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Powerful CEOs, debt financing, and leasing in Chinese SMEs: Evidence from threshold model

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ABSTRACT

This study investigates the impacts of CEO power on firm financing policies (i.e. debt financing and operating leasing) using the Caner and Hansen (2004) instrumental variable threshold regressions approach. The sample consists of a panel of 297 Chinese listed small and medium sized enterprises (SMEs) over the period 2009–2012. The empirical results indicate that there are threshold effects in the CEO power-debt relationship and CEO power-operating lease relationship. In particular, we find that firms tend to use more debt financing (and operating leasing) when CEO power index below a certain threshold level; beyond the threshold level, CEO tends to manipulate firm capital structure to pursue their own interests, thus using less debt financing and operating leasing. In addition, our estimation results suggest a positive relationship between debt and operating leases when CEO power is smaller than certain threshold, while it becomes negative if the power index exceeds the threshold level.

1. Introduction

Since the seminal work of Modigliani and Miller (1958), several theories have been developed explaining the determinants of capital structure, including the agency theory (Jensen & Meckling, 1976) and the trade-off theory (Miller, 1977). Building on these theories, previous empirical studies have provided evidence that firm- and industry-level characteristics play important roles in shaping firms' financing decisions. The majority of existing evidence is based on firms in industrialised countries with little attention to emerging markets. Some of financial economists argue that the previously identified factors in the developed countries studies are also crucial in developing countries (e.g., Booth, Aivazian, Demirgüç-Kunt, & Maksimovic, 2001; Demirