio of firm i at time t , lev_{it}^* is the target value of leverage, and $(lev_{it}^* - lev_{i(t-1)})$ is the desired change in leverage.

In contrast, the pecking-order theory suggests that, bigger firms are more likely to use less debt due to lower asymmetric information problems between insiders and outside investors (i.e. larger firms provide more information to lenders than smaller firms, so the cost of issuing new equity is lower than the debt issuing cost).

Previous empirical studies from developed countries (Titman and Wessels, 1988; Berger et al., 1997; Brailsfore et al., 2002; Florackis and Ozken, 2009), from developing economics (Wiwattanakantang, 1999; Booth et al., 2001; Pandey, 2001; Deesomsak et al., 2004), as well as in the context of Chinese firms (Chen and Strange, 2005; Zou and Xiao 2006; Haung and Song, 2006; Qian et al., 2009) all uniformly find that leverage is positively related to firm size. We therefore expect a positive relationship between firm size and leverage. In this study, firm size (*size*) is measured by the natural logarithm of total real assets.

3.5.1.2.2 Profitability

According to the static trade-off theory, the more profitable the firms, the greater the use of leverage, *ceteris paribus*, due to an increase in the tax shield benefits and, to a lower financial distress and agency costs of debt. Thus, this theory predicts that profitability is positively related to leverage. In contrast, there is an opposite prediction based on the pecking-order theory that the most profitable firms tend to borrow less. In other, the pecking-order theory suggests that firms first finance their investment using internal resources (i.e. retained profit), and then move to debt and new equity financing as a last resort.

Previous empirical findings on financing behaviour of firms in developed economies (Titman and Wessels, 1988; Chiarella et al., 1992; Allem, 1993; Wald, 1999; Rajan and Singales, 1995; Berger et al., 1997; Brailsfore et al., 2002; Fama and French, 2002; Frank and Goyal, 2003; Florackis and Ozken, 2009), and in emerging economies (Wiwattanakantang, 1999; Booth et al., 2001; Pandey, 2001; Deesomsak et al., 2004) find a negative relationship between leverage ratios and profitability. In the context of Chinese enterprises, several authors (Chen, 2004; Chen and Strange, 2005; Zou and Xiao 2006; Haung and Song, 2006; Qian et al., 2009) also report a similar relationship.

In this study, the measure of earnings before interest and taxes scaled by total assets is employed to measure profitability (*profit*) of firms.

3.5.1.2.3 Tangibility³³

According to the pecking-order theory, firms with more fixed assets can easily access secured debt since tangible assets are used as collateral for debt. The static trade-off theory postulates that the larger the fixed assets of the firm (fixed assets are collateralised for debt and thus they reduce the risk of lenders), the lower the bankruptcy and financial distress costs. In line with the explanation of both theories, a positive relationship between tangibility and leverage is expected.

The findings of prior empirical research on leverage based on developed countries (Rajan and Singales, 1995; Berger et al., 1997; Wald, 1999; Brailsfore et al., 2002; Florackis and Ozken, 2009), and developing countries (Wiwattanakantang, 1999; Deesomsak et al., 2004) as well as China (Chen, 2004; Chen and Strange, 2005; Zou and Xiao 2006; Haung and Song, 2006; Qian et al., 2009), confirm this theoretical prediction. We thus expect a positive relationship between tangibility and leverage. In this study, tangibility (*tang*) is measured by net fixed assets normalized by total assets of the firm.

3.5.1.2.4 Growth opportunities:

According to the static trade-off theory, firms with high growth opportunities (which are a form of intangible assets) in the future are likely to be high risk, and this leads to a greater financial distress costs (Frank and Goyal, 2009). Therefore, an inverse relationship between growth opportunities and leverage is postulated. The pecking-order theory, in contrast, predicts a positive relationship between these variables since high-growth opportunity firms are likely to face more information asymmetry problems between insiders and outsiders (i.e. company managers know more about their future investment opportunities than outside investors). So these firms use more debt than equity in the financing hierarchy, since debt capital suffers less from information asymmetries.

³³ Note that tangibility means collateral value of assets throughout the Chapter.

Most empirical work on capital structure decisions show an opposite relationship between growth opportunities and leverage. Empirical studies from developed countries (Titman and Wessels, 1988; Rajan and Singales, 1995; Fama and French, 2002; Brailsfore et al., 2002; Frank and Goyal, 2009; Florackis and Ozken, 2009), from developing countries (Wiwattanakantang, 1999; Deesomsak et al., 2004), and from China (Zou and Xiao 2006; Haung and Song, 2006) obtain an inverse relationship between leverage and growth opportunities. Therefore, we also expect to find a negative relationship between the two variables in Chinese listed companies. Following Rajan and Zingales (1995) and Booth et al. (2001), we use the ratio of the sum of the market value of equity and the book value of debt to the book value of total assets to measure growth opportunities (*growth*) in our study.

3.5.1.2.5 Non-debt tax shields

Non-debt tax shields (*nontaxshd*) represent tax credits for investments and depreciation. Non-debt tax shields reduce a firm's tax payments and thus reduces the need for debt financing as a means to obtain tax advantages (Dammon and Senbet, 1988). That is, non-debt tax shields are substitutes for the tax benefits of debt financing. Therefore, the trade-off theory predicts a negative relationship between non-debt tax shields and leverage.

Previous empirical studies from developed countries (Wald, 1999; Chaplinsky and Niehaus, 1993), from developing countries (Wiwattanakantang, 1999; Deesomsak et al., 2004), as well as in the context of Chinese firms (Huang and Song, 2006; Qian et al., 2009), find an inverse relationship between non-debt tax shields and leverage. Therefore, we expect a similar relationship between non-debt tax shields and leverage. In this study, we use non-debt tax shields (*notaxshd*) measured by depreciation scaled by the total assets as an inverse proxy for tax shield advantage.

3.5.1.2.6 Volatility

According to the trade-off theory, a firm with higher earnings volatility has a higher probability of financial distress, since the volatility of earnings is the chief factor in determining firms' ability to meet debt obligations, such as interest charges. Therefore, an inverse relationship between volatility and leverage is postulated.

The findings of prior empirical studies on leverage based on developed countries (Titman and Wessels, 1988; Friend and Lang, 1988; Brailsford et al., 2002), and developing countries (Booth et al., 2001) as well as Chinese firms (Huang and Song, 2006) converse an inverse relationship between the volatility of earnings and leverage. We thus also expect to find a negative relationship between volatility and leverage. Following Johnson (2003), in this study, we define volatility (*vol*) as the standard deviation of the first differences of earnings before taxes and depreciation over the four years preceeding the sample year, divided by average total assets for that period.

3.5.1.2.7 Firm age

Both the static-trade off and pecking-order theories are silent as regards the relationship between the firm age and leverage. However, based on the agency framework, some authors (e.g. Du et al., 2010) suggest that the older firms are less likely to face asymmetric information problems and should have much easier access debt financing compared to younger ones, *ceteris paribus*. Also, older firms are less likely to invest in risky projects, since they are established over many years and well reputed in the market (Diamond, 1991). Moreover, Tian and Estrin (2007) also mention that firm with long history can easily establish their reputation in the debt market, resulting older firms are more likely to have a higher leverage ratio than younger ones.

Previous empirical studies on Chinese firms (for example, Chen and Strange, 2005) find that firm age is positively related to leverage. In line with the above explanation and previous findings, we expect a positive relationship between firm age and leverage. In this study, firm age (*firmage*) is measured by the natural logarithm of years since the establishment of the firm.

3.5.2 Estimation methodology

3.5.2.1 OLS and fixed effects

In this study panel data estimation methodologies are used. Panel data analysis presents several advantages: it increases the degree of freedom owing to large

number observation, reduces the possibility of collinearity among the explanatory variables, and results in more efficient estimates.

However, several important estimation problems often arise in dynamic panel data specifications. When unobservable firm-specific effects are correlated with the regressors, OLS coefficients will be biased (Hsiao, 1985). Furthermore, in a dynamic model (Equation 3.3) OLS will always give inconsistent (upward biased) estimates of the coefficient on the lagged dependent variable since the lagged dependent variable is correlated with firm fixed effects.³⁴ In addition, OLS assumes that all independent variables are exogenous which may not be the case in capital structure decisions, i.e. it does not control for possible endogeneity of the regressors. Although it is possible to eliminate the firm-specific fixed effects by taking first-differences, the OLS estimators are still not efficient since the first-difference transformation introduces correlation between the lagged dependent variables ($\Delta lev_{i,(t-1)}$) and the differenced errors (Δe_{it}) due to the correlation between $lev_{i,(t-1)}$ and $e_{i,(t-1)}$.

Alternatively, the fixed effects estimator controls for firm-specific fixed effects by transforming the equation in differences of each variable from its mean value. However, in the presence of dynamic effects as in our Equation 3.3, this estimator will give inconsistent (downward biased) estimates of the coefficient on the lagged dependent variable, since the difference of the lagged dependent variable from its mean is correlated with in difference of an random/ idiosyncratic error term from its mean. Moreover, the fixed effects estimator has a problem with slow moving variables (Zhou, 2001) since it wipes out all cross sectional variations and thus it considers only within variations over the years.³⁵ However, corporate governance variables are more likely to be cross-sectional phenomena. Furthermore, the fixed effects model only control for endogeneity arising from omitted variables (i.e. firm-specific unobserved time-invariant effects), and it assumes that all the explanatory variables are exogenous. It does not control for endogeneity arising from reverse

³⁴ That is, $lev_{i,(t-1)}$ is correlated with the v_i component of the error term in Equation (3.3).

³⁵ In order to check which model (fixed-effects versus random-effects) better suits to our panel data, we formally perform the Hausman-test, which is used to check, whether random effects exist. This test employs a Chi square test to compare the coefficients of the random effects model and fixed effects model with a null hypothesis that random affects estimator provide consistent estimates (i.e random effects exist). If there is no systematic difference, we accept null of hypothesis that random effects exist. In our study we find $\chi^2 = 44.20$, $p < 0.001$, suggesting that null hypothesis is rejected and thus unobserved heterogeneity cannot be assumed to be unrelated to the predictors of leverage outcomes. Therefore, Hausman test supports the use of a fixed effects model.

causality.

3.5.2.2 The system GMM estimator

To overcome the above mentioned problems, this study uses the system GMM estimator, which is a powerful tool to account for unobserved firm heterogeneity and the potential endogeneity of the regressors (Arellano and Bover, 1995; Blundell and Bond 1998).³⁶

Endogeneity is an important concern in our study. First, our estimates may be affected by reverse causality/ simultaneity bias i.e. not only the ownership structures can affect the firms' leverage, but the ownership structure can also be affected by leverage. For instance, when firms already have a high level of leverage that can constrain managers' opportunistic behaviour, there may not be the need for increasing managers' equity ownership or vice-versa for the purpose of aligning the interest of managers and shareholders. That is leverage may act as a substitute to managerial shareholding. Similarly, larger shareholders (legal person shareholding and state ownership) and board composition can also be a substitute for leverage. For example, Deesomsak et al. (2004), Wiwattanakantang (1999) find that leverage is inversely related to ownership concentration, implying that large shareholders have greater incentive to monitor the managers. This, in turn, can reduce equity agency conflicts and limit managers' discretionary spending such as empire building. As a result, there is less demand for debt to control the opportunistic behaviour of managers in the firms. Wen et al. (2002) also suggest that outside directors' monitoring can reduce the value placed on the debt as a monitoring device. This suggests that different governance mechanisms indeed can be substitutes to each other (see also Agrawal and Knoeber, 1986).

A second source of endogeneity that is likely to arise in the capital structure choices is when observable and unobservable characteristics of the firm affecting leverage choices are also likely to affect corporate governance. Therefore, the simultaneous determination of corporate governance and an unobserved or uncontrolled factor

³⁶ The simultaneous equations approach (2SLS) which can also be used to control for potential endogeneity is subject to several criticisms. Firstly, finding appropriate instrumental variables for each equation is very difficult and poor instruments may disguise an underlying relationship. Secondly, this approach is quite sensitive to model specification and consequently, a misspecification of any equation affects the entire system and inflates the standard errors (i.e., reduces t-statistics) of the coefficient estimates.

could potentially bias our estimates. Finally, external shocks such as the financial crisis may jointly affect leverage, corporate governance, and firm characteristics.

Following recent studies (e.g., Lemmon et al., 2008; Florackis and Ozkan, 2009), we use the system GMM estimator in our study. There are two GMM estimators: the first differenced GMM estimator (Arellano and Bond, 1991) and the system GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). The GMM estimator takes first-difference of all the variables in order to eliminate the firm fixed effects (unobserved firm heterogeneity). An instrumental variable (IV) approach is then applied to deal with endogeneity. Therefore, the GMM estimator not only controls for omitted variable bias and the endogeneity associated with our corporate governance and control variables, but also purges the endogeneity inherent in first difference of the lagged leverage ratio. As discussed in Bond (2002) and Bond et al. (2007), the system GMM estimator is preferred to the first-difference GMM estimator when instruments are likely to be weak and the value of the lagged dependent variable approaches unity as in the case of leverage ratios. They also show that the first difference GMM estimator could be subject to finite sample biases. The system GMM estimator is more efficient than the first-differenced estimator since it considers all possible instruments set by estimating the relevant equation (our Equation 3.3) simultaneously both in levels and in first-differences: it combines the equation in the first differences instrumented by lagged levels, with an additional set of equation in levels instrumented by lagged first differences. We treat firm age, volatility and the dummy variables (year, industry, and regional dummies) as exogenous and all other variables as endogenous variables. In Equation (3.3), we use all right-hand side variables except firm age, volatility and the dummy variables lagged twice or more ($t-2$ or earlier) as instruments in the first-differenced equation, and first-differences of these same variables lagged once as instruments in the level equation. In addition, we include year dummies, industry dummies, and regional dummies as additional instruments set in all regressions.

To evaluate whether our instruments are legitimate and our model is correctly specified, we first use the test for first and second-order (i.e. AR (1) and AR (2)) serial correlation of the residuals in the differenced equation. The AR (1) and AR (2) tests are asymptotically distributed as a standard normal distribution under the null hypothesis of no first/ second-order serial correlation on the first-difference

residuals, and provide a check on the legitimacy of instruments in the differenced equation. We next use the Sargan test (also known as J test) which tests the over-identifying restrictions, concerning the validity of instruments. Under the null of instrument validity, this test is asymptotically distributed as a chi-square with degrees of freedom equal to the number of instruments less the number of parameters. Furthermore, we use two step robust standard errors in GMM. This two-step GMM methodology can control for the correlation of errors over time, heteroskedasticity across firms, simultaneity, and measurement errors due to the utilization of orthogonal conditions on the variance-covariance matrix

Although System GMM estimator is superior to many other methods, some caveats are worth mentioning. The main disadvantage of the system GMM estimator is that it is complicated and so can easily generate invalid estimates (Roodman, 2009). Another problem is that although the dynamic panel data estimators (the system GMM estimator) are linear estimators, they are highly sensitive to the particular specification of the model and its instruments.

3.6. Data and descriptive statistics

In this section, we describe the dataset and sample that is used in our study, and explain how the data is processed. This section also provides a discussion on summary statistics and correlation analysis of our variables.

3.6.1 Data and sample selection

Our sample includes all the publicly held firms that have been listed on the Shanghai and Shenzhen stock exchanges over the period of 2003 to 2010. Data are collected from the China Stock Market and Accounting Research (CSMAR) database and Sino-fin. We first delete firms in the financial industry, since their capital structure is subject to many regulations. We then remove the potential outliers (i.e., extreme observations) by deleting observations below the 1st and above the 99th percentile of all our regression variables, except dummy variables. Our final sample has 1844 Chinese firms and covers an unbalanced panel of 9624 firm-year observations. When using the system GMM estimator, since we lag all the right hand side variables

twice or more to obtain suitable instruments, the final sample comes down to 6414 firm year observations.

3.6.2. Summary statistics

Table 3.1 presents descriptive statistics for the dependent variables, explanatory and control variables used in our regression analysis. Included are mean, median, standard deviations, minimum and maximum for the variables used in our study.

The minimum and maximum book values of leverage (*lev*) ratios for the sample firms range from 5.8 % to 306.1 % with an average of about 50% (median 50 %). This suggests that on average, half of total assets are financed by debt capital. Furthermore, this figure implies that our sample firms in China have similar mean leverage compared with the findings of the previous studies in developed economies. For example, in their sample of firms from G-7 countries Rajan and Zingales (1995) report that mean leverage ratios (in book value) of 52 % and 54 %, respectively for the United States and the UK. Moreover, the mean leverage ratio of Chinese listed firms is also similar to the ratios observed in developing countries (which average 51 % according to Booth et al., 2001).

As for the ownership structure, average (median) managerial share ownership (*dstmshare*) for the sample firms is 2.5% (0.00) of the total outstanding shares. The mean of managerial ownership is in line with Berger et al. (1997) who report a mean of managerial ownership of 2.7 % for 434 US firms for the period 1984 to 1992. Brailsford et al. (1992) and Florackis and Ozkan (2009) find a mean of 10.65% and 11.6% for Australian and UK firms, respectively. Our sample firms on average (at the median) have 25.3 % (22.9 %) and 16.1 % (4.2%) of shares owned by state (*sos*) and legal person (*lpos*), respectively. Using 1424 firm-year observation over the period 1993-2000, Zou and Xiao (2006), report that state, legal person and foreign shareholding have a mean of 33%, 28% and 8% respectively. The average level of foreign shareholding (*fcap*) is 3.6 % (0.00).

The mean (the median) of the board size (*lnbodsize*) is 9.4 (9) with the proportion of independent directors (*indes*) of 35 % (33.3 %).

With regard to firm characteristics, i.e. traditional determinants, the mean (median) of firm size (*size*) proxied by total assets of the firm is 1.463 billion RMB (732 billion RMB).³⁷ Moreover, according to the sample, Chinese firms have an average profitability (*profit*) of 7.4 %, an average tangibility (*tang*) of 46 %, and average growth opportunity (*growth*) of 20.82 %.

Average (median) non- debt tax shield (*notaxshd*) for the sample firms is 2.5% (2.2%) while average (median) volatility (*vol*) for the sample firms is 3.7 % (2%) . The average level of firm age (*firmage*) is 10.5 (10.00). Using data 972 Chinese PLCs in 2003, Chen and Strange (2005) find a mean of 6.60 for firm age. The mean values of these variables are comparable to those reported in studies on capital structure decision in the context of China, such as Huang and Song (2006) among others.

3.6.3 Correlation analysis

Table 3.2 presents the Pearson correlation coefficients between variables used in our regression analysis. Legal person shares exhibit a positive significant correlation with total leverage, as we hypothesised (H2). State shares exhibit a negative but insignificant correlation with leverage. Managerial ownership shows a negative and statistically significant correlation with the leverage ratio. This unexpected sign of managerial ownership may be due to the confounding factors behind such association. Our multivariate regressions analysis using econometric techniques should account for this issue.

Table 3.2 shows a high negative correlation between state and legal person shareholders (-0.51), implying that multicollinearity is likely to be a problem.³⁸

³⁷ It should be noted that although firm size is measured as the logarithm of total real assets in the regression analysis, the figure reported in the descriptive statistics in Table 3.1 is not in logarithms as actual value is easier to interpret.

³⁸ When we calculate the correlation on a yearly basis, we find that correlation coefficient between *lpos* and *sos* is above -0.8 during the period before 2005. This is similar to the one reported by Yuan et al. (2008) who find a correlation coefficient of -0.88 between *lpos* and *sos*. We also calculate the variance inflation factor (VIF), and note that the VIF is 9.2 (which is closer to the threshold of 10), which suggests that the observed high correlation coefficient between state shareholdings and legal person shareholdings may cause problems in our regressions.

Therefore, in order to mitigate the problem, we include one and drop the other at one time. Previous studies that involve the ownership structure of Chinese listed corporations also do so (for example, Zou and Xiao, 2006 and Yuan et al., 2008). Moreover, except for these variables, the correlation coefficients between other explanatory variables are generally moderate.

As for the control variables, while firm size and tangibility exhibit a positive association with total leverage, profitability and growth opportunities show a negative correlation with total leverage. These results are consistent with the theories and our expectations. Table 3.3 reports a matrix of Spearman correlation coefficients for all of these variables which shows a similar pattern to the one in Table 3.2.

3.7. Empirical results

This section discusses the empirical results. As we discussed in methodology section, we mainly rely on the estimation results of the dynamic system GMM estimator for inferences, which enable us to control for potential unobserved heterogeneity, endogeneity and persistency in capital structure decisions. In addition, we report estimates from static models obtained using the pooled OLS and firm fixed effects regressions which enable us to directly compare our results with previous studies based on developed countries as well as in the context of Chinese firms. Additionally, we carry out many robustness tests using alternative model specifications and sub-sample of firms.

3.7.1 The traditional determinants of capital structure

We begin by estimating a naïve model with a set of firm characteristics suggested by the typical capital structure theories and by numerous empirical studies (e.g., Rajan and Zingales, 1995; Titman and Wessels, 1988; Frank and Goyal, 2009). In addition, we include year, industry and regional dummies in our regressions as control variables. Columns 1, 2 and 3 in Table 3.4 refer to the regression results obtained using the OLS, Fixed effects and the system GMM estimators, respectively.

We can see that in all regressions in Table 3.4, firm size (*size*) attracts a positive and statistically significant coefficient. This is consistent with the previous empirical findings (e.g., Berger et al., 1997; Booth et al., 2001) and with the trade-off and agency theories, meaning that larger firms are more diversified compared to small ones and consequently, they are associated with a lower risk of bankruptcy cost and better borrowing capacity relative to smaller firms.

In line with the pecking-order theory, the relationship between profitability (*profit*) and leverage is negative and precisely determined in all columns. This provides additional support to findings of previous empirical studies in the context of Chinese listed companies. For example Chen (2004) proposes ‘a new pecking-order’, whereby firms use first retained profits, then equity financing, and debt capital as a last resort since bond markets in China are not very much developed. He finds that firms with more profitable projects tend to use less external financing since these firms have better access to internal financing than firms with lower profits.

Tangibility (*tang*) is positively related to leverage in columns 1 and 2, suggesting that the larger the proportion of fixed to total assets the firm has, the lower the bankruptcy costs. This finding is in line with the trade-off theory and the findings of previous empirical studies (e.g., Rajan and Zingales, 1995; Zou and Xiao, 2006). Yet, results from the GMM regression in Column 3 show that tangibility has no significant impact on leverage ratios. This finding is consistent with Titman and Wessels (1988).

Furthermore, as can be seen in the OLS and the GMM regression in columns 1 and 3 respectively, growth opportunities (*growth*) exhibit a negative significant coefficient in line with the static trade-off theory. This can be also explained following Myers (1977) who argues that high growth firms tend to use less leverage in order to reduce underinvestment problem. This result is also consistent with the findings of the previous studies in the context of China (Zou and Xiao 2006; Haung and Song, 2006; Moosa et al., 2011), from developed countries (Brailsfore et al., 2002; Frank and Goyal, 2003; Florackis and Ozken, 2009), and from developing countries (see e.g., Wiwattanakantang, 1999; Deesomsak et al., 2004). However, results from the fixed effects model in column 2 indicate that growth opportunities have no

significant impact on leverage ratios. This finding could be due to the fact that the fixed effect estimates do not take endogeneity into account.

Columns 1 and 3 of Table 3.4 show that the non-debt tax shield (*nontaxshd*) is negatively and significantly related to leverage, confirming non-debt tax shields are substitutes for the tax benefits of debt financing (DeAngelo and Masulis, 1980). This result is consistent with the findings of the previous empirical studies (Deesomsak et al., 2004; Wiwattanakantang, 1999; Qian et al., 2009). However, as shown in column (2), sign, the estimated coefficient on non-debt tax shield is insignificant in fixed effects regressions.

The results from OLS and fixed effects regressions in columns (1) and (2), respectively indicate that firm age (*firmage*) is positively and significantly related to leverage, suggesting that older firms have much easier to access debt financing since they face less asymmetric information problems. This is consistent with the previous empirical finding in the context of Chinese listed firms (Chen and Strang, 2005). However, in the GMM regression (column 3), firm age has no significant impact on leverage ratios, which is consistent with Wiwattanakantang (1999). This finding is also consistent with Du et al. (2010) who find an insignificant coefficient on firm's age in their leverage equations estimated on a panel of Chinese SMEs.

As can be seen in columns (1) and (2) of Table 3.4, the estimated coefficient on volatility (*vol*) is significantly positive. These results are consistent with the findings of the previous studies for Chinese listed firms (Qian et al., 2009). However, the results from the system GMM in column 3 reveal that there is no significant relationship between volatility and leverage. This finding is consistent with Titman and Wessels (1988).

It is worth noting that the lagged dependent variable has a positive and strongly significant coefficient, which is about 0.88 in column 3, indicating that there is a high level of persistency in the leverage ratio. This warrants the use of dynamic modelling strategy and the system GMM estimator in our study. On the other hand, this suggests that only 12 per cent of the gap between last period's leverage and this period's target is eliminated within a year. The Chinese listed firms' adjustment

speed of leverage is much lower than that observed for the Chinese SMEs which is about 30% (as reported in DU et al., 2010), and for the US firms, which ranges between 30% (as reported in Flannery and Rangan, 2006) and 22-25% (as reported in Lemmon et al., 2008). This mean that the Chinese listed firms adjust towards a target leverage ratio slowly and partially, and can be due to higher adjustment and other costs (such as costs of negotiating with lenders in an under developed capital market

So far, our analysis indicates that the average leverage ratio of Chinese listed firms is similar to those observed in other developing countries; the leverage is highly persistent over time; and the level of leverage is well explained by traditional determinants. In the next section, we introduce corporate governance variables as additional determinants of firms' leverage ratio and analyse how they affect firms' capital structure decisions.

3.7.2 The effects of ownership structure and board structure on capital structure decisions

The estimation results of our static baseline model Eq. (3.2) and dynamic baseline model Eq. (3.3) are reported in columns 1-4 and columns 5-6 of Table 3.5, respectively. As *sos* and *lpos* are highly correlated, regressions estimates are reported separately for regressions containing one or the other. Generally our results are consistent with our hypotheses and the results of previous empirical studies.

It is interesting to see that different from our conjecture, managerial ownership is negatively related to leverage in the OLS regression in column (1). This can be explained considering that when managers' stock ownership increases, managers become risk averse and adopt a capital structure with lower leverage. This result is consistent with Huang and Song (2006) who reports OLS estimates of regressions of the level of total leverage against managerial ownership. However, one needs to be cautious in interpreting this finding as evidence for a negative relationship between managerial ownership and leverage. This result may be in fact contaminated by spurious correlation between the two variables, since, as we discussed to estimation methodology section, OLS does not effectively control for potential unobserved heterogeneity and endogeneity.

As can be seen in columns 5-6 of Table 3.5, when endogeneity is controlled for using the system GMM estimator, the estimated impact of managerial ownership (*dstmshare*) on total leverage becomes positive and statistically significant, in line with our hypothesis (H1).³⁹ Furthermore, its magnitude is also economically more significant (Huang and Ritter, 2009): calculating the economic significance from column 5, we find that incrementing managerial ownership by one-standard deviation increases leverage by 3.1 % of its mean.⁴⁰ This finding is consistent with the incentive alignment hypothesis of Jensen and Meckling (1976), suggesting that greater managerial shareholding leads to a better alignment of the interest of insiders and outsiders, which in turn motivates managers to adopt more risky financial choices by using relatively more leverage. Moreover, the positive relationship may also imply that when managerial shareholding increases they choose higher leverage ratios as a signal for committing to low agency costs to outsiders. That is, a higher leverage ratio serves as a signal to outside investors that the managers are committed, and not going to pursue any non-profit maximization activities like excess consumption of perquisites and empire building. This finding is consistent with previous findings by Kim and Sorensen (1986), Mehran (1992), Berger et al. (1997) for US firms. Most recent studies (Li et al., 2007; Hu and Zhou, 2008; Liu et al., 2012) provide strong evidence that managerial ownership is positively associated with performance and value of the firms. In this study we identify one channel (i.e debt financing), which managers use to achieve this. Additionally, the flip in the sign (from negative to positive) of the estimated coefficient on managerial ownership provides an actual fact that relationship between managerial ownership and leverage is endogenous, and thus this is a focal new finding from our study in the context of Chinese firms.

The estimated coefficient on legal person shareholding (*lpos*) is significantly positive, consistent with our expectation (H2), in the OLS regressions (column 1), implying that legal person investors do conduct active monitoring. Legal person shareholders can closely monitor the managerial opportunistic behaviour since they have large stake in the firm. A one standard deviation increase in legal person

³⁹ We also tested whether managerial ownership is non-linearly related to leverage, but we do not find such relationship in our data.

⁴⁰ The estimated coefficient on managerial ownership (0.173) times standard deviation (0.089), divided by the mean value of leverage (0.503).

shareholding increases leverage by approximately 2.5%.⁴¹ Yet, as can be seen in column 5 of Table 3.5, after controlling for potential unobserved heterogeneity and endogeneity, legal person shareholding is found not to have significant impact on leverage though it bears a positive sign. Column 3 also shows that the estimated coefficient on legal person shareholding is insignificant. This is consistent with the previous empirical findings (for example, Zou and Xiao, 2006; Chen and Strange, 2005).

Consistent with our hypothesis (H3), state ownership (*sos*) has a negative significant impact on leverage in all columns (columns 2, 4 and 6). A one standard deviation increase in state shareholding decreases leverage by approximately 2.08% in column 6.⁴² This finding is inconsistent with Qian et al. (2009) who find that a positive relationship between state shareholding and leverage by using data over the period 1999 to 2004. Our results lend support to the argument that state banks have become semi-commercial banks and started to act indiscriminately towards all the firms, regardless of the state involvements in them (Lin and Bo, 2011) and thus, managers in state controlled firms no longer enjoy easy access to finance from state owned banks. Therefore, the risk averse managers in the state owned firms with weak managerial incentives (Kato and Long, 2006a, b, c, and 2011) are more likely to prefer a low level of leverage. This result is in line with Lin and Bo (2011) who find a negative but insignificant relationship between state shareholding and leverage. Furthermore, this result may also imply that SOEs not only may face fewer restrictions in equity issuance but also might receive favorable treatments when applying for seasoned equity financing, thus use less debt.

Different from what we hypothesised (H4), foreign shareholding (*fcap*) is negatively related to leverage to OLS and the GMM regressions. Focusing on the column (5), a one standard deviation increase in foreign shareholding, decreases leverage by approximately 4.1%.⁴³ This result may be explained by the fact that most of Chinese listed firms have controlling shareholders who may use debt to acquire more resources for their expropriation at the expenses of minority shareholders without

⁴¹ The estimated coefficient on legal person shareholding (0.06) times standard deviation (0.207), divided by the mean value of leverage (0.503).

⁴² The estimated coefficient on state shareholding (0.043) times standard deviation (0.244), divided by the mean value of leverage (0.503).

⁴³ The estimated coefficient on foreign shareholding (0.205) times standard deviation (0.101) divided by the mean value of leverage (0.503).

diluting their control of the firms (Stulz, 1988; Xu and Wang, 1999; Faccio et al., 2010). As for the foreign ownership, it is relatively low in these firms, the foreign investors may therefore prefer to use less debt in their portfolio firms to avoid expropriation by controlling shareholders.

Turning to the effects of board structure, our results suggest the absence of significant relationship between board structure variables [board size (*lnbodsize*) and independent directors (*indes*)] and leverage ratios of Chinese listed firms. Our empirical result for board size is consistent with previous findings of Wiwattanakantang (1999) for Thai firms and Wen et al. (2002) for Chinese firms. While our finding that independent directors do not affect capital structure decisions is inconsistent with Wen et al. (2002), it is consistent with criticism of Clarke (2003 and 2006) among others that independent directors of Chinese PLCs have no necessary knowledge and experience on financial and strategic aspects of the firms they represent and they are added to the board just to meet the legal and regulatory requirements. This finding is consistent with empirical findings of Su (2010) and Dixon et al. (2015) in that they show that Chinese independent directors are not effective in influencing listed firms' capital structure decisions and internationalisation decisions, respectively.

As for the control variables, most of the traditional determinants of leverage retain their sign and significance levels as reported in the previous sub section. Furthermore, when we calculate the economic significance of these variables from column 6, we find that incrementing size and firm age of one-standard deviation increase leverage by 0.11 times and 0.17 times (from column 5) of its mean, respectively whereas incrementing profitability, growth opportunities and volatility by one-standard deviation decreases leverage by 7.25%, 6.61% and 2% of its mean, respectively.

The estimated coefficients on volatility (*vol*) are significantly negative in the system GMM (columns 5 and 6). This result is consistent with previous studies from developing countries (Wiwattanakantang, 1999; Deesomsak et al., 2004), in the context of Chinese listed companies (Zou and Xiao, 2006) and with the trade-off and theory, suggesting that high volatility of earnings increases the probability of

financial distress which in turn decreases firm's debt capacity. Firm age (*firmage*) attracts a positive and statistically significant coefficient with leverage ratios, except in column 6. This is consistent with the previous empirical findings (e.g. Chen and Strang, 2005).

3.7.3 Robustness checks

In this sub-section we verify whether our results are robust to using alternative model specifications and different sub-sample of firms.

3.7.3.1 Estimating separate regressions for state and non-state firms

In this section, we investigate how the impact of managerial ownership on the leverage differs between the sub-sample of state and non-state firms. This exercise is motivated considering that top executives who come from the state sector are generally appointed by the Communist Party of China and government agencies (typically party secretaries, government officials or veteran socialist managers) (Walder, 2011). Therefore, Walder (2011) argues that managerial autonomy is limited in state controlled firms.

In contrast, top executives in the private sector may have begun their careers in the state sector. But, they have not been appointed by the state. The managers of the private sector have greater independency from the state agencies compared to their counterparts. Moreover, Walder (2011) notes that top executives who come from private sector get much higher levels of compensation and they are more likely to have a significant level of ownership stake. These developments indicate that managers of these companies play a major role, as they have to take ultimate decision of the company.

In the light of these considerations, in columns (1) and (2) of Table 3.6, we provide separate system GMM estimates of Equation (3.3) for state and non-state (private) firms. The results show that managerial ownership (*dstmshare*) only affects the leverage decisions of private firms, whilst the coefficient on managerial ownership is insignificant for state firms.

As can be seen in columns (1) and (2) of Table 3.6, legal person shareholding (*lpos*) have a negative impact on leverage ratios of state firms, whilst the coefficient on legal person shareholding is insignificant for private firms.⁴⁴

In addition, we verify how the impact of state shareholding on the leverage differs between the sub-samples of state and non-state firms. This exercise is motivated by Tian and Estrin's study (2007), who use a sample of 2660 firm-year observation over the period 1994-1998 to examine the governance role of debt capital in the context of Chinese listed firms. When they differentiate the role of the debt on constraining managers between state controlled firms and private controlled firms, they find evidence that bank loans facilitates managerial exploitation of corporate wealth in government controlled firms while bank loans helps to constrains agency cost in firms controlled by private owners. Therefore, they argue that a firm which is controlled by government is associated with soft budget constraints since loans from state owned banks facilitate managers in government controlled firms to expand the resources under their control for expropriation (the government is both debtors and creditors). Thus, soft budget constraints make debt as an ineffective governance mechanism in reducing agency cost in state-controlled firms. In the light of these considerations, column 3 shows that state ownership (*sos*) negatively influences the leverage decisions of state firms. Moreover, the coefficient on foreign ownership (*fcap*) is insignificant for both firms.

The absence of a significant relationship between board structure variables (board size and independent directors) and leverage ratios applies to both of the subsamples of state and non-state listed firms.

3.7.3.2 Taking into account differences in the pre- and post-reform periods

Managerial ownership has become more important in recent years and Chinese corporations have been allowed to provide incentives to their top management in the form of stocks and stock options only from January 2006 onwards. Furthermore, firms' ownership structures have changed tremendously following the 2005 split share structure reform in which large part of the non- tradable shares have been converted to tradable shares which have been bought by private shareholders.

⁴⁴ When we use state ownership (*sos*) instead of legal person shareholding (*lpos*), it is also not significant in private controlled firms.

Consequently, managerial shareholding has increased considerably after 2005. In particular, it was less than 1% before 2005, but has increased to about 8% by the end of 2010. It is therefore interesting to examine whether managerial ownership has played a more significant effect on firms' leverage decision during the post reform period (2005-2010). To this end, we generate a dummy variable = 1 if year > 2005, and 0 otherwise and interact it with our proxy for managerial ownership. We include this interaction term in our dynamic specification (Equation 3.3).

The results are reported in column 4 of Table 3.6. We can see that, the estimated coefficients on the interaction term (*dstmshare*post_reform*) is positively and significantly related to leverage ratios, whilst managerial ownership (*dstmshare*pre_reform*) is found not to have a significant impact on leverage in the pre-reform period. This suggests that the effects of managerial ownership on leverage only became apparent in the post-reform period. The coefficients on the other regressors in our leverage equations are consistent with those obtained in Table 3.5.

3.8. Conclusion

In this chapter, we study the relationship between leverage, and both ownership structure and board structure. We use a sample of 1844 Chinese non-financial firms over the period 2003 to 2010 for our empirical analysis. This is the first empirical study after the 2005 split-share reform, which takes into account ownership structure and board structure variables. Moreover, we use the system GMM (Blundell and Bond, 1998) estimator to study the relationship, explicitly controlling for potential unobserved heterogeneity and endogeneity. A dynamic model is adopted to control for persistency in capital structure decisions and to trace capital structure adjustments over time.

Controlling for traditional determinants of leverage, endogeneity, and persistency in capital structure decisions, we find that firms adjust their leverage towards target leverage at a speed of 12%. Furthermore, the ownership structure plays a significant role in determining leverage ratios. More importantly, we document a strong positive

relationship between managerial shareholding and total leverage, consistent with the incentive alignment hypothesis of Jensen and Meckling (1976).

More specifically, managerial ownership is positively related to leverage ratios after the split-share reform, but it does not have significant influence on the leverage ratios before the split-share reform. Furthermore, when differentiate state and non-state firms, we find that managerial ownership only affects the leverage decisions of private firms.

Our empirical results also reveal that state ownership is negatively related to leverage. However, legal person shareholding does not influence firms' leverage decisions. Contrary to our expectation, foreign ownership negatively influences leverage decisions. Furthermore, the board structure (board size and board composition/proportion of independent directors) does not influence firms' capital structure decisions.

Our research has policy implications. Our findings suggest that recent ownership reforms have been successful in terms of providing incentive to managers through managerial shareholdings to take risky financial choices. Further, our study also suggests that managerial ownership can work as an incentive mechanism in countries like China with unique institutional settings. Therefore, our study recommends that managerial ownership should be further encouraged in state controlled firms so as to provide managers of these firms to take more risk. However, even after the introduction of corporate governance code and the independent director system for Chinese listed corporations like in the Western countries, board of directors, especially independent directors do not seem to influence firms' important decisions like capital structure choices. Thus, our study recommends that a strong and truly independent board structure should be encouraged in the Chinese listed corporations in order to improve effectiveness of their corporate governance.

Appendices

Table A3.1 Definition of variables

<u>Variables</u>	<u>Name</u>	<u>Measures</u>	<u>Expected sign</u>
<u>Dependent Variable</u>			
Leverage	lev	: Total debt / total assets	
<u>Governance variables</u>			
Managerial ownership	dstmshare	: Shares owned directly by directors, supervisors & top management / total number of outstanding shares	+(H1)
Legal person shares	lpos	: Shares owned by legal persons/ total number of outstanding shares	+(H2)
State shares	sos	: State owned shares/ total number of outstanding shares	-(H3)
Foreign investors	focap	: Foreign investor owned shares/ total number of shares	+(H4)
Board size	lnbodsize	: Log of total number of directors on the board	-(H5)
Board composition (independent directors)	indes	: Percentage of independent directors on the board	+(H6)
<u>Control variables</u>			
Size	size	: Natural logarithm of total real assets	+
Profitability	profit	: ROA =Return on assets = Earnings before interest, taxes and depreciation / total assets	-
Tangibility	tang	: Net fixed assets/ Total assets	+
Growth opportunities	growth	: Ratio of the sum of the market value of equity and the book value of debt to the book value of total assets Non-tradable share price is used to calculate as the market value of the tradable equity.	-
Non-debt tax shield	notaxshd	: Depreciation / total assets	-
Volatility	vol	: Standard deviation of the first differences of earnings before taxes and depreciation over the four years preceding the sample period, divided by average total assets for that period.	-
Firm age	firmage	: Log of the number of years since the establishment of the firm	+
Year dummies	v_t	: Year dummies for the years 2003 to 2010	
Industry dummies	v_j	: CSMAR B classification: 5 industries : Utilities, Properties, Conglomerates, Industry, Commerce (except financial industries)	
Regional dummies	v_k	: Dummies indicating whether the firm is located in the Coastal, Western, or Central region of China	

Notes: We exclude CEO duality from the analysis since its variation is not sufficient for it to be included in our model as an independent variable. It is typically 15% over the period of 2003 to 2010. ‘+’ means that leverage increases with the variables, ‘-’ means that leverage decreases with the variables.

Table A3.2 Summary of determinants of capital structure, predicted signs and their reasons

Control variables (abbreviations)	Theories	Predicted signs	Reasons
Firm size (<i>size</i>)	TOT	+	Larger firms are more diversified, and have a greater debt capacity and a relatively lower bankruptcy cost than smaller firms.
	AT	+	Larger firms provide more information to debt holders and hence a lower level of agency cost of debt.
	POT	-	Larger firms face lower level of information asymmetry since they are well established in the market and hence a lower cost of equity.
Profitability (<i>profit</i>)	TOT	+	Profitable firms have greater tax shield, and a lower financial distress and bankruptcy costs.
	AT	+	Profitable firms have more free cash flow. Hence, debt financing reduces the free cash flow problem in the presence of an active market for corporate control (Jensen, 1986).
		-	Managers of profitable firms prefer lower level of debt in order to avoid the disciplinary role of debt financing in the absence of an active market for corporate control (Rajan and Zingales, 1995)
Tangibility (<i>tang</i>)	POT	-	Profitable firms prefer internal financing over external financing.
	TOT	+	Firm with more tangible assets are more capable of providing collaterals for debt.
	AT	+	Debt financing creates the sub-optimal investment problem (Jensen and Mackling, 1976) and higher level of debt diminishes managers' discretionary spending (Grossman and Hart, 1982)
Growth opportunities (<i>growth</i>)	POT	+	Firms with more fixed assets can easily access secured debt since tangible assets are used as collateral for debt.
	TOT	-	Firms with high growth opportunities are likely to be risky and hence have a greater likelihood of financial distress

			and bankruptcy costs.
	AT	-	Debt financing creates assets substitution problem (Jensen & Mackling, 1976). In order to mitigate the underinvestment problem associated with use of excessive leverage, firms with more growth opportunities tend to have a lower level of leverage (Myers, 1977).
		+	Debt financing reduces the free cash flow problem in low growth firms (Jensen, 1986)
	POT	+	Firms with high growth opportunities face severe asymmetric information problems.
Non-debt tax shield (<i>notaxshd</i>)	TOT	-	Firms can use non-debt financing (such as depreciation) in order to reduce the tax payments. DeAngelo and Masulis (1980) suggest that non-debt tax shields may substitute for the tax shield benefits of debt.
Volatility (<i>vol</i>)	TOT	-	Firms with higher earnings volatility use less debt in order to avoid financial distress costs (bankruptcy costs) (Fama and French, 2002).

Notes: Trade-Off Theory (TOT), Pecking Order Theory (POT) and Agency Theory (AT). ‘+’ means that leverage increases with the variables and ‘-’ means that leverage decreases with the variables.

Table A3.3 Summary of studies on the effects of corporate governance in capital structure based on Chinese firms

Empirical study	Sampling	Analytical method	Reported results and findings
Wen et al. (2002)	Sample of 180 observations for 60 Chinese listed firms over the period 1996 to 1998. Source: annual reports	Multiple regression analysis. (Using OLS)	Outside directors - The tenure of the CEO – Board size 0 CEOs fixed compensation 0
Huang and Song (2006)	Sample of more than 1200 listed companies over the period 1994-2003.	Cross-sectional analysis and OLS	Managerial shareholding – Institutional ownership 0 Size + Profitability - Fixed assets + Non-debt tax shields –
Zou and Xiao (2006)	Panel of 1424 firm-year observation over the period 1993-2000.	Fixed and random effects regression.	State ownership 0 Domestic legal person shareholding 0 Foreign ownership 0 Size + Tangibility + Asset intensity Growth - Profitability – Earning volatility (risk) – Marginal tax rate + Non-debt tax shield + Dividend pay-out ratio –
Shen (2008)	Sample of 1098 listed companies over the period 1991–2000.	OLS	Government ownership + Ownership concentration of the 10 largest shareholding + Legal person - Size and profitability - Tangibility 0 Tax rate and Growth + Capital intensity + Product diversification + Asset specificity - Risk and Duration 0
Su (2010)	Panel of of 789 firms with a total of 5523 firm-years over the period 2000-2006.	Fixed effects regression.	State ownership – Board size – Independent directors 0 CEO duality 0 Largest shareholder + Size and age + Profitability - Growth and nontax shields 0 Risk and Tangibility 0
Chang, Chen and Liao (2014)	Panel of of 13,107 firm-year observations over the period 2000-2009.	Fixed effects regression.	State ownership - Large shareholder -

			Profitability – Size + Tangibility + Asset growth + Industry leverage +
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Note: + significantly positive; - significantly negative; + - significantly positive or negative; 0 insignificant.

Table A3.4 Summary of studies on the effects of the traditional determinants of the capital structure based on Chinese firms

Chen (2004)	Sample of 77 Chinese public-listed companies for the period 1995-2000. (Dataset- the Dow-China 88 index) using firm-level panel data	Pooled OLS Fixed effects Random effects	Size - Profitability – Tangibility + Growth opportunities +
Chen & Strange (2005)	Sample of 972 listed companies on the Shanghai Stock Exchange and Shenzhen Stock Exchange in China in 2003	OLS	Profitability - Size + Business risk + Intangibility 0 Growth 0 Age + Income tax rate 0
Yan (2008)	Panel of 722 listed Small and Medium Enterprises (SMEs) in the manufacturing industry (202 firms) over the period 2004 - 2007.	OLS	Size + Liquidity - Profitability - Growth opportunities + Asset structure +
Qian et al. (2009)	Sample of 650 publicly listed firms over the period 1999–2004.	DPD-GMM	Size + Profitability -, Tangibility + Volatility + State shareholding + Nontax debt shields -
Moosa et al. (2011)	Data on 344 publicly listed shareholding companies from the OSIRIS database.	Cross-sectional analysis. EBA	Size + Liquidity - Profitability - Growth - Tangibility + Pay-out ratio 0 Age 0

Note: + significantly positive; - significantly negative; + - significantly positive or negative; 0 insignificant.

Table 3.1 Summary statistics of leverage, corporate governance, and control variables of Chinese listed firms over the period of 2003 to 2010.

Variables	Obs.	Mean	Median	Std. Dev.	Min	Max
Dependent variable						
lev	9624	0.503	0.505	0.214	0.058	3.061
Governance variables						
dstmshare	9624	0.025	0.000	0.089	0.000	0.546
lpos	9624	0.161	0.042	0.207	0.000	0.730
sos	9624	0.253	0.229	0.244	0.000	0.750
fcap	9624	0.036	0.000	0.101	0.000	0.513
lnbodsize	9624	9.390	9.000	1.856	5.000	15.000
indes	9624	0.351	0.333	0.042	0.222	0.500
Control variables						
size (billion RMB)	9624	1.463	0.732	2.471	0.067	26.136
profit	9624	0.074	0.074	0.063	-0.254	0.268
tang	9624	0.460	0.457	0.165	0.061	0.845
growth	9624	2.082	1.659	1.237	0.807	8.504
notaxshd	9624	0.025	0.022	0.015	0.000	0.081
vol	9624	0.037	0.020	0.049	0.000	0.368
firmage	9624	10.543	10.000	4.132	1.000	26.000

Note: Definitions for all variables are provided in Table A3.1.

Table 3.2 Pearson correlation matrices

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
lev	1	1.00													
dstmshare	2	-0.17*	1.00												
lpos	3	0.03*	0.00	1.00											
sos	4	-0.02	-0.26*	-0.51*	1.00										
fcap	5	-0.01	-0.05*	-0.05*	-0.03*	1.00									
lnbodsize	6	0.04*	-0.07*	-0.07*	0.14*	0.06*	1.00								
indes	7	-0.00	0.08*	-0.02	-0.10*	0.01	-0.27*	1.00							
size	8	0.20*	-0.15*	-0.21*	0.14*	0.17*	0.21*	0.03*	1.00						
profit	9	-0.33*	0.08*	-0.06*	0.02	0.03*	0.06*	-0.00	0.19*	1.00					
tang	10	0.20*	-0.15*	-0.10*	0.11*	0.03*	0.09*	-0.03*	0.16*	0.09*	1.00				
growth	11	-0.22*	0.22*	0.01	-0.19*	-0.04*	-0.09*	0.06*	-0.30*	0.21*	-0.21*	1.00			
nontaxshd	12	0.29*	-0.16*	0.05*	-0.06*	0.05*	-0.09*	0.03*	-0.12*	-0.21*	-0.01	0.07*	1.00		
vol	13	-0.02	-0.12*	-0.12*	0.12*	0.10*	0.08*	-0.04*	0.06*	0.23*	0.50*	-0.08*	0.06*	1.00	
firmage	14	0.25*	-0.27*	-0.08*	-0.22*	0.06*	-0.05*	0.03*	0.15*	-0.10*	0.08*	-0.03*	0.29*	0.02*	1.00

Notes: * denotes significance at the 5% level. See Table A3.1 for definitions of all variables.

Table 3.3 Spearman correlation matrices

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
lev	1	1.00													
dstmshare	2	-0.09*	1.00												
lpos	3	0.01*	0.08*	1.00											
sos	4	0.01	-0.23*	-0.41*	1.00										
fcap	5	-0.04	-0.08*	-0.01	-0.02*	1.00									
lnbodsize	6	0.05*	-0.04*	-0.05*	0.15*	0.06*	1.00								
indes	7	0.02	-0.03*	-0.05*	-0.08*	0.02	-0.17*	1.00							
size	8	0.29*	0.00	-0.22*	0.13*	0.13*	0.20*	0.03*	1.00						
profit	9	-0.30*	0.08*	-0.05*	-0.01	0.04*	0.05*	-0.01*	0.16*	1.00					
tang	10	0.22*	-0.09*	-0.08*	0.11*	0.03*	0.10*	-0.01*	0.16*	0.11*	1.00				
growth	11	-0.28*	0.06*	-0.02*	-0.21*	-0.02*	-0.10*	0.05*	-0.34*	0.26*	-0.21*	1.00			
nontaxshd	12	0.23*	-0.14*	-0.06*	-0.03*	0.03*	-0.06*	0.00	0.04*	-0.16*	0.07*	0.01	1.00		
vol	13	-0.05	-0.07*	-0.12*	0.12*	0.07*	0.08*	-0.04*	0.04*	0.31*	0.51*	-0.08*	0.09*	1.00	
firmage	14	0.23*	0.06*	-0.06*	-0.24*	0.05*	-0.07*	0.03*	0.14*	-0.09*	0.04*	0.02*	0.43*	-0.01	1.00

Notes: * denotes significance at the 5% level. See Table A3.1 for definitions of all variables.

Table 3.4 The traditional determinants of capital structure

Variables	Predicted sign	OLS (1)	Fixed effects (2)	System GMM (3)
lev _{it-1}				0.886 ^{***} (0.038)
size	+	0.049 ^{***} (0.004)	0.050 ^{***} (0.008)	0.016 ^{**} (0.007)
profit	-	-0.974 ^{***} (0.066)	-0.606 ^{**} (0.044)	-0.513 ^{***} (0.105)
tang	+	0.270 ^{**} (0.026)	0.175 ^{**} (0.023)	-0.043 (0.059)
growth	-	-0.012 ^{***} (0.005)	-0.002 (0.003)	-0.023 ^{**} (0.011)
nontaxshd	-	-1.109 ^{***} (0.300)	-0.212 (0.352)	-0.317 ^{***} (0.101)
vol	-	1.042 ^{***} (0.140)	0.566 ^{***} (0.110)	0.606 (0.879)
firmage	+	0.053 ^{**} (0.009)	0.072 ^{**} (0.019)	-0.005 (0.006)
Constant		-0.744 ^{***} (0.097)	-0.815 ^{***} (0.172)	-0.117 (0.286)
Industry dummies		yes	Yes	yes
Regional dummies		yes	yes	yes
Year dummies		yes	yes	yes
Firm fixed effects			yes	yes
Observations		9624	9624	8055
R ²		0.298	0.192	
adj. R ²		0.296	0.191	
F		82.761	46.929	145.316
P		0.000	0.000	0.000
Sargan test (p values)				0.242
m1 (p values)				0.000
m2 (p values)				.311

Notes: Cluster robust standard errors are reported in columns 1 and 2 (clustered on firms). Asymptotic standard errors robust to heteroskedasticity are reported in parentheses in column 3. For the system GMM regression, AR2 is a test for second-order serial correlation of the differenced residuals, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation. The Sargan test (also known as J test) of over-identifying restrictions is distributed as *Chi-square* under the null of instrument validity. We treat all right-hand side variables except firm age, volatility and dummy variables as potentially endogenous variables. ***, **, and * denote significance levels of 1%, 5% and 10%, respectively. See Table A3.1 for definitions of all variables.

Table 3.5 The effects of ownership structure and board structure on capital structure decisions

	Predicted sign	OLS		Fixed effects		System GMM	
		1	2	3	4	5	6
Governance variables							
dstmshare	+	-0.031 (0.038)	-0.070* (0.040)	0.042 (0.071)	0.022 (0.070)	0.173*** (0.051)	0.116** (0.053)
lpos	+	0.060*** (0.017)		0.002 (0.015)		0.010 (0.026)	
sos	-		-0.056*** (0.016)		-0.034** (0.014)		-0.043** (0.018)
fcap	+	-0.129*** (0.038)	-0.142*** (0.039)	0.034 (0.059)	0.019 (0.059)	-0.205** (0.102)	-0.225** (0.099)
lnbodsize	-	0.014 (0.018)	0.013 (0.018)	-0.002 (0.018)	-0.002 (0.018)	0.029 (0.044)	0.044 (0.043)
indes	+	-0.036 (0.072)	-0.043 (0.073)	0.013 (0.051)	0.013 (0.051)	0.068 (0.184)	0.163 (0.168)
Control variables							
lev _{it-1}						0.856*** (0.041)	0.862*** (0.035)
size	+	0.056*** (0.005)	0.057*** (0.005)	0.057*** (0.009)	0.059*** (0.009)	0.018** (0.008)	0.023*** (0.007)
profit	-	-0.993*** (0.073)	-0.994*** (0.073)	-0.628*** (0.046)	-0.629*** (0.045)	-0.593*** (0.108)	-0.579*** (0.108)
tang	+	0.257*** (0.027)	0.255*** (0.027)	0.169*** (0.023)	0.170*** (0.023)	-0.020 (0.079)	-0.076 (0.050)
growth	-	-0.012** (0.005)	-0.011** (0.005)	-0.001 (0.003)	-0.002 (0.003)	-0.026** (0.012)	-0.027** (0.013)
nontaxshd	-	-0.946*** (0.322)	-0.951*** (0.320)	0.000 (0.374)	0.021 (0.375)	0.604 (0.724)	0.600 (0.478)
vol	-	1.080*** (0.140)	1.096*** (0.140)	0.602*** (0.114)	0.603*** (0.112)	-0.362*** (0.116)	-0.171** (0.079)
firmage	+	0.051*** (0.009)	0.047*** (0.009)	0.065*** (0.020)	0.059*** (0.019)	0.021*** (0.008)	0.011 (0.008)
Constant		-0.926*** (0.109)	-0.897*** (0.107)	-0.934*** (0.188)	-0.950*** (0.188)	-0.463 (0.335)	-0.681** (0.301)
Industry dummies		yes	yes	yes	yes	yes	yes
Regional dummies		yes	yes	yes	yes	yes	yes
Year dummies		yes	yes	yes	yes	yes	yes
Firm fixed effects				yes	yes	yes	yes
Observations		8426	8426	8426	8426	6414	6414
R ²		0.312	0.312	0.207	0.208		
adj. R ²		0.310	0.310	0.204	0.206		
F test		65.883	66.020	39.526	39.895	107.067	97.600
P value		0.000	0.000	0.000	0.000	0.000	0.000
Sargan test (p values)						0.339	0.800
m1 (p values)						0.000	0.000
m2 (p values)						0.819	0.685

Notes: Cluster robust standard errors are reported in columns 1- 4 (clustered on firms). Asymptotic standard errors robust to heteroskedasticity are reported in parentheses in column 5-6. For the system GMM regression, AR2 is a test for second-order serial correlation of the differenced residuals, asymptotically distributed as $N(0,1)$ under the null of no serial correlation. The Sargan test (also known as J test) of over-identifying restrictions is distributed as Chi -square under the null of instrument validity. We treat all right-hand side variables except firm age, volatility and dummy variables as potentially endogenous variables. ***, **, and * denote significance levels of 1%, 5% and 10%, respectively. See Table A3.1 for definitions of all variables.

Table 3.6 Robustness checks

	Private	State		Reform
	(1)	(2)	(3)	(4)
Governance variables				
dstmshare	0.189** (0.086)	0.073 (0.626)	0.132 (0.661)	
dstmshare*post_reform				0.114** (0.058)
dstmshare*pre_reform				0.100 (0.097)
lpos	-0.042 (0.031)	0.070** (0.032)		0.027 (0.020)
sos			-0.063** (0.027)	
fcap	-0.150 (0.119)	-0.054 (0.164)	-0.101 (0.172)	-0.201* (0.105)
lnbodsize	0.072 (0.085)	0.067 (0.049)	0.084 (0.051)	0.056 (0.044)
indes	0.260 (0.393)	0.192 (0.157)	0.152 (0.201)	0.189 (0.164)
Control variables				
lev _{it-1}	0.926*** (0.056)	0.819*** (0.050)	0.823*** (0.049)	0.857*** (0.036)
size	0.033** (0.016)	0.020** (0.009)	0.020** (0.009)	0.022*** (0.007)
profit	-0.638*** (0.159)	-0.557*** (0.135)	-0.487*** (0.144)	-0.576*** (0.105)
tang	-0.194 (0.126)	-0.063 (0.067)	-0.027 (0.077)	-0.073 (0.051)
growth	-0.025** (0.013)	-0.022** (0.011)	-0.024* (0.013)	-0.021** (0.010)
nontaxshd	3.787** (1.649)	0.420 (0.851)	-0.033 (0.975)	0.589 (0.481)
vol	-0.310* (0.175)	-0.433*** (0.154)	-0.421** (0.164)	-0.168** (0.078)
firmage	0.017 (0.016)	0.006 (0.012)	0.005 (0.014)	0.015* (0.008)
Constant	1.071* (0.561)	0.699* (0.366)	0.711* (0.401)	0.718** (0.284)
Industry dummies	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes
Observations	2132	4256	4256	6414
F test	55.176	66.556	68.591	93.993
P values	0.000	0.000	0.000	0.000
Sargan test (p values)	0.405	0.566	0.531	0.462
m1 (p values)	0.000	0.000	0.000	0.000
m2 (p values)	0.590	0.752	0.676	0.759

Asymptotic standard errors robust to heteroskedasticity are reported in parentheses. For the system GMM regression, AR2 is a test for second-order serial correlation of the differenced residuals, asymptotically distributed as $N(0,1)$ under the null of no serial correlation. The Sargan test (also known as J test) of over-identifying restrictions is distributed as *Chi-square* under the null of instrument validity. We treat all right-hand side variables except firm age, volatility and dummy variables as potentially endogenous variables. ***, **, and * denote significance levels of 1%, 5% and 10%, respectively. See Table A3.1 for definitions of all variables.

Chapter 4

Debt maturity and the effects of growth opportunities and liquidity risk on leverage: Evidence from Chinese listed companies

4.1. Introduction

Research on capital structure decisions has broadened its scope since the seminal work of Modigliani and Miller (1958). A large number of studies, such as Smith and Watts (1992) and Rajan and Zingales (1995), have focused on a single capital structure decision (the debt/equity choice). Yet, recently, other strands of theoretical and empirical literature on capital structure decisions have focused on various attributes of the debt in firms' capital structure rather than the simple debt-equity choice. One particular attribute that has been widely studied is debt maturity. For example, in his seminal paper, Myers (1977) argues short-term maturity debt can mitigate the suboptimal incentive effects of debt financing, for example the under-investment problem. The 'under-investment' problem arises from the use of high leverage and long term debt. Firms' managers (who act on behalf of shareholders) forego positive net present value projects because a portion or all of the benefits from the project may accrue to debt holders. This conflict of interest between shareholders and debt holders over the exercise of growth options creates considerable agency costs to the firms. Yet, as Myers (1977) argues, when shortening the debt maturity, refinancing occurs or the debt matures before investment options expire, which prevents gains from new projects accruing to debt holders by allowing debt to be re-priced. Firms with greater growth opportunities face greater underinvestment problems. It is, therefore, argued that firms whose investment sets contain more growth opportunities have the incentive to employ a higher proportion of short-term debt. That is, short-term debt is an important mechanism to attenuate the agency problems arising from conflicts of interest between stockholders and bondholders (i.e., underinvestment).

Conversely, according to the liquidity risk hypothesis of Diamond (1991, 1993) and Sharpe (1991), firms with high growth opportunities are expected to suffer from

liquidity risk problems when they choose too much short-term debt in order to reduce the underinvestment problems.

Taken together, firms with a greater liquidity risk problem have an incentive to choose long-term debt, but may still choose lower leverage because the longer maturity increases the cost of underinvestment problems, as suggested by Myers, (1977). On the other hand, the use of too much short-term debt by firms with high growth opportunities is likely to result in the firm facing higher expected bankruptcy costs due to the high risk of liquidity associated with the short-term debt, thus reducing optimal leverage. On balance, considering the two opposing effects of short term debt, firms will trade-off the cost of under-investment problems (i.e., agency cost) against the cost of liquidity risk problems (i.e., bankruptcy cost) in order to reach an optimal maturity structure.

A vast number of early studies have empirically examined the relationship among growth opportunities, leverage and debt maturity separately. For example, studies that examine capital structure decisions (i.e., the debt/equity choice) (Titman and Wessels, 1988; Stulz, 1990; Smith and Watts, 1992; Rajan and Zigales, 1995; Frank and Goyal, 2003, Sun et al.,2015) find a negative relationship between growth opportunities and leverage, while studies based on debt maturity choices find a positive relationship between short-term debt and growth opportunities (or equivalently, a negative relationship between growth opportunities and longer maturity) (e.g., Barclay and Smith, 1995; Guedes and Opler, 1996, Arslan and Karan, 2006; Stephan et al., 2011). The findings of these two sets of papers are consistent with Myers's (1977) prediction that firms with greater growth opportunities face a greater degree of underinvestment problems and thereby tend to lower their leverage and/ or shorten the maturity of their debt.

Following Barclay et al. (2003) and Johnson (2003), the importance of modelling the two major components of a firm's capital structure namely leverage and debt maturity as jointly determined has been well-established in the capital structure literature.⁴⁵ Barclay et al. (2003) mainly focus on the joint determination of leverage

⁴⁵ That is, while they include leverage as an endogenous variable on the right-hand side of their debt-maturity equation, they include debt-maturity as an endogenous variable on the right-hand side of the leverage equation.

and maturity, as well as on the effect of growth opportunities on leverage and debt maturity. Johnson (2003) extends this work by empirically testing both predictions that short-maturity debt can mitigate the negative effect of high growth opportunities on leverage (Myers, 1997 and Hart & Moore, 1995), on the one hand, and it increases liquidity risk (Diamond, 1991, 1993 and Sharpe, 1991), on the other.⁴⁶ Using a large sample of 20,565 Compustat firm-year observations over the period 1986 to 1995, Johnson (2003) finds that although leverage is negatively associated with growth opportunities, shortening debt maturity helps attenuate the negative effect of growth opportunities on leverage. Yet, his other finding that there is a significant negative relationship between short-term debt and leverage provides support to the liquidity risk hypothesis. His study thus provides evidence for both attenuation effects and liquidity risk effects of short-term debt for US firms. Based on these findings, the author concludes that the use of short-term debt does not completely eliminate the negative effect of growth opportunities on leverage due to the liquidity risk inherent in it, leading to a less than optimal level of total leverage. In other words, when combining both effects together, his results show that the negative direct effect is greater (i.e., increased liquidity risk) than the positive effects (i.e., reduced under investment problem). As a result, the net effect on leverage is negative.

China has a unique institutional environment where state still retains considerable ownership and control not only in business firms but also in banks; bond market is still very small compared to its huge banking sector; legal system has not well been developed. As discussed in Cai et al., (2008) and Firth et al. (2008), the opening up of China's economy and the adoption of capital market principles have presented many investment opportunities for its listed firms and thus Chinese investors have higher expectations regarding their future prospects. Furthermore, there is a high level of information asymmetry; Chinese firms are more likely to face asymmetric information problems over their investment opportunities. Furthermore, even after considerable development in the commercial bank lending environment in China

⁴⁶ Billett et al. (2007) also extend this work by examining how the types of restrictive covenants in the debt indentures affect the negative effect of growth opportunities on leverage. They find that restrictive covenants (i.e., protection from the covenants) act as a substitute to short-term debt in controlling stockholder-bondholder conflicts over the exercise of growth options and thus, significantly attenuate the negative effect of growth opportunities on leverage.

(Firth et al., 2009; Tsai et al., 2014), short-term debt still accounts for more than 80% of the total debt of listed firms.

China, therefore, provides an interesting context to examine the interaction between growth opportunities, and leverage and maturity choices of firms in an institutional environment that is different from Western countries where these interactions have already been tested.

In the Chinese context, some empirical studies that have examined the determinants of leverage, debt maturity and linkages between leverage and investment provide empirical evidence suggesting that Chinese listed firms face underinvestment problem, by showing a negative relationship between growth opportunities and leverage (Zou and Xiao, 2006; Haung and Song, 2006; Moosa et al., 2011) and a negative relationship between leverage and investment (Firth et al., 2008). However, they do not focus on the attenuation effect of short-term debt. In this study, using a framework similar to Johnson (2003), we extend this literature to China, a largest emerging market with a unique institutional background, by examining how the attenuation and liquidity risk effects of short-debt maturity simultaneously affect leverage. Thus, our study fills an important gap in the literature.

Using a large panel of 7860 non-financial Chinese listed firms over the period 2003 to 2010, we will estimate the full capital structure decisions of firms by estimating leverage and maturity equations simultaneously, using the system GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). Unlike Barclay et al. (2003) and Johnson (2003),⁴⁷ the use of the system GMM estimator enable us to control for the high level of persistency observed in the capital structure decisions (Graham et al., 2008; Denis, 2012) in addition to accounting for the presence of unobservable fixed effects and endogeneity of all regressors.

We find a negative relationship between growth opportunities and leverage. Also consistent with our expectation and prior empirical work, we find a positive relationship between the proportion of short-term debt and growth opportunities. We

⁴⁷ Barclay et al. (2003) and Johnson (2003) estimate the two equations simultaneously by using two-stage least squares.

also find that the coefficient on growth opportunities interacted with short-term debt is significantly positive in the leverage equation, suggesting that the proportion of short-term debt attenuates the negative effect of growth opportunities on leverage. Additionally, we also report that short-term debt is negatively related to leverage, suggesting that firms with a higher leverage ratio prefer a longer maturity of debt in order to avoid the liquidity risk problems associated with short-term debt. However, our analysis indicates that the economic implication of liquidity risk effect is much lower for Chinese firms than that observed in the literature for US firms. Our study suggests that these differences can be explained by differences in the institutional environment in which firms operate. This new finding related to Diamond's (1991) liquidity risk hypothesis extends our understanding of the relationship between liquidity risk and the debt maturity choice.

The remainder of the chapter is organized as follows. Section 2 discusses the relevant theories, and reviews the related empirical studies on debt maturity structure. In section 3, we develop testable hypotheses. In Section 4 we discuss the research methodology used to analyse the data. Section 5 describes our data and presents some descriptive statistics. Section 6 discusses our main empirical results. Section 7 provides conclusions.

4.2. Review of the literature

In this section, we provide a review of relevant theories and previous empirical studies on the debt maturity choices, estimating a single debt maturity equation as well as adopting a simultaneous equation approach.

4.2.1 Review of relevant theories

We focus on two major relevant theories which are used to explain the rationale behind the use of debt maturity in the capital structure, namely, the agency theory and liquidity risk hypothesis

4.2.1.1 The agency theory

As Jensen and Meckling (1976) and Myers (1977) argue, when firm's investment opportunities are financed by risky debt, the benefits from undertaking positive NPV projects accrue, at least partially, to the creditors rather than accruing fully to the shareholders. For example, if firms are, in some circumstances, likely to go bankrupt in the near future, equity holders do not have the incentive to contribute new capital because bondholders may capture a large portion of the returns if firms undertake profitable investment projects (the debt overhang problem). In this situation, firms' managers have the incentive to forego positive net present value project. This is known as the underinvestment problem. Myers (1977) suggests that these sub-optimal incentive effects of debt financing associated with high growth options can be control in two ways.⁴⁸ The first is using a lower level of leverage in the capital structure. Therefore, firms with greater growth opportunities are likely to use a lower than optimal level of leverage. The second is by shortening the maturity of debt. Specifically, he notes that if the debt matures before the investment options expire, gains from profitable investment projects do not accrue to debt holders, eliminating therefore the underinvestment problem. This theory predicts a negative relationship between leverage and growth opportunities, on the one hand, and a positive relationship between growth opportunities and short-term debt, on the other.

4.2.1.2 The liquidity risk hypothesis

Diamond (1991) point out that the optimal debt maturity is reached by trading off between the benefit of short-term debt and liquidity risk. Given the information asymmetry between insiders and lenders, short-term debt helps to reduce borrowing costs when a firm receives good news and the debt is refinanced. Further short-term debt reduces underinvestment problem of growth opportunities. However, short-term debt exposes the firm to liquidity risk: if a firm defaults in its obligation, control rents are very high (control of the firm is transferred to creditors) (Diamond, 1991) and refinancing costs (denial of refinancing), (Flannery, 1986). The implications of the liquidity risk argument are twofold.⁴⁹ First, the use of too much

⁴⁸ Debt covenants provide another way to control for the underinvestment problem. In a recent empirical study, Billett et al. (2007) show that protective covenants are increasing in growth opportunities.

⁴⁹ Liquidity risk is a financial risk that a firm may be unable to meet short term financial demands. This usually arises from the difficulty or the inability to convert a security or hard asset to cash.

short-term debt by firms creates liquidity risk problems, thereby increasing bankruptcy costs (Diamond, 1991 and 1993). Therefore, the relationship between growth opportunities and short-term debt is determined by the trade-off between the cost of underinvestment problems (i.e. agency cost) and the cost of liquidity risk problems (i.e. bankruptcy cost). Second, firms with higher leverage attempt to avoid liquidity risk by lengthening their maturity (Diamond, 1991 and 1993; Sharpe, 1991). Leland and Toft (1996) theoretically show that the leverage level relies on the debt maturity: firms with a higher leverage ratio tend to choose longer maturity of their debt and vice versa. Thus, the theory predicts a negative relationship between leverage and short-term debt. Stohs and Mauer (1996) recommend controlling for leverage when testing the effect of liquidity risk on debt maturity

In sum, while the agency theory (Myers, 1977) supports the use of short-term debt in order to control under-investment problems, the liquidity hypothesis (Diamond, 1991 and 1993; Sharpe, 1991) supports the use of long-term debt so as to avoid the liquidity risk associated with short-term debt when firms have higher leverage level.

4.2.2 Review of related empirical studies

4.2.2.1 Prior evidence on the relationship between debt maturity and growth opportunities.

Most early empirical studies have focused on debt maturity choices of US firms (Barclay and Smith, 1995; Guedes and Opler, 1996; Stohs and Mauer, 1996). For example, utilizing a large panel of 37979 firm-year observations over the period 1974 to 1992, Barclay and Smith (1995) examine the determinants of debt maturity structure. They find evidence that firms with fewer growth opportunities use larger proportions of long-term debt in their capital structures, while firms with high growth opportunities prefer short-term debt.

Using a panel of 328 industrial firms from Compustat industrial annual files over the period 1980 to 1989, Stohs and Mauer (1996) find a positive relationship between

growth opportunities and long term leverage when they include leverage as an independent variable in the regression. However, when they drop leverage from their regression, they find a negative relationship between growth opportunities and leverage⁵⁰. They also find that asset maturity has a positive impact on long-term debt. This result is consistent with the matching principle, according to which firms match their debt maturity to their assets maturity, in order to control for the risk and cost of financial distress. The authors also find that earnings volatility and firm quality are negatively related to long-term debt, and that firms with greater leverage use more long-term debt, suggesting that the optimal leverage and debt maturity structure are determined simultaneously.

Using a sample of 7,369 debt issues by US-based corporations over the period 1982 to 1993, Guedes and Opler (1996) find that firms with high growth opportunities tend to issue more short-term debt. Furthermore, they find that firm size and asset maturity are positively related to long-term debt.

Researchers have also focused on the determinations of debt maturity structure in Western Europe. They have also shed light on the dynamic nature of adjustment of corporate maturity structure using GMM estimation procedures. For example, Ozkan (2000) uses an unbalanced panel of 4624 firm year observations over the period 1982 to 1996 to investigate the determinants of debt maturity structure among UK firms, in addition to the speed of adjustment towards the target debt maturity. He finds a negative relationship between growth opportunities and long-term debt, which he explains considering that the firms face severe asymmetric information problems. He also finds that firm size is positively related to debt maturity, suggesting that large firms are less likely to face severe agency problems and can easily access to the capital market. His results also show that asset maturity of firms has a positive effect on their maturity structure, implying that firms match the maturity of their assets and liabilities, consistent with the prediction of the matching theory.

⁵⁰ As Baclay et al. (1997) notes, Stohs and Mauer's (1996) estimates are potentially biased and inconsistent since they include both a leverage measure (an endogenous variable) and a growth opportunity measure as independent variables in their regressions without accounting for potential endogeneity.

Using cross sectional data for 3153 UK firms, 1253 French firms, and 1590 German firms over the periods 1969 to 2000, 1983-2000 and 1987-2000, respectively, Antoniou et al. (2006) report that each country's firms' maturity structure is determined by firm-specific factors, as well as by the country's financial systems and macroeconomic factors (institutional traditions) in which they operate. Their results show that most of the factors identified in the literature as determinants of debt maturity structure are found to be also significant in the case of UK firms. Moreover, their dynamic results show that the adjustment speed of French firms (56%) is faster than that of the UK and German firms.⁵¹ Overall, their results provide evidence in support of the fact that firms in three major European countries adjust their maturity structure towards their optimal level.

In the context of developing countries, Booth et al. (2001) analyse data from ten emerging economies between 1980 and 1991 and find that, unlike Western countries, most of the emerging countries choose short-term debt since capital markets are not well developed in most of these economies. In a similar vein, Demirgüç-Kunt and Maksimovic (1999) use a larger data set (9,649 non-financial firms from 30 developed and developing countries) over the period 1980 to 1991 to study the choices of debt maturity structure. They find that there are many similarities in the determinants of firms' debt maturity choices across developed and developing markets. Moreover, they show that firms (especially small ones) are prone to rely on short-term debt. They argue, following Diamond (1991, 1993) and Rajan (1992), that in the developing countries where financial and legal systems are inefficient or costly to use, short-term debt is more likely to be employed than long-term debt.

Using a cross sectional sample of 1726 Thai firms, 2493 Malaysian firms, 1164 Singaporean firms, and 809 Australian firms over the period 1993 to 2001, Deesomsak et al. (2009) find that firms operating in these regions have a target optimal debt maturity structure, and their maturity structure decisions are driven by both their own characteristics and the economic environment. Moreover, they point out that the financial crisis of 1997 has had a significant effect on firms' debt maturity structure and their determinants. Furthermore, leverage, firm size, liquidity

⁵¹ They report adjustment speeds of 52% and 34% for German and British firms respectively.

and asset maturity are positively related to long-term debt while earnings volatility is negatively related to long-term debt.

Cai et al. (2008) use a panel made up of 1554 firm year observations over the period 1999 to 2004 to examine the determinants of debt maturity structure of Chinese listed firms. Using the system Generalised Method of Moments (GMM) estimator to control for the endogeneity of the regressors, they find that firm size and assets maturity are positively related to long-term debt, which is consistent with the predictions of agency and matching theories, respectively. Growth opportunities have a positive but insignificant impact on debt maturity choices (long term debt). Furthermore, they find that ownership concentration does not affect debt maturity choices. However, they neither account for the persistency in the capital structure choices nor for the dynamics of firms' debt maturity decisions.

To the best of our knowledge, so far, Cai et al. (2008) is the only study that focuses on the determinants of the debt maturity choices of Chinese listed companies in a static framework.

4.2.2.2 Prior evidence on the relationship between leverage, debt maturity and growth opportunities based on studies that focus on the joint determination of leverage and debt maturity

While early empirical studies have focused on explaining a single facet of financial policy choices, recent studies have focused on the joint determination of debt and maturity. Using a sample of 5765 industrial firms in the US over the period 1980 to 1999, Barclay et al. (2003) focus on the effect of growth opportunities on capital structure decisions and on the joint determination of leverage and debt maturity in a system of simultaneous equations. In both the leverage and maturity regressions, they find a negative relationship between growth opportunities and leverage, and growth opportunities and long-term debt. These results are consistent with Myer's (1977) prediction that firms with greater growth opportunities face a greater degree of underinvestment, and thereby tend to lower their leverage and/ or shorten the maturity of their debt. In the leverage regression, they find that profitability is negatively related to leverage, while tangibility is positively related to leverage. These results are consistent with the pecking-order theory and the trade-off theory,

respectively. In their maturity regression, firm size and asset maturity are positively related to long-term leverage.

Focusing on a large sample of 20,565 Compustat firm-year observations over the period 1986 to 1995, Johnson (2003) finds a negative relationship between growth opportunities and leverage in his leverage regression, in his pooled OLS and fixed effects regressions. More importantly, he finds evidence that shortening debt maturity attenuates the negative effect of growth opportunities on leverage.⁵² Moreover, he finds a negative relationship between stand-alone short-term debt and leverage, consistent with the liquidity risk hypothesis (Diamond, 1991, 1993 and Sharpe, 1991). Furthermore, in his maturity equation, he finds a negative relationship between asset maturity and short-term debt, which is consistent with Myers's (1977) prediction that firms match the maturity of their assets with their liabilities in order to reduce underinvestment problems. Johnson (2003) also finds that firm size and its squared term are negatively and positively related to short-term debt, respectively. These results are consistent with Diamond's (1991) prediction that there is a positive and negative relationship between firm size and long-term debt and its squared term and long-term debt, respectively.

Extending the work of Johnson (2003), Billett et al. (2007) examine the effect of growth opportunities on firms' joint choice of leverage, debt maturity and debt covenants in a system of simultaneous equations using the system GMM estimator. Using a panel data set of 7016 Compustat firm-year observations over the period 1989 to 2002, they find a negative relationship between leverage and growth opportunities. They also report that while short-term debt attenuates the negative effect of growth opportunities on leverage for their sub-sample of non-investment grade firms (which are more likely to face asymmetric information problems over their investment opportunities). Additionally, they also report that while debt covenants attenuates the negative effect of growth opportunities on leverage, short-term debt and restrictive covenants are substitute mechanisms in mitigating the agency conflict between stockholders and debtholders over the exercise of growth options. Moreover, Billett et al. (2007) do not find support for the liquidity risk

⁵² He includes an interaction term (i.e. growth opportunities * the proportion of short-term debt in total debt) in his leverage equation.

hypothesis since all of the firms used in their sample are rated firms. These results are also consistent with Johnson's (2003) findings for the rated firms in his sample. Rated firms are likely to have higher credit quality and also likely to face fewer constraints on extending maturity than unrated firms. As such the liquidity risk effect on leverage is only relevant for lower credit quality firms (i.e. unrated firms) and firms that cannot easily lengthen their maturity.⁵³

In a similar vein, using a sample of 4170 firm-year observations over the period 1996 to 2003, Dang (2011) examines the effects of growth opportunities on leverage and debt maturity among UK firms, as well as the speed of adjustment towards the target debt maturity. Using the GMM estimator, he finds a negative relationship between leverage and growth opportunities in the leverage regression. Moreover, he finds a positive relationship between long-term debt and leverage. This finding is consistent with the liquidity risk hypothesis, suggesting that firms with long-term debt face a lower liquidity risk problem and, thus, are able to use more leverage. Furthermore, they find that profitability is negatively related to leverage, whereas tangibility is positively related to leverage. In his maturity regression, firm size and the tax rate are positively related to long-term debt, whilst growth opportunities do not have a negative impact on long-term debt. Therefore, his results suggest that high-growth firms in his sample deal with the underinvestment problem by reducing leverage but not by shortening their debt maturity.

4.2.3 Our contribution

This paper contributes to the existing literature in several ways. First, to the best of our knowledge, our paper is the first to empirically examine whether the short maturity of debt can attenuate the negative effect of growth opportunities on leverage in the context of emerging markets, particularly in China, which is the largest emerging economy in the world.

Second, our study provides a useful extension to Diamond's (1991) liquidity risk theory of debt maturity. While Diamond's (1991) proposition show that debt maturity increases with the liquidity risk of the firm, we show how institutional

⁵³ Unrated firms mostly rely on banks and non-bank private debt, both of which have shorter average maturity.

differences (such as state ownership of firms) influence the liquidity risk faced by the firms. To this end, we split our sample into state and privately controlled firms and test liquidity risk effect of short-term debt for these firms separately exploiting China's unique institutional environment where state-owned enterprises (SOEs) and non-SOEs co-exist.

Our third contribution is methodological. Following Barclay et al. (2003) and Johnson (2003), we treat leverage and debt maturity as jointly endogenous variables. However, unlike these studies, we use the system GMM estimator (Blundell and Bond, 1998) to control for the presence of potential endogeneity of all regressors. This is important considering that, for example, a vast number of studies show profitability as an important determinant of leverage, whilst others show that leverage itself affect profitability (e.g., Jensen and Meckling, 1976; Abor, 2005; Berger et al., 2009; Margaritis, Maria Psillaki, 2010). Furthermore, for the first time, we provide empirical evidence on the attenuation effect of short-term debt in a dynamic framework. Previous empirical studies by Johnson (2003) and Billett et al. (2007) are in fact based on a static framework and, thus fail to shed light on the dynamic nature of firms' capital structure and to control for persistency in the capital structure decisions (Lemmon et al., 2008; Denis et al., 2012).

4.3. Hypotheses

In this section, we develop hypotheses based on relevant theories and previous empirical studies.

4.3.1 Leverage and growth opportunities

Agency arguments suggest that although debt financing can mitigate conflicts of interest between managers and shareholders, i.e., agency costs of equity, it may create conflicts of interest between shareholders and bondholders, i.e., agency costs of debt (Jensen and Meckling, 1976; Myers, 1977; Jensen, 1986). Myers (1977) argues that when managers in a firm with risky debt outstanding act in the interest of equity holders to maximize the value of equity rather than total firm value, they have incentives to sub-optimally invest in future growth opportunities. More specially, Myers (1977) argues that managers of highly levered firms may be induced to reject

positive net present value projects because a portion of the benefits of the project would accrue to debt holders. The loss in firm value from these suboptimal investment decisions and the cost of contracting mechanisms (e.g. short-term debt or debt covenants) that the firm uses to mitigate stockholder–bondholder conflicts account for considerable agency cost of debt. In the absence of mechanisms to control these conflicts between stockholders and bondholders, rational bond holders anticipate conflicts and thus require a higher premium for debt financing. Therefore, in order to mitigate or avoid potential conflicts over the exercise of future growth options altogether, the firm may resort to using less debt financing. Thus, agency arguments predict that there should be a negative relationship between growth opportunities and leverage. A large number of empirical studies provide empirical support for this theoretical prediction (Smith and Watts, 1992; Rajan and Zingales, 1995; Brailsford et al., 2002; Frank and Goyal, 2003; Florackis and Ozkan, 2009; Sun et al., 2015). Previous research on Chinese financial markets suggests that, the opening up of China’s economy and the adoption of capital market principles has presented many investment opportunities for its listed firms and thus Chinese investors have higher expectations regarding their future prospects (Cai et al., 2008; Firth et al., 2008). Therefore, Chinese listed firms with high growth options are likely to face conflicts of interest between shareholders and debtholders. In line with this, using data from Chinese listed firms, Zou and Xiao (2006), Haung and Song (2006), and Moosa et al. (2011) find a negative relationship between leverage and growth opportunities. In line with these findings, we hypothesize that:

H1: There is a significant negative relationship between leverage and growth opportunities (in the leverage equation)

4.3.2 Debt maturity (the proportion of short-term debt in total debt) and growth opportunities

Myers (1977) shows that conflicts between stockholder and bondholders over the exercise of growth opportunities can be controlled for by the use of a shorter maturity of debt in the capital structure. Thus, his theory suggests a positive relationship between growth opportunities and the proportion of short-term debt in

total debt. Childs et al. (2005) also show that short-term debt can mitigate the sub-optimal investment effects of debt financing, by making the debt less sensitive to changes in firm value and by allowing for more frequent re-pricing of debt.

A positive relationship between growth opportunities and the use of short-term debt (or equivalently, a negative relationship between growth opportunities and longer maturity) has been observed in several empirical studies from developed countries (for example, Barclay and Smith, 1995; Guedes and Opler, 1996; Ozkan, 2000; Barclay et al. 2003; Datta et al., 2005; Guney and Ozkan, 2005) as well as from emerging economies (for example, García-Teruel and Martínez-Solano, 2010; Stephan et al. 2011).

Only a handful of papers have examined attenuation effect of short-term debt. Based on a large panel of 20,565 US firm-year observations over the period 1986 to 1995, Johnson (2003) argues and provides empirical evidence suggesting that while growth opportunities have a negative direct effect on leverage, the use of short-term debt attenuates this negative effect. Billett et al. (2007) confirm Johnson's (2003) findings by using a sub-sample of non-investment grade firms. In this line, we hypothesise that:

H₂: There is a significant positive relationship between leverage and growth opportunities interacted with short-term debt (in the leverage equation).

H₃: There is a significant positive relationship between growth opportunities and the proportion of short-term debt (in the maturity equation)

4.3.3 Debt maturity (the proportion of short-term debt in total debt) and liquidity risk

According to the liquidity risk hypothesis, firms with higher leverage ratio tend to choose longer maturity of their debt in order to avoid liquidity risk problems (Diamond, 1991 and 1993; Sharpe, 1991). Therefore, the theory predicts a negative relationship between leverage and the proportion of short-term debt in total debt.

Most of the previous empirical studies from developed and developing countries (e.g. Barclay and Smith, 1995; Stohs and Mauer, 1996; Datta et al., 2005; Antoniou et al., 2006; García-Teruel and Martínez-Solano, 2010; Stephan et al. 2011) report a positive relationship between leverage and long-term debt (equivalently, a negative relationship between the proportion of short-term debt and leverage).

In the context of China, prior research reports evidence that Chinese firms largely rely on short-term debt for their external financing needs (Cai et al., 2008; Du et al., 2013) suggesting that these firms face greater rollover risk/liquidity risk than their Western counterparts.⁵⁴ Cai et al. (2008) provide empirical evidence that leverage is positively associated with maturity (long term debt). We thus hypothesize that

H₄: There is a significant negative relationship between leverage and the proportion of short-term debt (in both leverage and maturity equations)

4.4. Baseline specifications and estimation methodology

In this section, we first present our model specifications and then discuss our estimation methodologies

4.4.1 Baseline specifications

Following Barclay et al. (2003) and Johnson (2003), we estimate two models namely a leverage equation and a maturity equation.

4.4.1.1 Leverage equation

In order to test our hypotheses, we estimate the following equation:

⁵⁴ As in the previous literature (i.e., Johnson, 2003; Billett et al., 2007), the negative relationship between leverage and the proportion of short-term debt is interpreted as our sample firms face liquidity risk.

$$\begin{aligned}
tle_{it} = & \beta_0 + (\beta_1 tle_{it-1}) + \beta_2 prop_stlev_{it} + \beta_3 growth_{it} + (\beta_4 growth_{it} * prop_stlev_{it}) + \\
& \beta_5 tang_{it} + \beta_6 profit_{it} + \beta_7 size_{it} + \beta_8 vol_{it} + \beta_9 nontaxshd_{it} + \\
& \beta_{10} firmage_{it} + v_i + v_t + v_j + v_k + e_{it}
\end{aligned} \tag{4.1}$$

where i indexes firms, and t years. The terms v_i , v_t , v_j , and v_k represent respectively a time-invariant firm specific fixed effect, a time-specific effect, an industry-specific effect, and a region-specific effect. e_{it} is a random/ idiosyncratic error term.

On the left hand side of equation (4.1), our dependent variable is the leverage ratio of firm i in year t (defined as the ratio of the book value of total debt to the book value of the firm's total assets). On the right hand side, we include a stand-alone measure of debt maturity– the proportion of short term debt in total debt ($prop_stlev$). According to Hypothesis (H4), we expect a negative relationship between leverage and short term debt ($prop_stlev$).

We measure growth opportunities (Q) as the ratio of the sum of the market value of equity and the book value of debt to the book value of total assets. According to Hypothesis 1, we expect to observe a negative relationship between leverage and growth opportunities (Q). Following Johnson (2003), we include an interaction term between growth opportunities and the proportion of short-term debt ($growth * prop_stlev$) in the leverage equation. The interaction term makes the effect of growth opportunities on leverage conditional on the maturity structure of a firm's leverage, and thus allows testing whether a short debt maturity attenuates the negative relationship between growth opportunities and leverage (attenuation effects). In line with Hypothesis 2, we expect to observe a positive relationship between leverage and this interaction term ($growth * prop_stlev$).

Turning to the control variable, as in the previous literature, we include in the leverage equation firm size, profitability, tangibility, volatility and non-debt tax shield and firm age as control variables. These control variables are the same as in the previous Chapter (Chapter-3) and defined in Table A3. We have already discussed theories and the prior evidence related to these control variables and the expected signs of all these variables in the previous Chapter (see section 3.5.1) These control

variables are motivated mainly by the empirical findings of Berger et al. (1997), Barclay et al. (2003), Johnson (2003) and Frank and Goyal (2009), among others. Following Johnson (2003) and Ghosh et al. (2011), we exclude firm size squared and asset maturity from the leverage equations because capital structure theories suggest that these variables only influence the debt maturity structure.

Lemmon et al. (2008) provide strong evidence that firm-specific unobservable fixed characteristics (v_i) have a significant impact on firms' capital structure decisions. They vary across firms but are assumed to remain constant for each firm through time. They include factors such as quality of management and managers' attitudes towards risk. On the other hand, time-specific effects (v_t) which are controlled for by including year dummies vary through time but are the same for all the firms at a given point in time. They capture macroeconomic factors such as changes in interest rates, inflation and business cycle effects that are outside the control of firms. Additionally, we include industry and regional dummies to control for industry-specific and geographic fixed effects.

Since recent studies emphasize that capital structure decisions are more likely to be highly persistent due to adjustment costs and other market imperfections (e.g. Antoniou et al., 2008; Lemmon et al., 2008; Florackis and Ozkan, 2009), we also estimate the dynamic equation with a lagged dependent variable ($\beta_1 \text{tlev}_{it-1}$). In Equation (4.1) we include the lagged dependent variable amongst other variables to capture the dynamic feedback effects in the capital structure decisions (Antoniou et al., 2008).

4.4.1.2 Debt maturity equation

Following Johnson (2003), to test the effects of leverage and other independent variables on the maturity structure of the Chinese listed firms, we estimate the following maturity equation (a static and dynamic models):

$$\text{prop_stlev}_{it} = \beta_0 + (\beta_1 \text{prop_stlev}_{it-1}) + \beta_2 \text{tlev}_{it} + \beta_3 \text{growth}_{it} + \beta_4 \text{assetmat}_{it} + \beta_5 \text{size}_{it} + \beta_6 (\text{size}_{it})^2 + \beta_7 \text{vol}_{it} + \beta_8 \text{nontaxshd}_{it} + \beta_9 \text{firmage}_{it} + v_i + v_t + v_j + v_k + e_{it}. \quad (4.2)$$

where i indexes firms, and t years. The term v_i , v_t , v_j , and v_k represent respectively time-invariant firm specific fixed effects, time-specific effects, industry effects, and regional effects. e_{it} is a random/ idiosyncratic error term.

On the left hand side of the maturity equation (Eq.4.2), our dependent variable is the debt maturity. Following Baum et al. (2007), Marchica (2008) and Stephan et al. (2011), we define debt maturity as the proportion of total debt that matures within one year. On the right hand side, we include leverage, asset maturity, firm size and its squared term, volatility, non-tax shield and firm age. These variables are motivated by the predictions of theoretical models of debt maturity and the empirical findings of Johnson (2003) and Barclay and Smith (1995), among others. In addition, in the maturity equation, unobservable firm-specific fixed effects, firm-invariant time-specific effects, the regional and industry effects are controlled for by including dummy variables.

Recent studies, for example, Ozkan, (2002), Antoniou et al. (2006); Marchica (2008); Denis (2012) emphasize that debt maturity decisions are more likely to be highly persistent due to the adjustment costs and other market imperfections. We thus extend previous empirical models on determination of maturity structure choices (Barclay and Smith, 1995; Johnson, 2003; Billett et al., 2007) in the context of China by estimating the dynamic equation. In the maturity equation (4.2), we include the lagged short-term debt to control for the dynamic effects of debt maturity.

The use of a dynamic modelling strategy considers the fact that firms do have target maturity ratios in their maturity structure decisions and that it may take time to reach target maturity following changes in standard financial characteristics or random economic shocks, due to adjustment and other costs (Ozkan, 2000; Antoniou et al., 2006). Therefore, firms make a partial adjustment towards the desired maturity ratio (Ozkan, 2000; Antoniou et al., 2006; Marchica 2008). Firm's speed of adjustment towards its target maturity ratio is calculated by one minus the value of the coefficient of lagged dependent variable ($1-\beta_1$). A value of 0 indicates that there is no adjustment at all towards the target maturity structure, and a value of 1 indicates that there is an instantaneous adjustment. Our dynamic specification assumes that the

speed of adjustment depends on the parameter β_1 which gives the fraction of the desired change [i.e. $prop_stlev_{it} - prop_stlev_{i(t-1)} = \beta_1(prop_stlev_{it}^* - prop_stlev_{i(t-1)})$] that managers can achieve.⁵⁵

4.4.1.2.1 Independent variables

Following previous studies (Johnson, 2003; Barclay and Smith, 1995; among others), we use several important variables as independent variables in the maturity equation.

4.4.2.1 Firm size

Following Johnson (2003), Barclay et al. (2003) and Datta et al. (2005), we use firm size (measured by the natural logarithm of total assets) and its square as proxies for credit quality or liquidity risk. Diamond (1991) argues and finds an increasing, then decreasing relationship between credit quality and debt maturity (measured by proportion of long term debt in total debt). This suggests that a short maturity of debt should be positively and negatively related to firm size and its squared term, respectively. The main reason behind this non-linear relationship is that larger firms are more diversified and have lower bankruptcy risk and thus are able to use more rolling debt. More recently, Johnson (2003) provides empirical evidence supporting Diamond's (1991) increasing, and decreasing relationship between credit quality (measured by firm size) and debt maturity. In line with his findings, we also expect to observe a non-linear (U-shaped) relationship between firm size and the proportion of short-term debt for Chinese listed firms.

4.4.2.3 Asset maturity

According to the matching principle, firms match the maturity of their liabilities to that of their assets in order to control for potential risk and cost of financial distress. Thus, firms with longer lived assets are expected to have longer debt maturity, whereas firms with shorter lived assets expected to have shorter debt maturity. As discussed in Stohs and Mauer (1996), on the one hand, when debt has a shorter

⁵⁵ $prop_stlev_{it}$ is the actual proportion of short-term debt in total debt of firm i at time t , $prop_stlev_{it}^*$ is the target value of the proportion of short-term, and $(prop_stlev_{it}^* - prop_stlev_{i(t-1)})$ is the desired change in proportion of short-term debt (debt maturity).

maturity than assets, the firms may not have sufficient cash to pay their debt obligations when they fall due. On the other hand, if the maturity of debt is longer than that of assets, firms would have remaining debt obligations to meet. Therefore, firms should match their debt maturity to their assets maturity. Furthermore, Myers (1977) argues that the underinvestment problem can be eliminated by matching the maturity of firm's debt to that of its assets. These arguments suggest that there should be a negative relationship between asset maturity and short-term debt.

Previous empirical finding on corporate debt maturity structure for the US (Guedes and Opler, 1996), Western Europe (Antoniou et al. 2006; Ozkan, 2000), the Asia Pacific region (Deesomsak et al., 2009) and China (Cai et al., 2008) find a positive relationship between asset maturity and long-term debt. Therefore, equivalently, we expect a negative relationship between asset maturity and the proportion of short-term debt. Following Ozkan (2000) and Marchica (2008), we define the ratio of net fixed assets (include land and buildings, plant and machinery, and other fixed assets) to annual depreciation expenses as a proxy for the asset maturity (*assetmat*).

4.4.2.4 Volatility in earnings

Firms with more volatility in earnings may have difficulty to repay debt. Thus, firms with high earning volatility prefer a longer debt maturity in order to avoid frequent re-balancing of their capital structure (Johnson, 2003). This suggests the presence of a negative relationship between earnings volatility and short-term debt.

Previous empirical studies (Johnson, 2003; Marchica, 2008) find a negative relationship between earnings volatility and short-term debt. Therefore, we also expect to observe a negative relationship between volatility and the proportion of short-term debt in total debt. Following Johnson, (2003) and Marchica (2008), we measure earnings volatility (*vol*) as the standard deviation of the first differences of earnings before taxes and depreciation over the four years preceding the sample year, divided by average total assets for that period.

4.4.2.5 Non-debt tax shield

The tax hypothesis analyses the tax implications of the debt maturity choices. In their model, Brick and Ravid (1985) demonstrate that if the term structure of interest rates increases, the firm will issue long-term debt, since the interest tax shield on debt is accelerated with interest rates which increase the value of the firm. Following Johnson (2003) and Saretta and Tookes (2013), we use non-tax shield (*notaxshd*) as a proxy for an alternative tax shield⁵⁶, which is defined as depreciation scaled by the total assets. Availability of alternative tax shields can reduce the value of long-term debt, if a firm expects to raise its value by issuing long-term debt. Therefore, we expect to observe a positive relationship between short-term debt and our proxy for alternative tax shield (i.e. the non-debt tax shield).

4.4.2.6 Firm age

Firm age is often used as a proxy for credit rating and reputation. On the ground of agency theory, Du et al. (2013) suggest that the older firms are likely to use more long-term debt since these firms face less asymmetric information compared to younger ones, *ceteris paribus*. Using a large panel of data of Chinese SMEs, they find that firm age is positively related to long-term debt. In this line, we expect to observe a negative relationship between firm age and the proportion of short-term debt in total debt. In this study, firm age (*firmage*) is measured by the natural logarithm of firm age.

4.4.3 Estimation methodology

Using the OLS estimator can lead to biased coefficient estimate for our right hand variables because firms' financial policy choices (e.g. the level of debt and the maturity) are likely to be jointly determined as a function of firm characteristics and the contracting environment (Billett et al., 2007). For example, Barclay et al (1997 and 2003) show that leverage and debt maturity are endogenously chosen complements. Given the endogeneity issue, the coefficient on the maturity variable and any related interaction terms in the leverage equation obtained using OLS could be biased and inconsistent. Therefore, to account for the endogenous choice of

⁵⁶ In our empirical analysis, using the effective tax rate (which is defined as the total tax charged divided by pre-tax profit) significantly reduces the sample size due to a large number of missing observations. This is why we include the alternative tax shield in our equation.

leverage and maturity, we use the system GMM estimator to estimate the models of leverage and maturity. We treat only firm age, volatility and the dummy variables (i.e., year, industry and regional dummies) as exogenous. Please see section 3.5.2 (Chapter 3) for a detailed discussion on the GMM estimator.

4.5. Data and descriptive statistics

In this section, we describe the dataset and sample that is used in our study and provide a discussion on summary statistics and correlation analysis of our variables.

4.5.1 Data and sample selection

Our sample includes all the publicly held firms that have been listed on the Shanghai and Shenzhen stock exchanges over the period of 2003 to 2010. Data are collected from the China Stock Market and Accounting Research database (CSMAR) and Sino-fin. Following the literature, we first delete firms in financial industries since their capital structure is subject to many regulations. We then remove outliers (i.e. extreme observations below the 1st and above the 99th percentile) for all regression variables. In the system GMM, since we lag all the right hand side variables twice or more to obtain suitable instruments, 7860 firm year observations are used in estimation. This sample is an unbalanced panel

4.5.2. Summary statistics

Table 4.1 provides summary statistics for the main variables used in this study for the full sample of firms, as well as for state- and privately-controlled firms. The average (median) leverage to total assets ratio (*tlev*) is 53.4 (53.9) per cent. We observe that the average (median) proportion of short-term debt to total debt (*prop_stlve*) is 86 % (92.2%). The minimum and maximum values of the short-term debt (*prop_stlev*) ratios range from 34.0 % to 100 % with a standard deviation of 15.6%. For the average firm, 86% of total debt is due within one year, which implies that short-term debt is popular among Chinese firms. This figure is higher than that reported by Marchica (2008) for the UK (i.e. 54%). This finding is in line with

Demirgüç-Kunt and Maksimovic (1999), who show that firms in developing countries tend to depend more on short-term debt.

The average (median) long-term debt to total debt ratio is only 14% (8%) in China compared with a mean of 41% in the G-7 countries and 22% in developing countries (Rajan and Zingales, 1995; Booth et al., 2001). The substantially low amount of long-term debt reflects the fact that the Chinese-listed companies are mainly financed by short-term debt rather than long-term debt. The minimum and maximum values of long-term debt to total debt (*ltlev*) ratios for the sample firms range from 0% to 65% with a standard deviation of 15.6%.

Similar to the data reported in Cai et al. (2008), the mean (median) value of growth opportunities (*growth*) of our sample firms (measured by Tobin's ratio) is 2.026 (1.62). This may indicate that the average firm (median) has valuable investment opportunities and thus is likely to face potential underinvestment problems, as stated by Myers (1977). This figure is considerably greater than that reported by Johnson (2003) and Datta et al. (2005) for US firms, and by Marchica (2008) for UK firms. The main reason for this difference is that, as discussed in Cai et al., (2008) and Firth et al. (2008), the opening up of China's economy and the adoption of capital market principles has presented many investment opportunities for its listed firms and thus Chinese investors have higher expectations regarding their future prospects. The average (median) asset maturity (*assetmat*) is 12.1 years (11.4 years).

Furthermore, compared to firms controlled by the state, privately-controlled firms exhibit higher growth opportunities (*growth*) measured by Tobin's Q and use more short-term debt suggesting that these firms may face more underinvestment problems, and thus use more short-term debt. On average, non-state controlled firms use slightly more total leverage than state-controlled firms. The conclusions drawn from these summary statistics are similar to those reported in Huyghebaert and Wang (2013). This finding is also consistent with Firth et al. (2012) who show that privately controlled firms are able to get more external financing than state controlled firms with the liberalisation and improvement in the governance of China's banking system

4.5.3 Correlation analysis

Table 4.2 reports a matrix of Pearson correlation coefficients between the variables used in our regression analysis. These correlations show some simple relationship between the variables.

We observe a significantly negative correlation between growth opportunities and leverage (-0.12), consistent with Myer's (1977) prediction that leverage is negatively associated with firms' growth opportunities due to the potential underinvestment problems. This finding is also consistent with the findings of previous empirical studies on capital structure (e.g., Johnson, 2003). Furthermore, growth opportunities exhibit a statistically significant and positive correlation with the proportion of short-term leverage: firms with more growth opportunities have an incentive to choose short-term debt in order to control underinvestment problems (Myers, 1977). This is consistent with most previous studies on debt maturity choices. Turning to control variables, as expected, asset maturity shows a significant negative correlation with the proportion of short-term leverage in total leverage, suggesting that in order to reduce Myers' underinvestment problem firms' match their debt maturity to their assets.

Taken together, in general, the above findings from the correlation analysis are consistent with Johnson's (2003) findings for US firms. We next test our hypotheses in a multiple regression framework using the system GMM estimator, and test whether and to what extent the empirical relationship between leverage and growth opportunities and liquidity risk of the firms are affected by firms' choices of debt maturity.

4.6. Empirical results

We use the system GMM estimator to estimate leverage and maturity equations. The estimation results are presented in three subsections: the first subsection focuses on results for the leverage equation, the second contains the results for the maturity equation, and the third contains the results of various robustness checks. The

summary of the main empirical predictions for this paper are as follows. In the leverage equation, we predict that leverage should be negatively related to the market-to-book ratio and the proportion of short-term debt in total debt, and positively related to the interaction term between market-to-book ratio and the proportion of short-term debt in total debt. In the maturity equation, we predict that the proportion of short-term debt in total debt (debt maturity) is negatively related to leverage (H4) and positively related to the market-to-book ratio (H3).

4.6.1 Leverage equation results

Columns (1) and (2) of Table 4.3 report the estimation results of static and dynamic specifications for leverage equations respectively, estimated using the system GMM estimator. The system GMM estimator estimates the relevant equation both in levels and in first-differences. First-differencing is used to control for unobserved heterogeneity. We use all right-hand side variables except firm age, volatility and the dummy variables lagged twice or more as instruments in the first-differenced equation, and first-differences of these same variables lagged once as instruments in the level equation. As for the validity of the instruments, the $AR(2)$ and Sargan tests generally indicate that our models are correctly specified and that the instruments are generally valid.

In both the static and dynamic specifications of the leverage regressions, the estimated coefficients on growth opportunities (*growth*) (-0.119 and -0.106, respectively, in columns 1 and 2) are significantly negative, supporting our hypothesis H1, according to which growth opportunities negatively affect leverage. This finding is consistent with Myers' (1977) prediction that high growth firms use less leverage. This finding is also consistent with previous empirical findings for US firms (e.g. Smith and Watts, 1992; Rajan and Zingales, 1995; Johnson, 2003) as well as Chinese listed firms (e.g. Zou and Xiao, 2006; Haung and Song, 2006; Moosa et al., 2011). In general, this result is also consistent with the notion that Chinese listed firms face underinvestment problem (e.g. Firth et al. (2008) who report a negative relationship between leverage and investment of Chinese listed firms).

Focusing on the dynamic specification in Column 2, we can observe that these effects are economically significant as well: considering that the mean value of

leverage is 0.534, and the standard deviation of growth opportunities is 1.194 for the firms in our sample (as shown in Table 4.1), a one-standard deviation increase in the growth opportunities reduces leverage by 23.7% of its mean for the average firm in our sample⁵⁷. Although economically significant, this effect represents only 1/3 of the marginal effect (69%) reported by Johnson (2003) for the average US firm. This difference can be explained by the fact that as shown in table 4.1, Chinese listed firms' proportion of long term debt to total debt is only about 14%. As it is long term debt which leads to potential underinvestment (debt overhang) problems over the exercise of growth options, it is likely that Chinese listed firms face lower conflicts of interest between shareholders and debtholders than their Western counterparts. Furthermore, Chinese listed firms are made of state controlled (SOEs) and privately controlled firms. Government's socioeconomic objectives might induce soft budget constraints for government controlled firms (Bai et al., 2006, Poncet et al., 2010; Guariglia et al., 2011), suggesting that state controlled firms may be able to obtain debt financing irrespective of growth potential. In a similar vein, while Chen et al. (2011) provide evidence that the sensitivity of investment expenditure to investment opportunities is significantly weaker for SOEs, and Firth et al. (2008) report that the negative relationship between leverage and investment is weaker in state controlled firms.

Furthermore, we observe from the results of both the leverage regressions in Table 4.3 that the estimated coefficients on the interaction term between growth opportunities and the proportion of short-term debt (*growth* prop_stlev*) are significantly positive (at the 5% level or more) and precisely determined. This result is consistent with our H2, and suggests that short-term debt can significantly attenuate the negative effect of growth opportunities on leverage. This result is also consistent with Myers's (1977) second theoretical prediction, and with the empirical finding in Johnson (2003) for US firms. As for growth opportunities, a one standard deviation increase in the proportion of short-term debt increases leverage only by approximately 7 % of its mean through the positive interaction⁵⁸. The smaller

⁵⁷ This is obtained as the estimated coefficient of the growth opportunities (-0.119) times the standard deviation of growth opportunities (1.194) divided by the mean value of leverage (0.534).

⁵⁸ Following Johnson (2003), we calculate this marginal effects as follows: the estimated coefficient of the interaction term between growth opportunities and the proportion of short-term debt (0.120)

attenuation effect of short-term debt compared with 30% increase in leverage reported by Johnson (2003) for the US firms can be attributed to the fact that Chinese listed firms use larger proportion of short-term debt in their capital structure than their Western counterparts.

Consistent with our hypothesis (H3), the estimated coefficients on the stand-alone short-term debt are found to be significantly negative in both specifications. This finding is consistent with the finding of Johnson (2003), and lends support to the liquidity risk hypothesis (Diamond, 1991, 1993 and Sharpe, 1991) that predicts a negative relationship between short-term debt and leverage. That is, firms with short-term debt face a potential liquidity risk problem and thus lower their optimal level of leverage.

Interestingly, computing economic significant, we find that Chinese listed firms face a lower liquidity risk than US firms: a one standard deviation increase in their proportion of short-term debt to total debt reduces in fact their leverage ratio only by approximately 7% of its mean through the negative direct effect⁵⁹. Furthermore, combining the negative effect between the proportion of short-term debt and leverage (due to the liquidity risk) with the positive interaction effect of short-term debt, the results show that the net effect ($7\% - 7\% = 0$) on leverage is zero. These finding of a smaller liquidity risk effects (negative effect of the proportion of short-term debt/ maturity on leverage) and a zero net negative effect of short-term maturity debt for average Chinese firms is in marked contrast to the strong effects (71%, $(71\% - 30\%) = 41\%$, respectively) reported by Johnson (2003) for the average US firm.

Surprisingly, even though Chinese listed firms use a large amount of short-term debt in the capital structure, the rollover /liquidity risk appears to be less important for them. The possible explanation for why liquidity risk may be less of a concern for Chinese listed firms are as follows. First, out of large number of Chinese firms seeking for listing on both Chinese stock exchanges, only a very small

times the standard deviation of short-term debt (0.156) divided by the mean value of leverage (0.535) times the mean value of growth opportunities (2.026).

⁵⁹ This is obtained as the estimated coefficient of stand-alone short-term debt (-0.231) times the standard deviation of short-term debt (0.156) divided by 0.534.

number of firms are granted approval to do so after a stringent screening process. Therefore, the listed firms may be considered more profitable and thus less risky by lenders (especially banks). This reasoning is consistent with Johnson (2003) and Billett et al. (2007) who report evidence that the liquidity risk of short-term debt is not important for rated US firms (firms with bond ratings) in Compustat and is only relevant for lower quality firms (unrated firms).

Second, perhaps more plausible but complementary to the above explanation is that in China a considerable number of listed firms are still owned and controlled by the government. Since these firms operate with multiple objectives such as socio-economic objectives, it is costly for the government to allow them to fail. Furthermore, the big four Chinese commercial banks in China are still mainly owned and controlled by the government. This suggests thus that soft budget constraints might arise in government controlled listed firms (Bai et al., 2006; Guariglia et al., 2011). Avivazian et al. (2005) suggest that compared with non-corporatized SOEs, corporatized SOEs have a greater preference for credit from the four major state banks (which are the main sources of government subsidized loans) than from other market oriented financial institutions and thus, the high dependence on these banks indicates that the soft budget constraint may not be alleviated. Consequently, state controlled firms are able to obtain external funding or extend the maturity of loans more easily than privately controlled firms (Sheshinski and Lopez-Calva, 1999), which makes liquidity risk less important for them. In fact, Firth et al. (2012) show that state controlled firms increase investment irrespective of growth opportunities even when they have negative cash flows. Further, unlike their Western counterparts, while Chinese private firms rely on personal (or family) connections and personal reputation of entrepreneurs to obtain finance from alternative financing channels (Allen et al., 2005), they use social capital building strategies (Du et al., 2013) for accessing or rolling over debt finance⁶⁰. These reasoning may also explain the lower liquidity risk faced by the Chinese listed firms.

⁶⁰Allen et al. (2012) note that alternative financing channels, such as informal financial intermediaries, internal financing and trade credits, and coalitions of various forms among firms, investors, and local governments are important even for the State and Listed sectors.

Turning to the control variables, the estimated coefficients on these variables in the leverage equation show that results are generally consistent with previous capital structure studies. Specifically, the coefficient on the profitability (*profit*) is significantly negative in both the static and the dynamic regressions, supporting Myers' (1984) pecking order prediction that highly profitable firms will use less leverage since these firms have better access to internal financing than their low profit counterparts. Also, in both regressions, firm size (*size*) has a significantly positive coefficient. This is consistent with the trade-off and agency theories, meaning that larger firms are more diversified compared to small ones and, consequently, face a lower risk of bankruptcy cost and better borrowing capacity relative to smaller firms. Except for the dynamic specification, the estimated coefficient on tangibility (*tang*) is significantly positive suggesting that the larger the fixed assets of the firm, the lower its bankruptcy costs. The coefficient on volatility (*vol*) is negative in the dynamic specification but insignificant. Wiwattanakantang (1999), Deesomsak et al. (2004) and Zou and Xiao (2006) also find an insignificant relationship between volatility and leverage. The non-debt tax shield (*nontaxshd*) attracts a poorly determined coefficient in both specifications. This can be seen as evidence against the trade-off theory. Du et al. (2013) also find insignificant non-debt tax shield coefficients in the context of Chinese firms.

Finally, as can be seen in column 2 of Table 4.3, the estimated coefficient on lagged leverage is significantly positive, and equal to 0.83, indicating that there is a high level of persistency in the capital structure decisions of Chinese listed firms.

4.6.2 Debt maturity equation results

Table 4.4 presents the system GMM estimation results for maturity equations. In the static specification, consistent with the negative coefficient on maturity in the leverage equation, the coefficient on leverage (*tlev*) is significantly negative. Yet, this same coefficient is negative but not different from zero in the dynamic specification. The negative relationship between leverage and the proportion of short-term debt is consistent with our hypothesis (H4) that firms with high leverage try to avoid liquidity risk by lengthening their maturity (Diamond 1991 and 1993;

Sharpe, 1991). This is also consistent with the previous empirical findings of studies estimating a single debt maturity equation (e.g., Barclay and Smith, 1995; Stohs and Mauer, 1996; Datta et al., 2005; Antoniou et al., 2006; Marchica, 2008) as well as studies adopting a simultaneous equation approach (Johnson, 2003)

In support of our hypothesis (H3), we observe that the estimated coefficient on growth opportunities is positive though not statistically significant in both specifications. This result supports the notion that firms with greater growth opportunities (*growth*) prefer shorter maturities of debt so as to reduce the underinvestment problem (Myers, 1977). Previous empirical studies (Stohs and Mauer, 1996; Billett et al., 2007) also report an insignificant relationship between a debt maturity measure and growth opportunities in the debt maturity equation.

Consistent with our expectation, the estimated coefficient on asset maturity (*assetmat*) which is negative and statistically significant at 5% level in both specifications. This indicates that firms in our sample match the maturities of their assets with those of their liabilities in order to reduce the underinvestment problem (Myers, 1977). Thus, maturity matching is an important strategy for firms in China. This result is also consistent with the findings of the previous empirical studies (e.g., Johnson, 2003; Cai et al., 2008; Ozkan, 2000; Guedes and Opler, 1996; Deesomsak et al., 2009).

Following Barclay et al. (2003) and Johnson (2003), we use firm size and its square to control for the effect of credit quality in the debt maturity equation. As shown in Table 4.4, the estimated coefficients of log firm size (*size*) is significantly negative and its squared term (*size*²) is significantly positive in both regressions, which is consistent with Diamond's (1991) prediction that larger firms have higher credit quality/lower liquidity risk and thus use more short-term debt. This result is also consistent with the findings of the previous studies (e.g. Johnson, 2003; Datta et al., 2005).

The estimated coefficient on volatility (*vol*) is negative, but insignificant in both specifications. The negative sign suggest that firms with greater volatility may be

associated with greater credit risk. Yet, previous empirical studies also report insignificant volatility coefficient (e.g. Johnson, 2003; Cai et al., 2008). The coefficients on non-debt tax-shield (*nontaxshd*) are not significant at conventional levels in both specifications, suggesting that non-debt tax-shield does not influence debt maturity choices. This result is consistent with Johnson (2003). Furthermore, we can see that, as expected, firm age (*firmage*) is negatively related to the proportion of short-term debt in total debt in both specifications, but is insignificant. This finding is consistent with, Du et al. (2013) who find that the coefficient on firm's age in a regression for short-term debt is insignificant in the Chinese context.

Finally, it is also worth noting that the lagged short-term debt has a significantly positive coefficient, which is about 0.52 in the dynamic specification. This suggests that 48 per cent ($1 - 0.52$) of the gap between the last period's short-term debt and this period's target short-term debt is eliminated within a year. Considering that only about 17% of the gap between last period's leverage and this period's target leverage is eliminated within a year in the leverage equation, firms adjust their target short term leverage at very high speed (48%), suggesting that adjustment costs are rather low for short term debt compared to total leverage. Chinese firms seem to adjust their short-term debt approximately three times faster compared to total leverage, in an attempt to reach their target debt maturity. So, firms with potential investment opportunities finance them largely by shorter maturity debt rather than long-term debt.

4.6.3 Additional tests

In this sub-section, following Johnson (2003), we verify whether our results are robust to using firms with Tobin's $Q > 1$. We then provide regression results for results for state and privately controlled firms separately.

4.6.3.1 Differentiating firms according to whether their Tobin's Q is greater or smaller than one

In this section, we investigate Myer's (1977) prediction that potential underinvestment problems should be more severe for firms with valuable growth

opportunities. To take this into account, we divide firms into two categories based on Tobin's Q (*growth*) in order to identify potential underinvestment problems: (1) firms who have Tobin's q greater than one (*growth* >1), (2) firms who have Tobin's q equal or less than one (*growth* <=1). Table 4.5 presents the system GMM estimation results of leverage equation for both groups of firms

As can be seen in column 1 of Table 4.5, the estimated coefficient for the attenuation effect is positive and statistically significant at the 5% level only for firms with valuable growth opportunities, suggesting that the attenuation effect reflects a reduction in the underinvestment problems. Moreover, the coefficients associated with the other variables in columns 1 of Table 4.5 are generally consistent with the main results reported in Table 4.3⁶¹.

Looking at the results for the firms with less growth opportunities (*growth* <=1) in column 2 of Table 4.5, our hypothesised variables are statistically insignificant at conventional levels, suggesting that the potential underinvestment problem or attenuation and liquidity risk effects of short-term debt are not important for firms with low growth opportunities. These results are consistent with Johnson (2003).

Turning to the estimation results for maturity equations for these groups of firms in Table 4.6, we note that the estimated coefficients for the independent variables in the maturity equation for firms with Tobin's q greater than one show that results are generally consistent with those of full sample firms reported in Table 4.4. By contrast, none of the independent variables except the legged maturity variable (*growth* <=1) are statistically significant for the firms with Tobin's q equal or less than one.

4.6.3.2 Estimating separate regressions for state and non-state firms

Chinese listed firms can be classified into state controlled (SOEs) and privately/non-state controlled firms. As we discussed subsection 6.1, state controlled firms may have different behaviour than privately controlled firms. For example, Chen et al. (2011) provide evidence that the sensitivity of investment expenditure to investment

⁶¹ We observe that calculated economic significance for the hypothesized variables using mean and standard deviation for firms with Tobin's q greater than one are similar in magnitude to those for full sample firms.

opportunities is significantly weaker for SOEs than private firms, and Firth et al. (2008) report that the negative relationship between leverage and investment is weaker in state controlled firms. Therefore, leverage may be less sensitive to growth opportunities in state controlled firms. By contrast, as shown in the summary statistics, private firms are more likely to have higher growth opportunities and thus may face a greater underinvestment problem.

Furthermore, because of the government's socioeconomic objectives, state controlled firms may enjoy soft budget constraints (Bai et al., 2006, Poncet et al., 2010; Guariglia et al., 2011). Therefore, they may obtain necessary external finance for investment through political connections. Furthermore, with the government intervention and guarantee, state controlled firms may be able to extend the maturity of the loans more easily than private firms. Therefore, state controlled firms may face a lower liquidity risk than privately controlled firms.

Focusing on the results of leverage equations in column 3 & 4 of Table 4.5, we observe that the coefficient for growth opportunities and that of the stand-alone short-term debt are negatively significant at the 5% level, whereas the coefficient for growth opportunities interacted with the proportion of short-term debt in total debt (attenuation effect) is positive and statistically significant at the 5% level for privately controlled firms. As for the state controlled firms, although the coefficient on growth opportunities is negatively significant at the 10% level, the coefficients on the stand-alone short-term debt and growth opportunities interacted with proportion of short-term debt in total debt are not statistically significant at the conventional levels. These results are consistent with the notion that the attenuation effect and liquidity risk effects are relevant only for non-state controlled firms in the context of Chinese listed firms. Moreover, the coefficients on the other variables in columns 3 of Table 4.5 are generally consistent with those reported for the full sample in Table 4.3.

Looking at the estimation results for maturity equations reported in columns 3& 4 of Table 4.6, we can see that the estimated coefficients for the independent variables in the maturity equation for non-state controlled firms are consistent with those for the full sample reported in Table 4.4. By contrast, the estimated coefficients for the

independent variables except the legged maturity variable for state controlled firms are statistically insignificant at the conventional significant levels.

4.7. Conclusion

In this chapter we empirically investigate the attenuation effect (i.e., reducing the negative effects of growth opportunities on leverage) and liquidity risk effect of the short term debt on leverage. We estimate the equations of financial policy choices of leverage and debt maturity (i.e. proportion of short-term debt) using the system GMM estimation methodology which to account for unobserved firm heterogeneity and the potential endogeneity of the regressors (Arellano and Bover, 1995; Blundell and Bond 1998). In the context of China, for the first time, we study this link using a large sample of Chinese non-financial firm-year observations over the period 2003 to 2010.

First, we find that the direct effect of growth opportunities (i.e. stand-alone growth opportunities) on leverage is negative, suggesting that Chinese listed firms face underinvestment problem (debt overhang) due to the conflicts of interest between shareholders and debtholders/lenders (Firth et al., 2008). Second, we find a positive relationship between leverage and growth opportunities interacted with measure of short-term debt. This supports the prediction that short-term debt attenuates the negative effect of growth opportunities on leverage (Myers, 1977; Johnson, 2003). Third, we find that the short debt maturity negatively affects leverage, as predicted by the liquidity risk hypothesis (Diamond, 1991 & 1993). The latter two results therefore suggest that firms with valuable growth opportunities control the underinvestment problem by shortening the maturity of their debt, whilst using less total leverage in order to avoid liquidity risk. In other words, firms trade off the cost of underinvestment problems against the cost of increased liquidity risk when choosing short debt maturity. We report these results after controlling for all previously identified determinants of leverage and debt maturity and endogeneity of debt maturity, leverage, and other regressors in a dynamic framework using the system GMM methodology.

Importantly, however, we observe that the economic significance of the negative

effect of growth opportunities (underinvestment problem) and short maturity (liquidity risk) as well as the positive attenuation effect of short-term debt on leverage are much lower for Chinese listed firms compared to their US counterparts. We explain the observed differences on the grounds of the different institutional environment in which Chinese and US firms operate. More specially, a considerable number of Chinese listed firms are still owned and controlled by government, so these firms may be less responsive to growth opportunities and less likely to face liquidity risk (government ownership may provide an implicit guarantee). By contrast, although private firms face an underinvestment problem and use a higher proportion of short-term debt, they are able to mitigate the rollover risk through family contacts, relationship and personal reputation of the entrepreneurs. For example, Huyghebaert and Wang (2013) note that Chinese listed firms do rely on trade credit consistent with Fisman and Love (2007) who point out that supplier finance is characteristic of countries with immature capital markets.

Additional analysis conducted by differentiating the firms according to whether their Tobin's q is greater or lower than one, as well as according to whether they are state controlled (SOEs) or privately controlled provides further evidence to support our main findings and our explanation for the observed differences between Chinese listed firms and their US counterparts.

Our study extends the debt maturity structure literature in two ways. First, it refines our understanding of the attenuation and liquidity risk effect from the perspective of firms in the largest emerging economy. Second, we extend previous studies by examining the dynamic nature of Chinese firm's maturity choices. We find that Chinese firms adjust their short-term debt to reach their target short-term debt level relatively faster (approximately three times faster) than their leverage.

Our study has important policy implication in that it suggest that the importance of attenuation and liquidity risk effects of short-term debt for a firm is dependent on the institutional environment in which it operate.

The main limitation of this research is that since credible rating system in China has

not been well developed (Allen et al., 2012), we are unable to see how the importance of attenuation and liquidity risk effects differs between rated and unrated firms.

Appendix

Table A4 Definition of variables

Variables	Name	Measures	Expected sign	
			Leverage equation	Maturity equation
Leverage	<i>lev</i>	Total debt/ total assets		- (H ₄)
Debt maturity	<i>prop_stlev</i>	Short-term debt / total debt	- (H ₄)	
Growth opportunities	<i>growth</i>	The ratio of the sum of the market value of equity and the book value of debt to the book value of total assets. (the tradable share price is used to calculate the market value of the non-tradable equity shares.)	- (H ₁)	+ (H ₃)
Growth opportunities* Short-term debt	<i>growth*prop_stlev</i>		+ (H ₂)	
Long-term debt	<i>llev</i>	Long-term debt/ total debt (1- prop_stlev)		
Size	<i>size</i>	Log of total real assets	+	-
Size squared	<i>size²</i>			+
Asset maturity	<i>assetmat</i>	The ratio of total net fixed assets to annual depreciation expense. The total net fixed assets include land and buildings, plant and machinery, and other fixed assets.		-
Volatility	<i>vol</i>	The standard deviation of the first differences of firm's earnings before taxes and depreciation over the four years preceding the sample year, divided by average total assets for that period.	-	-
Non-taxshield	<i>taxratio</i>	The ratio of tax expense to pre-tax profit.	-	-
Firm age	<i>firmage</i>	Log of the number of years since the establishment of the firm.	+	-
Industry dummies	<i>v_j</i>	CSMAR B classification: 5 industries Utilities, Properties, Conglomerates, Industry, Commerce (except financial industries).		
Regional dummies	<i>v_k</i>	Dummies indicating whether the firm is located in the Coastal, Western, or Central region of China.		
Year dummies	<i>v_t</i>	Year dummies for the years 2004 to 2010.		

Notes: '+' means that leverage/short-term debt increases with the variables, '-' means that leverage/short-term debt decreases with the variables.

Table 4.1 Summary statistics of Chinese listed firms over the period of 2003 to 2010.

Variable	Obs.	Mean	Median	Std. Dev.	Min	Max
Panel A full sample firms						
<i>tlev</i>	7860	0.534	0.539	0.199	0.060	2.911
<i>stlev</i>	7860	0.860	0.922	0.156	0.344	1.000
<i>ltlev</i>	7860	0.140	0.078	0.156	0.000	0.656
<i>growth</i>	7860	2.026	1.630	1.194	0.807	8.373
<i>assetmat</i>	7860	12.144	11.427	4.869	2.438	35.344
Panel B Privately controlled firms						
<i>tlev</i>	2229	0.542	0.535	0.230	0.060	3.016
<i>stlev</i>	2229	0.875	0.937	0.150	0.346	1.000
<i>ltlev</i>	2227	0.125	0.063	0.151	0.000	0.654
<i>growth</i>	2229	2.230	1.802	1.345	0.809	8.373
<i>assetmat</i>	2229	12.585	11.578	5.338	2.464	35.264
Panel B State controlled firms						
<i>tlev</i>	5143	0.527	0.531	0.205	0.061	3.061
<i>stlev</i>	5143	0.850	0.911	0.163	0.344	1.000
<i>ltlev</i>	5142	0.151	0.089	0.163	0.000	0.656
<i>growth</i>	5143	1.930	1.571	1.102	0.807	8.521
<i>assetmat</i>	5143	12.319	11.533	4.971	2.438	35.344

Note: Definitions for all variables are provided in Table A4.

Table 4.3 Pearson correlation matrices

	<i>tlev</i>	<i>ltlev</i>	<i>prop_stlev</i>	<i>growth</i>	<i>assetmat</i>
<i>tlev</i>	1.00				
<i>ltlev</i>	0.09*	1.00			
<i>prop_stlev</i>	-0.09*	-1.00*	1.00		
<i>growth</i>	-0.12*	-0.09*	0.09*	1.00	
<i>assetmat</i>	0.05*	0.13*	-0.13*	-0.11*	1.00

Notes: * denotes significance at the 5% level. See Table A4 for definitions of all variables.

Table 4.4 System GMM estimation results of leverage equations

	Predicted sign	Static models (1)	Dynamic models (2)
<i>tlev_{it-1}</i>	+		0.831 ^{***} (0.038)
<i>prop_stlev</i>	-	-0.312 ^{***} (0.095)	-0.231 ^{**} (0.100)
<i>growth</i>	-	-0.119 ^{***} (0.041)	-0.106 ^{**} (0.046)
<i>growth* prop_stlev</i>	+	0.116 ^{***} (0.042)	0.120 ^{**} (0.049)
Control variables:			
<i>profit</i>	-	-1.044 ^{***} (0.198)	-0.789 ^{***} (0.195)
<i>size</i>	+	0.050 ^{***} (0.013)	0.022 ^{***} (0.007)
<i>tang</i>	+	0.178 ^{***} (0.065)	0.077 (0.076)
<i>vol</i>	-	0.220 (0.164)	-0.042 (0.095)
<i>nontaxshd</i>	-	-1.345 (0.974)	-0.938 (0.666)
<i>firmage</i>	-	0.072 ^{***} (0.014)	-0.003 (0.006)
<i>Regional dummies</i>		<i>yes</i>	<i>yes</i>
<i>Industry dummies</i>		<i>yes</i>	<i>yes</i>
<i>Year dummies</i>		<i>yes</i>	<i>yes</i>
<i>Firm fixed effects</i>		<i>yes</i>	<i>yes</i>
<i>Observations</i>		7860	6679
Hansen test (<i>p values</i>)		0.115	0.283
<i>m1 (p values)</i>		0.000	0.000
<i>m2 (p values)</i>		0.109	0.331

Notes: Asymptotic standard errors robust to heteroskedasticity are reported in parentheses. For the system GMM regression, AR2 is a test for second-order serial correlation of the differenced residuals, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation. The Hansen J test of over-identifying restrictions is distributed as Chi -square under the null of instrument validity. We treat all right-hand side variables except firm age, volatility and dummy variables as potentially endogenous variables. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively. See Table A4 for definitions of all variables.

Table 4.5. System GMM estimation results of maturity equations

	Predicted sign	Static models (1)	Dynamic models (2)
<i>prop_stlev</i> _{<i>it-1</i>}	+		0.520*** (0.040)
<i>tlev</i>	-	-0.109*** (0.040)	-0.062** (0.031)
<i>growth</i>	+	0.001 (0.007)	0.005 (0.006)
<i>assetmat</i>	-	-0.005** (0.002)	-0.004** (0.002)
<i>size</i>	-	-0.526** (0.211)	-0.265* (0.150)
<i>size</i> ²	+	0.011** (0.005)	0.008** (0.004)
<i>vol</i>	-	-0.056 (0.118)	-0.068 (0.096)
<i>nontaxshd</i>	+	-0.996 (0.990)	0.637 (0.469)
<i>firmage</i>	-	-0.006 (0.011)	0.001 (0.007)
<i>Regional dummies</i>		yes	yes
<i>Industry dummies</i>		yes	yes
<i>Year dummies</i>		yes	yes
<i>Firm fixed effects</i>		yes	yes
<i>Observations</i>		7860	6522
<i>Hansen test (p values)</i>		0.653	0.286
<i>m1 (p values)</i>		0.000	0.000
<i>m2 (p values)</i>		0.123	0.100

Notes: Asymptotic standard errors robust to heteroskedasticity are reported in parentheses. For the system GMM regression, *AR2* is a test for second-order serial correlation of the differenced residuals, asymptotically distributed as $N(0,1)$ under the null of no serial correlation. The Hansen *J* test of over-identifying restrictions is distributed as *Chi-square* under the null of instrument validity. We treat all right-hand side variables except firm age, volatility and dummy variables as potentially endogenous variables. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively. See Table A4 for definitions of all variables.

Table 4.5 Robustness checks: Dynamic system GMM estimation results of leverage equations differentiating firms based on their Q value and ownership

	Predicted sign	Firms with Q>1	Firms with Q<1	Privately controlled firms	State controlled firms
		(1)	(2)	(3)	(4)
<i>tlev_{it-1}</i>	+	0.822*** (0.040)	1.041*** (0.119)	0.839*** (0.074)	0.853*** (0.045)
<i>prop_stlev</i>	-	-0.254** (0.119)	-0.028 (0.197)	-0.306** (0.145)	-0.144 (0.099)
<i>growth</i>	-	-0.110** (0.055)	0.072 (0.141)	-0.090** (0.038)	-0.043* (0.025)
<i>growth* prop_stlev</i>	+	0.123** (0.057)	-0.006 (0.152)	0.104** (0.043)	0.054 (0.041)
Control variables:					
<i>profit</i>	-	-0.723*** (0.253)	-0.952** (0.412)	-0.765*** (0.189)	-0.546*** (0.149)
<i>size</i>	+	0.020*** (0.007)	0.035 (0.022)	0.038*** (0.013)	0.018** (0.008)
<i>tang</i>	+	0.078 (0.078)	0.124 (0.163)	0.097 (0.072)	0.053 (0.061)
<i>vol</i>	-	-0.005 (0.104)	-0.385 (0.319)	-0.006 (0.148)	-0.048 (0.102)
<i>nontaxshd</i>	-	-.997 (0.736)	.978 (.762)	0.909 (0.826)	-0.604 (0.641)
<i>firmage</i>	-	-0.003 (0.006)	-0.011 (0.015)	-0.005 (0.013)	0.000 (0.007)
<i>Regional dummies</i>		yes	yes	yes	yes
<i>Industry dummies</i>		yes	yes	yes	yes
<i>Year dummies</i>		yes	yes	yes	yes
<i>Firm fixed effects</i>		yes	yes	yes	yes
<i>Observations</i>		5880	642	1890	4248
<i>Hansen test (p values)</i>		0.288	0.330	0.236	0.595
<i>m1 (p values)</i>		0.000	0.0890	0.000	0.000
<i>m2 (p values)</i>		0.239	0.361	0.137	0.106

Notes: Asymptotic standard errors robust to heteroskedasticity are reported in parentheses. For the system GMM regression, AR2 is a test for second-order serial correlation of the differenced residuals, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation. The Hansen J test of over-identifying restrictions is distributed as Chi -square under the null of instrument validity. We treat all right-hand side variables except firm age, volatility and dummy variables as potentially endogenous variables. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively. See Table A4 for definitions of all variables.

Table 4.6 System GMM estimation results of maturity equations differentiating firms based on their Q value and ownership

	Predicted sign	Firms with Q>1 (1)	Firms with Q<1 (2)	Privately controlled firms (3)	State controlled firms (4)
<i>prop_stlev</i> _{it-1}	+	0.492*** (0.041)	0.753*** (0.095)	0.510*** (0.071)	0.519*** (0.049)
<i>tlev</i>	-	-0.062* (0.033)	0.044 (0.154)	-0.035* (0.020)	-0.039 (0.044)
<i>growth</i>	+	0.006 (0.006)	-0.008 (0.047)	0.005 (0.013)	0.008 (0.009)
<i>assetmat</i>	-	-0.004* (0.002)	-0.011 (0.007)	-0.010** (0.004)	-0.003 (0.003)
<i>size</i>	-	-0.261* (0.152)	-0.552 (0.879)	-0.479** (0.240)	-0.244 (0.207)
<i>size</i> ²	+	0.009** (0.004)	0.012 (0.020)	0.011** (0.005)	0.005 (0.005)
<i>vol</i>	-	0.074 (0.100)	-0.085 (0.332)	0.003 (0.175)	0.066 (0.135)
<i>nontaxshd</i>	+	0.434 (0.493)	-0.588 (1.398)	0.270 (0.841)	0.069 (0.635)
<i>firmage</i>	-	0.003 (0.007)	-0.016 (0.020)	-0.025* (0.013)	0.010 (0.009)
<i>Regional dummies</i>		yes	yes	yes	yes
<i>Industry dummies</i>		yes	yes	yes	yes
<i>Year dummies</i>		yes	yes	yes	yes
<i>Firm fixed effects</i>		yes	yes	yes	yes
<i>Observations</i>		5880	642	1890	4248
<i>Hansen test (p values)</i>		0.254	0.270	0.236	0.595
<i>m1 (p values)</i>		0.000	0.000	0.000	0.000
<i>m2 (p values)</i>		0.155	0.570	0.137	0.094

Notes: Asymptotic standard errors robust to heteroskedasticity are reported in parentheses. For the system GMM regression, AR2 is a test for second-order serial correlation of the differenced residuals, asymptotically distributed as $N(0,1)$ under the null of no serial correlation. The Hansen J test of over-identifying restrictions is distributed as *Chi*-square under the null of instrument validity. We treat all right-hand side variables except firm age, volatility and dummy variables as potentially endogenous variables. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively. See Table A4 for definitions of all variables.

Chapter 5

Capital structure and corporate performance: Evidence from Chinese listed companies

5.1 Introduction

The corporate finance literature widely recognizes that the levels of debt and maturity structure are important mechanisms for addressing the agency problems in a corporation. Modigliani and Miller (1958) argue that under perfect capital market conditions, capital structure is irrelevant to the value of a firm. However, in reality, the prevalence of a variety of market frictions (such as taxes, asymmetric information and the agency problems) affects the value of firms (Modigliani and Miller, 1963; Jensen Meckling, 1976; Myers, 1977; Myers and Majluf, 1984)⁶². For example, while Modigliani and Miller (1963) show that the presence of corporate taxes affects cost of capital and thus the value of the firm, Jensen and Meckling, (1976) argue that even in the absence of taxes, debt capital can have significant effects on corporate performance.

More specially, Jensen and Meckling's (1976) agency theory suggests that the conflicts of interest between shareholders and managers, as well as between shareholders and bondholders create considerable agency costs for the firms and the economy as a whole. According to the agency theory, agency costs of equity arise from the conflicts of interest between managers and shareholders when the ownership and control of the firm are separated. In these circumstances, managers indulge in overconsumption of salaries and perquisites, and tend to expand the firm to enhance their reputations and compensation (empire building) at the expenses of owners, rather than taking value maximizing decisions. Yet, agency theory also suggests that debt financing can be an important governance mechanism to control the agency costs of equity (Jensen and Meckling, 1976; Grossman and Hart, 1982; Fama and Jensen, 1983; Jensen 1986; Stulz, 1990). Debt financing works as a control mechanism

⁶² See Harris and Raviv (1991) and Shleifer and Vishny (1997) for excellent surveys.

through the following channels: (1) managers are closely monitored by debt-holders and more generally by the financial market (Jensen and Meckling, 1976; Rajan and Winton, 1995; Stulz, 2000) (2) the fixed interest payments that need to be made to the debt holders reduce the free cash flow available for the managers' discretionary spending (Jensen, 1986) and (3) debt is a commitment device for executives (Zwiebel, 1996). Since the interest payment to debt holders is a legal obligation, the failure to meet this obligation has potential for risk of bankruptcy and the resulting loss of reputation and jobs for managers (Fama, 1980; Grossman and Hart, 1982; Williams, 1987). This provides managers with an incentive to work hard and consume fewer perquisites (Grossman and Hart, 1982; Zwiebel, 1996).

Nonetheless, using debt financing to deal with the agency costs of equity is not costless; it creates agency costs of debt, which arise from conflicts of interest between shareholders and debtholders. That is, when leverage is relatively high, a further increase in leverage may lead to conflicts between the two parties, due to higher expected financial distress or bankruptcy costs.⁶³ These moral hazard problems suggest that leverage may negatively affect firm performance. The net effect of leverage on firm's performance is therefore an empirical issue.

Theoretical and empirical corporate finance research also analyses the impact of debt maturity structure on investment and financial decisions, as well as on firm performance/value. For example, while Myers (1977) shows that short-maturity debt mitigates conflicts between bondholders and shareholders and thus underinvestment problems. Similarly, others argue that the incentive properties of short-term debt make it a more effective controlling mechanism than long term debt in reducing agency conflict between managers and shareholders. Rajan and Winton (1995) and Stulz (2000) show that short-term debt can reduce the agency costs arising from managerial discretion, subjecting managers to more frequent monitoring. However, Hart and Moore (1995) show that short term debt provides managers an offsetting benefit, i.e., the flexibility to use assets in place to pursue empire building.

⁶³ Two agency costs of debt are well documented in the finance literature: shareholders' risk-shifting behavior/ asset substitution (Jensen and Meckling, 1976) and underinvestment or debt overhang problem (Myers, 1977). See Section 3.2.3.2 in Chapter 3 for a detail discussion on agency costs of debt.

Focusing on the empirical literature, although there is a relatively large number of studies in corporate finance that have examined the determinants of capital structure decisions (e.g., Titman and Wessels, 1988; Wald, 1999; Rajan and Zingales, 1995; Frank and Goyal, 2009; Booth et al., 2001), only a handful of studies examine empirically the impact of capital structure on firms' performance in the context of developed economies. For example, using a large cross-sectional sample of US firms for the years 1976, 1986, and 1988, McConnell and Servaes (1995) find that for 'high-growth' firms, leverage is negatively related to Tobin's Q, whereas for 'low-growth' firms, leverage is positively related to Tobin's Q. By contrast, focusing on a sample of 557 UK firms over the period 1967 to 1989, Dessi and Robertson (2003) find no significant relationship between leverage and firms' performance when endogeneity and the dynamics of debt are controlled for by using instrumental variable approach in a dynamic framework. Yet, Margaritis and Psillaki (2010) report a non-linear (inverted U-shaped) relationship for French manufacturing firms.

In the case of debt maturity, Schiantarelli and Sembenelli (1996), Schiantarelli and Jaramillo (1996), and Schiantarelli and Srivastava (1996) all estimate an augmented Cobb-Douglas production function with leverage and maturity and find that short-term debt is not conducive to improve productivity, but long term debt helps improve firms' total factor productivity (TFP) for Italy and the UK, India, and Ecuador, respectively. By contrast, Baum et al. (2007) find a strong positive association between short-term debt and financial performance for German firms (a Bank based economy) but an insignificant effect for US firms. They suggest that the nature of the financial system (i.e. whether countries are market based or bank based economies) plays an important role in determining the effect of debt maturity structure on performance.

Even though there is no a single study focused on the effects of debt and maturity structure on firm performance of Chinese companies, Tian and Estrin (2007) and Firth et al. (2008) provide evidence on the impact of debt financing on agency costs faced by these firms. Both of these studies unanimously find evidence that the Chinese government's ownership of both banks and firms, and the resultant soft budget constraints make debt an ineffective governance mechanism in reducing agency costs for Chinese listed firms, and particularly SOEs. However, following a

series of reforms of the banking system⁶⁴, the governance of the Chinese financial sector has significantly improved and banks now use more and more commercial judgment and prudence in their lending decisions (Cull and Xu, 2005; Ayyagari et al., 2008; Firth et al., 2009). Now loan officers in banks and other financial institutions are held responsible for their poor lending decisions (Allen et al., 2012). In light of these developments, recent research using data on Chinese listed firms suggests that bank financing no longer facilitates unwise investment and the overconsumption of perquisites in SOEs. By contrast, it now act as a governance mechanism that constrains managers' misconduct and thus help improve investment efficiency in both state controlled and privately controlled firms (Chan et al., 2012; Lin and Bo, 2012; Tsai et al., 2014). Yet, to the best of our knowledge, no one has focused on examining the effects of debt and maturity structure on firm performance of Chinese companies for the post WTO accession period. This paper fills this gap in the literature.

Using a large panel of non-financial Chinese listed firms over the period 2003 to 2010 and using the system GMM estimator to control for unobserved heterogeneity, and the possible endogeneity of our regressors, we find clear evidence of a positive relationship between leverage and the proportion of long term debt, on the one hand, and firms' performance, as measured by ROA, on the other. These results may be a consequence of the recent significant developments in the Chinese banking system, aimed at improving efficiency and at encouraging banks to adopt prudence in their lending behavior.

The reminder of this chapter is organized as follows. Section 2 discusses the relevant theories, and reviews previous literature that focuses on the relationship between capital structure and firm performance, as well as debt maturity structure and firm performance. Section 3 presents our hypotheses. The model specifications and estimation method are described in Section 4. In Section 5, we describe the data that we use in this study and provide some descriptive statistics. Section 6 discusses our

⁶⁴ For instance, these reforms involved the introduction of foreign ownership and management in Chinese banks and particularly, state owned commercial banks; as well as the listing of these banks in stock exchanges. See section 2.5 of Chapter 2 for a detailed discussion of China's banking sector reform.

main empirical results, as well as some further tests. Finally, Section 7 provides conclusions.

5.2. Review of the literature

In this section, we first discuss the relevant theory namely, the agency theory and we then provide a comprehensive review of the previous empirical studies that link capital structure and corporate performance, as well as debt maturity structure and corporate performance.

5.2.1. The agency theory

The agency theory suggests that when the ownership and control of the firm are separated, the interests of the firm's managers and its shareholders are not perfectly aligned (Jensen and Meckling, 1976). For example, managers may exert insufficient effort, over-consume perquisites, and invest in unrelated businesses to build empires, failing to maximize firm value. Theory also suggests that leverage may help to mitigate these agency costs (the agency costs of outside equity). According to Jensen (1986) debt is in fact a valuable monitoring mechanism for firms with large cash flows and few growth opportunities since it commits managers to pay out a fixed interest payment to the debt holders, thereby reducing the free cash flow available to the managers' discretionary spending (empire-building investments). Therefore, a high debt ratio decreases the agency costs of equity financing and increases corporate value by encouraging managers to bring their interest in line with the shareholders' interest. In this situation, debt will have a positive impact on firm's performance.

However, the use of debt capital in the capital structure itself creates agency costs resulting from conflicts of interest between shareholders and bondholders. When leverage is relatively high, further increases may lead to conflicts between them due to higher expected financial distress and bankruptcy costs. Managers acting on behalf of their stockholders might reject projects with positive net present values because risky debt absorbs a portion of stockholders' benefits. Myers (1977) thus argues that

there is a potential for an ‘under-investment’ problem arising from the use of higher levels of leverage. Further, greater financial leverage increases the agency cost through the threat of default risk, liquidation, and bankruptcy. In this situation, debt will have a negative impact on firm’s performance.

On the other hand, Myers (1977) suggests that firms with more growth options are likely to employ shorter-maturity. Debt that matures before execution of investment options cannot lead to suboptimal investment decisions. Given that underinvestment deteriorates profits in the long run, such behaviour implies a negative relationship between long term debt and firm performance. Further, Leland and Toft (1996) show that short-term debt can reduce the agency costs associated with the shareholders’ risk-shifting behavior (asset substitution) Thus, firms that employ more short-term debt are likely to have more growth option in their investment opportunities, resulting in increased firm’s performance.

Whereas traditionally it has been argued that managers will shun short-maturity debt to avoid the extra monitoring and liquidity risk associated with frequent capital market security issues, Hart and Moore (1995) show short-term debt can facilitate managerial empire building. More specially, they argue that, conditional on the use of debt financing to undertake a long-term project, managers may prefer to use short-term financing in order to preserve the flexibility to use those “assets in place” to fund a future negative NPV project and that only long-term debt is effective in limiting the ability of managers to build empires by financing new projects based on assets in place. Therefore, Hart and Moore (1995) show that the optimal debt maturity choice, from a firm’s perspective, is ambiguous: it depends on the firm’s existing leverage and requires a balancing of costs and benefits. The primary benefit of long-maturity debt is that assets in place are encumbered, thereby preventing management from using them to finance overinvestment or empire building. As we discussed above, the cost, however, is the risk of creating a debt overhang which can lead to underinvestment (Myers, 1977).

5.2.2 Review of empirical studies

5.2.2.1. Existing evidence on the relationship between capital structure and corporate performance

In the finance literature, a vast number of empirical studies have traditionally focused on the role of firms' profitability as a determinant of the level of debt in the capital structure. Most studies find a negative relationship between the two in line with pecking order theory (Myers, 1984; Myers and Majluf, 1984). However, a limited number of empirical studies examine the effects of leverage on corporate performance and provide mixed evidence. For example, as one of the early empirical studies, using a large sample of US firms for the years 1976, 1986, and 1988, McConnell and Servaes (1995) find that leverage is positively related to corporate performance (which is measured by Tobin's Q) in low-growth firms, whereas it is negatively related to Tobin's Q in high-growth firms.⁶⁵ Their findings are consistent with their explanation that firms with low growth opportunities choose a high level of leverage in order to reduce the free cash flow available to the managers' discretionary spending (i.e. empire-building investments) (Jensen, 1986), whilst firms with high growth opportunities prefer a low level of leverage in order to solve the underinvestment problem (Myers, 1977). However, McConnell and Servaes (1995) do not take into account the endogeneity problem in their study.

By contrast, using 400 large US firms for the year 1987, Agrawal and Knoeber (1996) examine the effect of leverage on firm performance (which is measured by Tobin's Q), including six other control mechanisms.⁶⁶ They find a negative relationship between leverage and Tobin's Q when they estimate an OLS regression of performance on leverage and other control variables. However, the significant effect of leverage on Tobin's Q disappears when they estimate their regressions in the simultaneous systems framework. Therefore, they suggest that different control mechanisms such as leverage and other internal governance mechanisms are chosen effectively, in the light of both observed and unobserved firm characteristics.

⁶⁵ They split the data into a 'high-growth' and a 'low-growth' based on either the firm's P/E ratio or its sales growth (as a proxy for future growth opportunities) in each cross-section.

⁶⁶ The other control mechanisms are: shareholdings of insiders, institutions, and large block holders; use of outside directors; the managerial labour market; and the market for corporate control.

Improving on previous studies, Dessi and Robertson (2003) analyze the effect of leverage on corporate performance, allowing for endogeneity and persistency in performance, by using Anderson and Hsiao's (1982) instrument variable approach. Focusing on a panel sample of 557 UK firms over the period 1967 to 1989, Dessi and Robertson (2003) find that debt has a significantly positive effect on firm's performance, (which is measured by Q), when they do not take into account the endogeneity of debt. However, the significant relationship disappears when they account for the endogeneity in both the static and dynamic models. Therefore, consistent with Agrawal and Knoeber (1996), Dessi and Robertson (2003) also suggest that firms choose their capital structure optimally, in the light of their observed and unobserved characteristics. The latter two studies empirically show the importance of taking into account the endogeneity of debt when one examines the relation between capital structure and performance.

While the previously mentioned empirical studies use data from non-financial firms, Berger and Bonaccorsi di Patti (2006) focus on the US banking industry to explore the relationship between leverage and performance. While the authors use an inverse proxy for leverage, namely the equity capital ratio (i.e. the ratio of equity to gross total assets), due to the nature of the banking industry, they employ profit efficiency to measure performance (i.e. frontier efficiency computed using a profit function). Using a sample of 7548 US banks over the period 1990 to 1995, they find a positive relationship between leverage and bank performance after controlling for the endogeneity of debt.

Margaritis and Psillaki (2010) employ a sample of French manufacturing firms over the period 2002 to 2005 to examine the impact of leverage on firm performance. Unlike the previous studies, they also examine the potential non-linear relationship between leverage and firm's performance, consistent with the argument that a lower level of leverage provides managers with the necessary incentive to improve performance but, at a high level of leverage, the costs of debt (arising from asset substitution effects and underinvestment problems) may overwhelm the benefit. Using firm's efficiency as an indicator of firm performance, the authors find a non-

linear (inverted U-shaped) relationship between leverage and firm's performance, which is consistent with their hypothesis.

Weill (2008) uses a sample of about 11836 medium-sized manufacturing companies from 7 European countries for 3 years: 1998, 1999, and 2000, to examine the relationship between leverage and corporate performance.⁶⁷ Using frontier efficiency techniques to measure the performance of firms, the author finds that the relationship between leverage and corporate performance varies across countries, i.e. it is significantly positive in five countries, namely Belgium, France, German, Norway and Spain, but significantly negative in Italy and not significant in Portugal, suggesting the influence of institutional factors on this link. More specifically, the author suggests the efficiency of the legal system influences the relationship between leverage and corporate performance. In other words, the efficiency of the legal system is able to exert a reduction in the moral hazard problems between shareholders and lenders.

Research focusing on emerging market also examines the impact of leverage on corporate performance. For example, Majumdar and Chhibber (1999) examine the relationship between the levels of debt in the capital structure and performance for a sample of 1000 Indian firms and find the relationship to be significantly negative.⁶⁸ They attribute this finding to the structure of capital markets in India, where both short-term and long-term lending institutions are almost completely state-owned (during the sample period) and do not effectively monitor their debt holders.

As a follow up work of Majumdar and Chhibber (1999), Sarkar and Sarkar (2008) use a later period cross-sectional data set of Indian listed manufacturing firms for three financial years, namely 1996, 2000 and 2003, to examine the link between the leverage and firm performance. As found in McConnell and Servaes (1995) for the US firms, they observe a positive relationship between leverage and Tobin's Q, for firm with low growth opportunities and a negative relationship for firms with high

⁶⁷ Their international sample consists of 1279 firms from Belgium, 3029 from France, 314 from Germany, 4403 from Italy, 409 from Norway, 90 from Portugal, and 2312 from Spain.

⁶⁸ They collected (cross-sectional) data for each firm for one of the years between 1988 and 1994, depending on the availability of all key variables for that year.

growth opportunities.⁶⁹ These results are consistent with the ‘free cash-flow’ hypothesis of Jensen (1986), and with Myer’s (1977) underinvestment problem, respectively. Moreover, their analysis indicates that in the early period of institutional change, debt did not act as a disciplining mechanism to mitigate conflicts between managers and shareholders in either standalone or group affiliated firms, but, in the later period, debt became as an effective disciplining device in constraining managers’ opportunistic behavior when institutions had become more market oriented.

5.2.2.2. Existing evidence on the relationship between debt maturity structure and corporate performance

Previous studies on the relationship between debt maturity and firm performance show that debt maturity structure has an important impact on firm performance. For example, one of the early empirical studies is by Schiantarelli and Sembenelli (1996). Using a sample of 604 UK listed firms over the period 1976-1991 and 750 Italian firms over the period 1977-1990, they investigate the impact of firms’ maturity structure (measured as long term debt divided by the sum of long term and short term financial debt) on corporate performance (which is measured by log of sales divided by the capital stock). They find that there is a positive relationship between debt maturity (which is defined as the proportion of long-term debt) and firm’s performance, suggesting that long-term debt allows access to better technologies and thus increases performance. Thus, they do not find support for the idea that short-term debt is conducive for improving firms’ performance. Furthermore, they find evidence that leverage (the ratio of total debt to total assets) is negatively related to performance for both Italian and UK firms. Their results suggest that the use of high levels of leverage produce significant agency cost (such as bankruptcy costs and financial distress) and hence decreases the firm’s performance.

Schiantarelli and Jaramillo (1996) use a panel data set of 731 Ecuadorian manufacturing companies over the period 1984-1988 to empirically investigate the

⁶⁹ The sample consists of 1,211 companies, 1,024 companies, and 1266 companies in 1996, 2000 and 2003, respectively.

effects of firms' debt maturity structure on profitability for Ecuador. They measure the length of maturity by the ratio of total long-term liabilities to total liabilities. A standard Cobb-Douglas production function is estimated, with the logarithm of the real value of sales as a proxy for output and capital, labor and materials as inputs in addition to financial variables. They find that debt maturity is positively related to productivity. They suggest that long-term debt may improve firms' productivity because it may allow firms access to better and more productive technologies, which the firm may be reluctant to finance with short-term debt because of fears of liquidation. However, they do not find any relationship between the total debt to total assets ratio and firm performance.

Similarly, using an unbalanced panel of public limited companies over the period 1980/81 to 1989/90, Schiantarelli and Srivastava (1996) estimate a Cobb-Douglas production function to see the impact of maturity on firm level total factor productivity (TFP) for India. They find that while debt maturity is positively associated with firm performance, leverage is negatively related to performance. They suggest that the negative effect of leverage may be attributed to (i) the fact that with more leveraging, the moral hazard problem is exacerbated and there may be fewer incentives for controlling-shareholders to strive for efficiency since they reap a smaller fraction of the rewards; (ii) the fact that since rehabilitation packages and re-financing are common for so called 'sick' firms, high leverage may indicate an inherently bad firm/project.

By contrast, using a large sample of 15,000 US manufacturing firms over the period 1984–2005 and 125,000 German firms over the period 1988 to 2000, Baum et al. (2007) find a positive relationship between the proportion of short-term debt to total debt, and German firms' profitability, but short-term debt does not have any impact on US firms' profitability, suggesting that the nature of the financial system (i.e., whether countries are market based or bank based economies) plays an important role in determining the effect of debt maturity structure on ROA. Furthermore, they find that the performance of larger German firms is more sensitive to their short-term debt ratio compared to their smaller ones. Similarly, the German firms with high short-term debt have a larger profitability compared to those with low short-term debt. Therefore, the authors provide evidence that not only firm-specific characteristics

but also the nature of the financial system are important mechanisms through which debt maturity affects performance.

Abor (2005) uses data from Ghana Stock Exchange (GSE) during a five-year period (1998 -2002) and finds a positive relationship between short-term debt and performance (measured by ROE). He also notes that short-term debt is the major source of financing for Ghanaian firms, representing 85 percent of total debt financing. In a similar vein, using an unbalanced panel of 167 Jordanian companies over the period 1989 to 2003, Zeitun and Tian (2007) find a positive relationship between short-term debt and firm performance, suggesting that firms with a high growth rate use more short-term debt in order to avoid underinvestment problem and thus they exhibit a high performance. However, these latter two studies do not control for potential endogeneity or persistency in firm performance.

Although prior studies suggest that both firms' capital structure and maturity structures of debt play an important role in determining the corporate performance, to the best of our knowledge, so far, no single study has examined in this area in the context of Chinese listed companies.

5.2.3. Our contributions

Our study contributes to the existing literature in many ways. First, we provide the first evidence on the effect of capital structure on performance for Chinese listed companies. Previous studies have in fact looked at the effect of capital structure on performance in the context of developed markets (see McConnell and Servaes, 1995; Dessi and Robertson, 2003). Yet, to the best of our knowledge, no study has examined this issue in the context of China, the largest emerging economy.

Second, although one paper examines the determinants of debt maturity in China (Cai et al., 2011), to the best of our knowledge, there is no evidence on the effect of debt maturity on performance in China. By analyzing this issue, we therefore add to the very limited but growing literature on the effects of debt maturity on firm performance.

Finally, for the first time, we examine the impact of capital structure decisions on corporate performance, differentiating between state-controlled and privately controlled firms. This distinction is particularly relevant in the Chinese context, as we discussed in previous chapters.

5.3. Hypothesis development

In this section, we develop our hypotheses by discussing how leverage and debt maturity (the proportion of short-term debt) are likely to affect Chinese firm's performance.

5.4.1 Leverage and firm performance

The agency theory suggests that leverage may help to mitigate agency problems arising from the conflict of interest between shareholder and managers. Jensen (1986) suggests that the fixed interest payment to the debt holders reduces the free cash flow available for managers' discretionary spending. (Grossman and Hart 1982, Jensen 1986, Williams 1987). Zwiebel, (1996) suggest that debt is a commitment device for executives .That is, since the interest payment to debt holders is a legal obligation, the failure to meet this obligation has potential for risk of bankruptcy and the resulting loss of reputation and jobs for managers (Fama, 1980; Grossman and Hard, 1982; and Williams, 1987). This provides managers with an incentive to work hard and consume fewer perquisites (Grossman and Hart, 1982 and Zwiebel, 1996). For example, Aghion and Bolton (1992) and Gilson (1990) show that financial distress or continuous low profits may lead to a shift of control of the firm to debt holders, which often result in the replacement of incumbent managers. Furthermore, debt financing also bring managers activities to a close monitoring of a third party (debt-holders) and more generally by the financial market (Jensen and Meckling, 1976; Rajan and Winton, 1995; and Stulz, 2000). These arguments suggest that debt financing help to align managerial incentives with those of shareholders and thus improve corporate performance. According to these studies, increasing the level of leverage results in lower the agency costs of equity and thereby improves firm performance. By contrast, when leverage becomes relatively high, further increase in leverage

increases the chances of bankruptcy or financial distress, resulting in decreased firm performance.

However, empirical results on the relationship between leverage and performance are mixed. Some researchers (Agrawal and Knoeber, 1996; Dessi and Robertson, 2003) show that debt is endogenously determined in light of both observed and unobserved firm characteristics in ways consistent with value maximization. Other researchers (e.g. Majumdar and Chhibber, 1999) find the relationship to be negative. By contrast, Berger and Udell (2006) find a positive relationship between leverage and performance even after controlling for endogeneity. Weill (2008) finds that the relationship between leverage and corporate performance varies across countries, i.e. it is significantly positive in five countries, namely Belgium, France, Germany, Norway and Spain, but significantly negative in Italy and not significant in Portugal, suggesting the influence of institutional factors on this link. Sarkar and Sarkar (2008) show that debt financing has become an effective governance mechanism for Indian firms with the improvement in the institutional environment which has become market oriented.

In the context of Chinese listed companies, early empirical studies, for example Tian and Estrin (2007) and Firth et al. (2008) provide evidence consistent with the notion that the Chinese government's ownership of both banks and firms, and the resultant soft budget constraints make debt an ineffective governance mechanism in addressing agency conflicts, especially for SOEs. This is because lenders (it is often government owned banks) have no incentive to monitor managers/ controlling shareholders behaviour, since government would not allow to fail these both institutions. However, with a series of reforms of the banking system and improvement in the governance of the Chinese financial sector, banks now use commercial judgment and prudence in their lending decisions (Cull and Xu, 2005; Ayyagari et al., 2008; Firth et al. 2009) and loan officers are now responsible for their poor lending decisions (Allen et al., 2012). Therefore, we would expect banks to monitor their borrowers. In light of these developments, recent research on Chinese listed firms suggests that bank financing is more likely to work as a governance mechanism that constrains managers' misconduct and thus helps improve investment efficiency in both state controlled and privately controlled firms (Chan et al, 2012; Lin and Bo, 2012; Tsai et al. 2014). We thus expect to observe a

significant positive relationship between leverage and corporate performances. In this study, following Margaritis and Psillaki (2010), we measure leverage (*TLEV*) by the ratio of the book value of total debt to the book value of total assets. Based on the above arguments, we hypothesise that:

H1: There is a significant positive relationship between leverage and firm's performance.

5.4.2 Debt maturity (proportion of short-term debt to total debt) and firm performance

Myers (1977) suggests that conflicts of interest between shareholders and bond holders over the exercise of growth options can be mitigated by the use of short-term debt in the capital structure. This results in a reduction in the underinvestment problem and thereby in an improvement in firm performance. Firms with greater growth options face greater underinvestment problems. Therefore, firms with high growth options prefer short-term debt. If, instead, firms whose investment sets contain more growth opportunities chose a longer maturity of debt, this could raise a conflict between stockholders and bondholders, leading to an underinvestment problem, and hence resulting in decreased firm performance.

Furthermore, it is argued that short-term debt is more effective than long term debt in disciplining managers by imposing a refinancing pressure on them. In particular, short maturity debt can serve as a mechanism to transfer control rights from debtors to creditors, (e.g., Diamond, 1991, 2004; Hart and Moore, 1994, 1998; Rajan, 1992; Sharpe, 1991). Short-maturity debt exposes the firm to the capital market when the firm needs to roll-over the debt.

Despite of these incentive properties of short maturity debt, Hart and Moore (1995) show that short term debt provides managers an offsetting benefit, i.e. the flexibility to use assets in place to pursue empire building.

Although Baum et al. (2007) find a positive effect of the proportion of short-term debt on German firms' (a bank-based economy) performance (ROA)⁷⁰, consistent with Hart and Moore (1995), Schiantarelli and Sembenelli (1996), Schiantarelli and Jaramillo (1996) and Schiantarelli and Srivastava (1996) all provide empirical evidence that short term debt is not conducive to improve firm performance measured by total factor productivity.

Following Baum et al. (2007), we use proportion of short-term debt (*PROP_STLEV*) as a proxy for debt maturity. Previous empirical studies on capital structure decisions show that for an average Chinese firm, about 86% of total debt is due within one year which implies that short-term debt is popular among Chinese firms (Table 5.2). Huyghebaert and Wang (2013) point out that Chinese banks try to curb their bigger exposure to firm-specific risk, arising from a more market-oriented lending policy, by shortening debt maturity. However, long-term debt may improve firms' productivity because it may allow firms access to better and more productive technologies, which the firm may be reluctant to finance with short-term debt due to high level of liquidity risk as argued in Schiantarelli and Jaramillo (1996). Therefore, we would expect to observe a negative relationship between proportion of short-term debt and performance. We thus hypothesise that:

H2: There is a significant negative relationship between a firm's proportion of short-term debt in total debt and its performance (equivalently, there is a significant positive relationship between a firm's proportion of long-term debt in total debt and its performance).

5.4. Baseline specification and estimation methodology

5.4.1. Baseline specification

Following Baum et al. (2007) and Wintoki et al. (2012), we estimate the following baseline model (equations 5.1) to formally check the relationship between leverage, the proportion of short-term debt in total debt, and corporate performance.

⁷⁰ Yet, this relationship is not observed for US firms.

$$\text{PERF}_{it} = \beta_0 + \beta_1\text{PERF}_{i-1} + \beta_2\text{PERF}_{i-2} + \beta_3\text{TLEV}_{it} + \beta_4 \text{PROP_STLEV}_{it} + \beta_5\text{SIZE}_{it} + \beta_6\text{TANG}_{it} + \beta_7\text{SAGROWTH}_{it} + \beta_8\text{INVENT}_{it} + \beta_9\text{LIQ}_{it} + \beta_{10}\text{FAGE}_{it} + v_i + v_t + e_{it}. \quad (5.1)$$

where i indexes firms and t , years. The error term in Equations (5.1) is made up of two components: v_i is a firm-specific effect; v_t , a time-specific effect, which we control for by including time dummies capturing business cycle effects. e_{it} is an idiosyncratic component. The list of variables used in the paper, their definition and expected sign are summarized in Table A5. Finally, following Dessi and Robertson, (2003), Baum et al. (2007) and Wintoki et al. (2012) to account for persistency in performance and dynamic endogeneity of debt, we include two lags of our performance measures among our explanatory variables in equations (5.1).⁷¹ Following Schiantarelli and Sembenelli (1996), Schiantarelli and Jaramillo (1996) and Schiantarelli and Srivastava (1996) we include both leverage and the proportion of short-term debt to total debt in our performance equation to see the impact of both leverage and its maturity on corporate performance.

5.4.1.1. Performance Measures

To assess the impact of capital structure on the performance of the Chinese listed firms, following Baum et al. (2007) and Wintoki et al. (2012), we use the return on assets (ROA) as our main firm performance measure. ROA is defined as operating income before interest, tax and depreciation divided by year-end total assets. In addition, return on sales (*ROS*) and productivity (*PROD*) are also used as additional performance measures. As in Wintoki et al. (2012), the *ROS* which is defined as operating income before interest, tax and depreciation to sales is used as an alternative measure of profitability. Following Avivasian et al. (2005), we also use productivity (*PROD*), which is measured by real sales divided by total number of employees to measure efficiency of firms.⁷² These two attributes (profitability and productivity) are perhaps the most important indicators of Chinese firms' performance because enhancing the profitability and efficiency of the SOEs through the corporate governance reforms such as corporatization, partial privatization and

⁷¹ Glen et al. (2001) and Gschwandtner (2005) analyse persistence in profitability and suggest that two lags are sufficient to capture persistence.

⁷² Another study by Berger and Bonaccorsi di Patti (2006) use profit efficiency (i.e. frontier efficiency computed using a profit function) for measuring corporate performance.

split-share structure reform were the main goals advanced by the government.

Although economists prefer to use stock market performance measures such as Tobin's Q or the market to book ratio of equity to measure performance, we use two accounting-based performance measures (i.e. ROA and ROS) which are most commonly used in the literature, particularly in emerging markets.⁷³ Using Tobin's Q as a measure of firm performance to study the relationship between governance mechanisms such as debt financing and performance can be problematic in the Chinese context for two reasons (Demsetz and Vilalonga, 2001; Wintoki et al., 2012; Conyon and He, 2012a and 2012b). Firstly, Tobin's Q is normally defined as the market value of equity and debt to the replacement value of assets, and represents growth opportunities. Based on the empirical support provided by Boone et al. (2007), Linck et al. (2008), and Lehn et al. (2008), Wintoki et al. (2012) argue that growth opportunities can be considered as a cause, rather than a consequence, of governance structures. Secondly, it is argued that the lack of information transparency and opaqueness in the Chinese financial markets make accounting-based firm performance measures rather than stock market measures more informative to shareholders in evaluating governance and performance relationship in China (Morck et al., 2000; Jin & Myers, 2006; Conyon and He 2012a and 2012b).

5.4.1.2. Capital structure variables

The main independent variables are total leverage (denoted by $TLEV$), and the proportion of short-term debt in total debt (denoted by $PROP_STLEV$), which are used to capture the effect of capital structure decisions on corporate performance in our specifications, equations 5.1. Following Dessi and Robertson, (2003) and Margaritis and Psillaki (2010), leverage is defined as the total debt to total assets ratio. As in Schiantarelli and Sembenelli (1999), Baum et al. (2007), we use proportion of short-term debt in total debt (short-term debt divided by total debt) as a proxy for debt maturity.

5.4.1.3. Control variables

⁷³ See, for example, Zeitun and Tian (2007), Abor (2005), Manawaduge et al. (2011).

Following previous studies (e.g., Majumdar and Chhibber, 1999; Dessi and Robertson, 2003; Baum et al., 2007; Margaritis and Psillaki, 2010), we also include several additional variables to control for a set of firm-specific characteristics that are likely to be correlated with firms' performance in our specifications (equations 5.1)

4.1.2.1. Firm size

Prior studies suggest that firm size is an important determinant of corporate performance and they find a positive relationship between firm size and performance, since larger firms are expected to have better technology, be more diversified and better managed than smaller firms. Large firms also perform better than smaller firms through economies of scale in monitoring top management and have a higher capacity for taking risks (Himmelberg et al., 1999; Greenaway et al., 2007; Dixon et al., 2015). In line with these arguments, we also expect to observe a positive relationship between firm size (*SIZE*) and performance in our sample.

4.1.2.2. Tangibility

Tangible assets can be monitored easily and are often used as collateral for debt (Himmelberg et al., 1999). Thus, they mitigate agency problems. However, diverse relationships can be observed between firms' performance and tangibility depending on the degree of efficient utilization of tangible assets by the firm. If a firm utilizes its tangible assets efficiently, then we would expect a positive relationship between tangibility and performance, otherwise the relationship would be negative.

Most of the previous studies report a positive relationship between tangibility and performance (see, for example, Margaritis and Psillaki, 2010). In line with this, we expect to observe a positive relationship between tangibility and firm's performance. Following previous research (Margaritis and Psillaki, 2010), we measure the tangibility (*TANG*) as the ratio of fixed tangible assets to total assets.

4.1.2.3. Sales growth

Majumdar and Chhibber (1999) suggest that sales growth can capture business-cycle effects and environmental volatility. Furthermore, since sales growth represents a

firm's growth prospects, they may be able to generate higher profit, suggesting that there should be a positive relationship between the sales growth and corporate performance. By contrast, such growth opportunities may attract new entrants, quite a common occurrence in emerging markets, which may reduce average profits for all players. Previous empirical studies report a positive effect of growth opportunities on firm performance (see Margaritis and Psillaki, 2010; Dessi and Robertson, 2003; Agarwal and Elston, 2001). In line with these studies, we expect to observe a positive relationship between sales growth and a firm's performance. Following Majumdar and Chhibber (1999), Margaritis and Psillaki (2010), growth opportunities (*SALGROWTH*) are measured by the growth of sales.

4.1.2.4. Inventories

This variable intends to control for industry-related effects since some industries need greater stockholding, but also help to account for business-cycle effects since in downturns (upturns) inventories tend to be accumulated (decumulated) (Majumdar and Chhibber, 1999). Since the stocking of inventories means a greater need for working capital, higher interest costs and, therefore, an erosion of profitability, there should be a negative relationship between inventory and firms' performance. In line with this explanation, we expect to observe a negative relationship between inventories and firms' performance. Following Majumdar and Chhibber (1999), inventory (*INVENT*) is measured by the ratio of inventories to total assets.

4.1.2.5. Liquidity

Liquidity is used to control for industry-related and business-cycle factors. Cash requirements for a firm reflect industry practices as well as the overall economic climate, since in lean times, cash-flow crises can arise. Furthermore, firm-specific attributes can also be captured by liquidity, since the management's ability to manage working capital and acquire a greater quantity of cash balances reflects superior skills which are also likely to be reflected in a firm's profitability. There should be therefore a positive relationship between corporate liquidity and performance. Previous empirical studies also report a positive effect of liquidity on firm performance (see for example Majumdar and Chhibber (1999) and Baum et al.

(2007)). Following Baum et al. (2007), liquidity (*LIQ*) is measured by the ratio of cash and cash equivalent to total assets.

5.4.2. Estimation methodology

5.4.2.1. Endogeneity

Endogeneity is an important concern in our study. First, our estimates may be affected by reverse causality (i.e., not only capital structure affect firms' performance, but the firms' performance may also affect the capital structure). On the one hand, according to Jensen's (1986) free cash flow hypothesis, debt may act as a valuable managerial incentive mechanism, because it commits managers to pay fixed interest payment to the debt holders, thereby reducing the free cash flow available to the managers' discretionary spending (i.e. empire-building investments). Thus, debt tends to increase firm's performance. On the other hand, more efficient firms are more likely to choose relatively higher levels of debt since the higher expected returns from the greater efficiency reduces the expected costs of bankruptcy and financial distress.

A second source of endogeneity is that unobservable characteristics of the firm (firm-specific fixed effects) are likely to affect both the firm's capital structure choices and its expected performance: for example, managers' ability and entrenchment (Zwiebel, 1996)⁷⁴.

Therefore, in order to address for the potential endogeneity issues, following Baum et al. (2007), we use the system Generalized Methods of Moments (GMM) estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). Please see section 3.5.2 (Chapter 3) for a detailed discussion on the GMM estimator. We use all right-hand side variables (except firm age and the dummy variables) lagged twice or more as instruments in the first-differenced equation, and first-differences of these same variables lagged once as instruments in the level equation.

⁷⁴ These are stable over time but will change across firms.

5.5. Data and descriptive statistics

In this section, we describe the dataset and sample that is used in our study and provide a discussion on summary statistics and correlation analysis of our variables.

5.5.1. Data and sample selection

The data used in this study are obtained from two Chinese databases, namely the China Stock Market Accounting Database (CSMAR) and Sino-fin for the period of 2003-2010. The sample is composed of publicly listed non-financial firms traded on the Shanghai and Shenzhen stock exchanges. Following the literature, we exclude financial firms from our analysis. To reduce the influence of potential outliers, we exclude observations in the one percent tails of each of the regression variables. Since we use two lags of the dependent variable in our empirical model, we end up with a panel of 6271 firm-year observations on 1420 companies over the period 2005-2010. The panel has an unbalanced structure.

5.5.2. Summary statistics

Table 5.1 presents descriptive statistics for the variables used in the analysis for the pooled full sample of firms. The pooled mean (median) return on assets (*ROA*) and return on sales (*ROS*) are 7.3% (7.2%) and 7.8% (7.4%), respectively. The pooled mean (median) productivity (*PROD*), measured as real sales per employee, is 0.50 million RMB (0.25).

The average (median) leverage to total assets ratio (*TLEV*) is 51.7 (52.5) per-cent, suggesting that about 50% of the firms' assets are financed by debt capital. We observe that the average (median) proportion of short-term debt to total debt (*PROP_STLVE*) is 86.6 % (92.6%). The minimum and maximum values of the short-term debt (*PROP_STLEV*) ratios range from 36.0 % to 100 % with a standard deviation of 15.1%.

With respect to the control variables included in our baseline model, average (median) size of the firms measured by natural logarithm of total assets is about

1.706 billion RMB (0.826 billion RMB)⁷⁵. The average (mean) tangible assets ratio, proxied by the ratio of fixed assets to total assets is given by 0.29 (0.27). The pooled mean (median) value of sales growth, measured by the real annual sales growth rate, is 13 % (9%). While the average (median) inventory ratio is 44% (37%), the pooled mean (median) value of liquidity, measured as firm's cash and cash equivalent scaled by its total assets, is 16% (13%). Finally, the average (median) firm age measured by number of years from the establishment of firm is 11.73 (12)

5.5.3. Correlation analysis

Table 5.2 reports the Pearson correlation coefficients between variables. Total leverage (*TLEV*) shows a negative correlation with firms' performance measured by *ROA* and *ROS*, while it shows a positive and statistically significant correlation with firms' performance measured by *PROD*. The proportion of long-term debt (*PROP_LTLEV*) exhibits a significant positive correlation with *ROA* and *ROS*, while the proportion of short-term debt (*PROP_STLEV*) exhibits a significant negative correlation with *ROA* and *ROS*, as we hypothesized (H2)..

Turning to control variables, as expected, firm size, sales growth and liquidity have a significant and positive correlation with *ROA*, *ROS* and *PROD*. While tangibility has a significant positive correlation with *ROA*, it is negatively associated with *ROS* and *PROD*. Finally, it is interesting to note that inventory and firm age have a negative but statistically insignificant correlation with *ROS*, while they show a significant negative correlation with *ROA*.

Finally, Table 5.2 suggests that given that the observed correlation coefficients are relatively low, multicollinearity should not be a serious problem in our study

5.6. Empirical results

5.6.1. The effect of leverage and maturity on firm performance

⁷⁵ It should be noted that although firm size is measured as the logarithm of total sales in the regression analysis, the figures reported in Table 2-the descriptive statistics are not in logarithms but as actual values.

The estimations of Equation 5.1 for all firms are shown in Table 5.3. Column (1) displays the results for all firms when the firm's performance is measured by ROA. Columns (2)-(3) report the results for sub-sample of firms when the firm's performance is measured by ROA.

As can be seen in column (1), when endogeneity is controlled for using the system GMM estimator, the estimated impact of leverage (*TLEV*) on firm's performance is positive and statistically significant, in line with our hypothesis H1. This finding is consistent with the agency theory, which suggests that debt financing is an effective mechanism to control agency costs by bringing in external monitoring and curbing discretionary spending (i.e. the fixed interest payment to the debt holders reduces the free cash flow available to the managers' discretionary spending) (Jensen, 1986), and thereby improves the firm performance. This finding is also consistent with findings of Berger and Udell (2006) for France and Weill (2008) for Belgium, France, Germany, Norway and Spain. Furthermore, calculating the economic significance from column (1), we find that incrementing leverage by one-standard deviation increases the firm's performance by 11 % of its mean.⁷⁶

More importantly, the estimated coefficient on long term debt/maturity (*LTLEV*) is positive and statistically significant, providing support to our hypothesis H2. Furthermore, calculating the economic significance from column (1), we find that incrementing the proportion of long-term debt by one-standard deviation increases the firm's performance by 10.7 % of its mean.⁷⁷ This finding corroborate with findings of Schiantarelli and Sembenelli (1996), Schiantarelli and Jaramillo (1996) and Schiantarelli and Srivastava (1996) who estimate an augmented Cobb-Douglas production function with leverage and maturity and find that short-term debt is not conducive to improve productivity but long term debt help improve firm level total factor productivity (TFP) for Italy and the UK, India and Ecuador, respectively. This finding is also consistent with Hart and Moore (1995) who show short-term debt can facilitate managerial empire building thereby decreasing the firm performance, whereas long term debt plays an opposite role. Additionally, Schiantarelli and

⁷⁶ This figure is given by the estimated coefficient on leverage (0.044) times its standard deviation (0.188), divided by the mean value of performance (0.073).

⁷⁷ This figure is given by the estimated coefficient on the proportion of long-term debt (0.052) times its standard deviation (0.151), divided by the mean value of performance (0.073).

Srivastava (1996) suggest that access to long-term debt may improve firms' productivity by allowing firms access to better and more productive technologies, which the firm may be reluctant to finance with short-term debt because of fears of liquidation and by removing the burden on the working capital, which may have adverse consequences on productivity. Furthermore, more recent research provide evidence suggesting that relaxing credit constraints and extending debt maturities can improve real investment in crisis period (Campello et al., 2010). Even in non-crisis times, long term debt allows firms to mitigate the potential rollover risk related to short maturity debt, as in Diamond (1991).

In addition, we verify how the impact of leverage (TLEV) and long term debt/maturity (LTLEV) on firm's performance differs between the sub-sample of state and non-state firms. As can be seen in columns (1) and (2) of Table, leverage (TLEV) and the proportion of the long-term debt (LTLEV) have a positive impact on firm's performance of private firms. Yet, this relationship is not observed for state firms.

Turning to the control variables, the estimated coefficients of the log of firm size (*SIZE*) is not significant in all columns. Tangibility (*TANG*) is positively related to ROA in columns (1) and (2), but the coefficient is insignificant in column (3) The estimated coefficient of sales growth (*SALGRTH*) is significantly positive in columns (1)-(3). The inventory to assets ratio (*INVENT*) is negatively related to ROA in columns (1) and (2). The estimated coefficient on firm's cash and cash equivalent to total assets ratio (*LIQ*) is positively significant in columns 1 and 2). These results suggest that larger, more liquid firms with better growth opportunities are characterized by better performance.

5.6.2 Robustness tests

Our results in Tables 5.3 are also robust to estimating Equation 1 by replacing return on assets with our productivity measure (which is measured by real sales divided by total number of employees), and return on sales.

Furthermore, we also distinguish the effects of debt and maturity structure on firms' performance between the pre and post-split share structure reform period. In an unreported results, we find that leverage and maturity mainly affect performance of Chinese listed firms in the post-reform period, suggesting that in the early period of institutional change, debt did not act as a disciplining mechanism to mitigate conflicts between managers and shareholders, but, in the later period, debt became as an effective disciplining device in constraining managers' opportunistic behavior when institutions had become more market oriented as observed in India By Sarker and Sarker (2005).

5.7 Conclusion

Corporate finance literature suggests that debt financing can be an effective mechanism to mitigate agency cost of equity by aligning interest of managers with that of shareholders. However, it creates agency costs of debt, for example underinvestment problem stemming from the conflicts of interest of shareholders and bondholders. In addition, research also focuses on the effects of debt maturity on the agency conflicts and corporate performance.

In this chapter, making use of a large panel of Chinese listed firms over the period 2003-2010, we examine the impact of debt and debt maturity structure on corporate performance, which we measure by profitability measures (namely, return on assets (ROA) and return on sales (ROS)) and a labour productivity measure proxied by total real sales divided by number of employees.

Using the system GMM estimator to control for unobserved heterogeneity, and the possible endogeneity of our regressors, we observe a positive relationship between leverage and the proportion of long term debt, on the one hand, and firms' performance, on the other. When differentiating between state and privately controlled firms, we find that leverage and long debt maturity positively affect corporate performance for privately controlled firms, while long debt maturity negatively affects corporate performance for state controlled firms. Our results also

suggest that debt and debt maturity positively affects firm performance only in the post-2005 split-share reform period.

Our research has significant policy implications it that it suggest that lenders such as banks may extend more long term credit to more productive private sector which helps to improve performance of these firms.

Table A5 Definition of variables

Variables	Name	Measures	Expected sign
Dependent Variable			
Performance:			
Return on assets	ROA	Operating income before interest, tax and depreciation/ year-end total assets.	
Return on sales	ROS	Operating income before interest, tax and depreciation/ sales	
Productivity	PROD	Real sales/ total number of employees	
Independent variables			
Leverage	TLEV	Total leverage/ total assets	+(H1)
Short-term debt	PROP_STLEV	Short-term liabilities/ total liabilities	-(H2)
Long-term debt	PROP_LTLEV	Long-term liabilities/ total liabilities	+(H2)
Control variables			
Size	SIZE	Natural logarithm of total sales	+
Tangibility	TANG	Fixed assets/ Total assets	+
Sales growth	SALGRTH	Sales/Total assets	+
Inventory	INVENT	Inventory/ Total assets	-
Liquidity	LIQ	Firm's cash and cash equivalent scaled by its total assets	+
State	STATE	Percentage of shares owned by the central government, local governments, or any entity representing the central or local governments.	
Firm age	FAGE	Logarithm of the number of years since the establishment of the firm	
Regional dummies		Dummies indicating whether the firm is located in the Coastal, Western, or Central region of China	
Year dummies		Year dummies for the years 2005 to 2010.	
Industry dummies		Dummies for the following four industrial groups based on the CSMAR B classification: Properties, Conglomerates, Industry, Commerce. Utilities and financial industries are excluded.	

Note: '+' means that the firm's performance increases with the variables, '-' means that the firm's performance decreases with the variables. Real sales are derived from the nominal figures using the deflator for China's GDP.

Table 5.1 Summary statistics of Chinese listed firms over the period of 2003 to 2010.

Variables	Obs.	Mean	Median	Std. Dev.	Min	Max
Return on assets (<i>ROA</i>)	6271	0.073	0.072	0.066	-0.386	0.272
Return on sales (<i>ROS</i>)	6271	0.078	0.074	0.177	-4.028	1.717
Productivity (<i>PROD</i>) (million RMB)	5631	0.508	0.253	0.862	0.022	9.308
Leverage ratio (<i>TLEV</i>)	6271	0.517	0.525	0.188	0.059	1.479
Short-term debt (<i>PROP_STLEV</i>)	6271	0.866	0.926	0.151	0.362	1.000
Long-term debt (<i>PROP_LTLEV</i>)	6271	0.134	0.074	0.151	0.000	0.638
Total assets (<i>SIZE</i>) (billion RMB)	6271	1.706	0.826	2.800	0.075	26.136
Tangibility (<i>TANG</i>)	6271	0.295	0.272	0.167	0.004	0.760
Sales growth (<i>SALGRTH</i>)	6271	0.131	0.091	0.342	-0.653	3.459
Inventory (<i>INTVENT</i>)	6271	0.439	0.373	0.317	0.001	1.719
Liquidity (<i>LIQ</i>)	6271	0.158	0.133	0.105	0.007	0.660
Firm age (<i>FAGE</i>)	6271	11.736	12.000	3.865	3.000	26.000

See Table A4 for definitions of all variables.

Table 5.2 Pearson correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12
1 <i>ROA</i>	1.00											
2 <i>ROS</i>	0.63*	1.00										
3 <i>PROD</i>	0.00	0.01	1.00									
4 <i>TLEV</i>	-0.33*	-0.26*	0.14*	1.00								
5 <i>PROP_STLEV</i>	-0.06*	-0.13*	0.01	-0.13*	1.00							
6 <i>PROP_LTLEV</i>	0.06*	0.13*	-0.01	0.13*	-1.00*	1.00						
7 <i>TANG</i>	0.13*	-0.04*	-0.22*	0.03*	-0.25*	0.25*	1.00					
8 <i>SALGRTH</i>	0.26*	0.18*	0.09*	0.05*	-0.04*	0.04*	-0.04*	1.00				
9 <i>INVENT</i>	-0.08*	-0.00	0.18*	0.18*	0.12*	-0.12*	-0.44*	0.10*	1.00			
10 <i>LIQ</i>	0.14*	0.11*	0.07*	-0.28*	0.20*	-0.20*	-0.38*	0.04*	-0.08*	1.00		
11 <i>SIZE</i>	0.09*	0.08*	0.15*	0.18*	-0.29*	0.29*	0.06*	0.09*	0.04*	-0.03*	1.00	
12 <i>FAGE</i>	-0.08*	-0.02	0.06*	0.15*	-0.06*	0.05*	-0.06*	-0.05*	0.05*	-0.05*	0.07*	1.00

Notes: This table reports Pearson correlation coefficients. * denotes significance at the 5% level. See Table A4 in the Appendix for definitions of all variables.

Table 5.3 Leverage, debt maturity and corporate performance measured by return on assets (ROA)

	Full sample	Non-state controlled firms	State controlled firms
	(1)	(2)	(3)
<i>ROA_{it-1}</i>	0.415*** (0.034)	0.465*** (0.055)	0.493*** (0.113)
<i>ROA_{it-2}</i>	0.086*** (0.027)	0.056 (0.050)	0.032 (0.048)
<i>TLEV</i>	0.044* (0.024)	0.110*** (0.039)	-0.056** (0.028)
<i>LTLEV</i>	0.052* (0.031)	0.124* (0.063)	0.012 (0.027)
<i>SIZE</i>	-0.001 (0.003)	-0.011 (0.008)	0.006 (0.004)
<i>TANG</i>	0.069*** (0.019)	0.016* (0.09)	0.057 (0.043)
<i>SALGRTH</i>	0.047*** (0.012)	0.029** (0.014)	0.047*** (0.016)
<i>INVENT</i>	-0.016* (0.009)	-0.028** (0.013)	-0.006 (0.015)
<i>LIQ</i>	0.125*** (0.031)	0.154** (0.067)	0.042 (0.050)
<i>FAGE</i>	-0.005* (0.003)	-0.006 (0.007)	0.001 (0.004)
<i>Regional dummies</i>	yes	yes	yes
<i>Industry dummies</i>	yes	yes	yes
<i>Year dummies</i>	yes	yes	yes
<i>Firm fixed effects</i>	yes	yes	yes
<i>Observations</i>	6271	1990	4281
<i>Hansen test (p values)</i>	0.369	0.736	0.205
<i>m1 (p values)</i>	0.000	0.000	0.000
<i>m2 (p values)</i>	0.155	0.179	0.191

Notes: Asymptotic standard errors robust to heteroskedasticity are reported in parentheses. All equations were estimated using the system GMM estimator, *AR2* is a test for second-order serial correlation of the differenced residuals, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation. The Hansen *J* test of over-identifying restrictions is distributed as *Chi-square* under the null of instrument validity. We treat all right-hand side variables except firm age and dummy variables as potentially endogenous. ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively. See Table A4 for definitions of all variables.

Chapter 6

Conclusions

6.1. Background

While Modigliani and Miller's (1958) irrelevant theory shows that under perfect capital market conditions, capital structure is irrelevant to the value of a firm, subsequent refinements and developments in the relevant literature argue that the prevalence of a variety of market frictions (such as taxes, bankruptcy costs, asymmetric information and agency problems) make capital structure decisions relevant to the value of the firm (e.g., Jensen and Meckling, 1976; Myers, 1977). A great deal of theoretical and empirical research in corporate finance has thus focused not only on the determinants of capital structure decisions (i.e. debt versus equity choice) and debt maturity decisions (short-term debt versus long term debt), but also effects of these financial policy choices on corporate performance in the context of Western countries. Agency costs and asymmetric information theories are used as the dominant theoretical frameworks underlying corporate governance and capital structure research.

In this study, we investigate the determinants of leverage and debt maturity choices and effects of these financing choices on corporate performance of Chinese listed firms. China provides us an interesting research setting. In line with China's wider economic reform initiated in the late 1970s, the government has taken various measures aimed at improving the corporate governance of former SOEs, on the one hand and the banking industry, on the other. In the early 1990s, government resorted to the partial privatization of selected former SOEs where the government or government agents still retained considerable ownership stakes. This led to Chinese listed firms characterized not only by the separation of ownership and control but also by having a controlling/large shareholders (which is often state) who often control corporate affairs. These features of China's modern corporations resulted in agency conflicts not only between the managers and the owners, but also between the controlling shareholders and minority shareholders. In addition, these state controlled firms were facing the problems of weaker incentives for managers, and

soft budget constraints arising from government's dual role as owner of commercial enterprises and owner of banks, as well as from the fact that the government often tended to use firms to achieve its social and political objectives such as full employment (Lin et al., 1998; Kato and Long, 2006a, b, c and 2011). Furthermore, before the 2005 split-share-reform, the majority of shares which were owned by controlling shareholders were non-tradable; therefore, controlling shareholders often resorted to reap private benefits via tunnelling detrimental to minority shareholders' interests (Jiang et al., 2010; Chen et al., 2012).

Yet, Chinese corporate governance system has undergone many changes during the last decade. In addition to the introduction of a corporate governance code and an independent director system, Chinese firms' ownership structures have changed tremendously following the 2005 split-share structure reform in which a large part of non-tradable shares have been converted to tradable shares. Furthermore, the number of privately controlled listed firms has steadily increased (Conyon and He, 2011). As part of these reforms, managerial shareholding has also increased considerably after 2005. On the other hand, Chinese banking system has improved significantly and become more efficient in the recent years (Allen et al., 2012).⁷⁸

In light of these developments, in this study, we have investigated the determinants of leverage and debt maturity choices and effects of these financing choices on corporate performance, especially from the agency costs perspective. Making use of a large panel of Chinese listed firms over the period 2003-2010, we have focused our investigation on three main themes.

Our first investigation focuses on the linkages between ownership and corporate governance structure and capital structure decisions. Although the use of debt financing in the capital structure offers many advantages, given the separation of ownership and control in modern corporations, the self-interested and risk adverse managers with the discretion to make decisions may be reluctant to use it. This is due to the fact that debt financing not only involves inherent financial risk (potential for bankruptcy) but also bring in external monitoring. Therefore, the capital structure decisions themselves are subject to an agency problem of discretion. It is expected

⁷⁸ See chapter two for a detailed discussion

that managerial equity ownership and other governance mechanisms can be effective in aligning managerial and shareholder interest to reduce such agency problems (Jensen and Meckling, 1976). Although a limited number of empirical studies have examined the relationship between corporate governance variables and firm's leverage in the context of Western countries, such as the US and UK, there is lack of research in this area in China. Our first empirical study (Chapter 3) uses a large dataset of Chinese listed companies over the period 2003-2010, to examine the impact of managerial ownership and other corporate governance variables on firm's capital structure decisions. This study uses the system GMM estimator as main estimation methodology since it is a powerful tool to account for unobserved firm heterogeneity and the potential endogeneity of the regressors (Arellano and Bover, 1995; Blundell and Bond 1998).

Our second empirical study (Chapter 4) uses the same dataset to examine, for the first time in the Chinese context, the attenuation effect (i.e. lessening the negative effects of growth opportunities on leverage) and liquidity risk effect of short-debt maturity on leverage. Although limited evidence is available from developed countries on this topic, to the best of our knowledge, no study has focused in this area in China. This study fills this gap. The system GMM estimator is used to estimate leverage and debt maturity equations, which control for unobserved heterogeneity and potential endogeneity of all regressors.

Although previous studies have examined empirically the impact of capital structure choice and maturity structure decisions on firms' performance in the context of developed economies, to the best of our knowledge, there is no a single research research that has focused on this issue in China. In order to fill this gap, our third empirical chapter (Chapter 5) uses recent data over the period of 2003-2010, to examine impact of capital structure decisions and maturity structure on corporate performance of Chinese listed firms, which are measured using ROA, ROS, and productivity.

6.2. Summary of main findings

The main finding arising from the analysis in the first empirical chapter is that there is a linear relationship between managerial ownership and firms' leverage after controlling for potential unobserved firm characteristic and endogeneity. This is consistent with the incentive alignment hypothesis of Jensen and Meckling (1976) which suggests that greater managerial shareholding leads to a better alignment of the interest of insiders and outsiders, which in turn motivates managers to adopt more risky financial choices by using relatively more leverage. We also observe that state ownership is negatively associated with leverage. Furthermore, the proportions of independent directors/board composition and board size generally do not influence firms' capital structure decisions.

When distinguishing the effects of managerial ownership on firms' leverage between state- and privately controlled firms as well as between the pre- and post-reform period, we provide additional evidence that managerial ownership works as an effective governance device influencing firms' leverage decisions of private firms while managerial ownership is positively related to leverage ratios only in the post-reform period.

Based on the empirical investigation undertaken in Chapter 4, we first document a negative relationship between growth opportunities and leverage. This result suggests that Chinese listed firms face underinvestment problem (debt overhang) due to the conflicts of interest between shareholders and debtholders/lenders. Second, we find a positive relationship between leverage and growth opportunities interacted with measure of short-term debt, suggesting that the proportion of short-term debt attenuates the negative effect of growth opportunities on leverage. Additionally, we also report that short-term debt is negatively related to leverage, suggesting that firms with a higher leverage ratio prefer a longer maturity of debt in order to avoid the liquidity risk problems associated with short-term debt. When we distinguish between state owned firms and privately controlled firms, we find evidence that these effects are only relevant to privately controlled firms. Surprisingly, we also find that even though Chinese listed firms use a large amount of short-term debt in the capital structure, the rollover /liquidity risk appears to be less important for

them as opposed to the findings reported by Johnson for US firms. We suggest that these differences can be explained by the institutional environment in which these firms operate.

In our third chapter, controlling for unobserved firm characteristics and endogeneity, we document that a direct relationship between leverage and the proportion of long-term debt, firms' performance, as measured by return on assets (ROA), return on sales (ROS) or productivity. This study suggests that debt financing works as an effective governance mechanism through which Chinese listed firms can mitigate agency problems. When distinguishing between state and privately controlled firms, we find that leverage and the proportion of long-term debt only affect the performance of private firms.

When distinguishing the effects of debt and maturity structure on firms' performance between the pre and post-split share structure reform period, we find that leverage and maturity mainly affect performance of Chinese listed firms in the post-reform period, suggesting that in the early period of institutional change, debt did not act as a disciplining mechanism to mitigate conflicts between managers and shareholders, but, in the later period, debt became as an effective disciplining device in constraining managers' opportunistic behavior when institutions had become more market oriented.

6.3. Potential implications

Our research has significant policy implications for managers, owners, potential investors and the government. First, our research provides evidence that managerial ownership has become as an important governance mechanism in the post reform period, which influences firm's leverage significantly. Managerial ownership provides managers with necessary incentives to take risky financial choices and thus use more debt in the capital structure. Our results therefore suggest that the Chinese government's recent ownership reform that encourages managerial ownership in listed firms have been successful. Yet, managerial ownership is effective in alleviating agency conflicts only for privately controlled firms. This is consistent

with our data which show that managerial ownership has increased significantly only in privately-controlled firms. Furthermore, our study shows that state ownership is negatively related to leverage. Main implication that arises from our first empirical analysis is that while managerial ownership should be further encouraged in the state-controlled sector which helps to overcome weak managerial incentive problem faced by them, the government ownership which still characterizes the majority of Chinese listed firms and weakens incentive mechanisms for managers in them should be further reduced so as to enable these firms to make appropriate financial choices.

Second, we find that independent directors do not exert any influence on capital structure decisions. Our findings therefore suggest that a strong independent board structure with independent directors having suitable qualifications and relevant business experience should be encouraged in the Chinese listed corporations in order to improve their corporate governance.

Third, our study has important implication for Diamond's (1991) liquidity risk hypothesis in that our study shows that institutional factors have significant influence on the liquidity risk faced by firms when they use more short-term debt in their capital structure. In particular, our analysis shows that compared to their Western counterparts, liquidity risk arising from the use of larger proportion of short-term debt is economically has small effect for Chinese listed firms. This can be attributed to the fact that while state ownership in the state controlled firms provide implicit guarantee that government would not allow them fail whereas privately controlled firms use networks/personal relations, reputations and trust to rollover their debt without facing much liquidity risk problem (Huyghebaert & Wang, 2013).

Finally, our study suggests that leverage works as an effective governance mechanism in mitigating agency conflict in China, thereby influence firms' performance. This suggests that the recent banking system reform has been successful in mitigating the political influence, soft budget constraints and inefficient lending practices which had been long standing issues in the Chinese banking sector. That is, Chinese banking system has become efficient in allocating resources to corporate sector in recent years. Therefore, Chinese banking sector should be further

improved by further development of financial institutions outside the Big Four banks such as foreign banks and private domestic banks and extending more long term credit to more productive private sector.

6.4. Limitations and suggestions for further research

Whilst our research suffers from a number of limitations, these limitations stimulate a number of researchable ideas and open more avenues for future investigation.

First, we do not examine the effect of stock options on leverage due to availability of limited data. Yet, Chinese listed firms have started using stock options in their incentive contracts to managers in a limited scale in recent years. Future research may be able to examine impact of stock options on firms' leverage and other risky activities of Chinese firms.

Second, in China, institutional investor types such as pension funds, insurance companies, mutual funds have been very small but are growing faster and play a vital role in corporate governances (CSRC, 2013). Future research can extend our study by examining how institutional shareholder types affect firms' capital structure by closely monitoring managers' behaviour and influencing firms' decisions.

Third, since rating system in China has not been well developed (Allen et al., 2012), we are unable to see how importance of attenuation and liquidity risk effects differs between rated and unrated firms.

Finally, in future research, we also plan to undertake a comparative analysis of the attenuation and liquidity risk effects of shorter maturity debt on leverage as well as effects of leverage and maturity on corporate performance in China, other emerging economies, and developed countries. This would enable us to clearly disentangle influence of institutional factors on the above mentioned linkages in corporate finance.

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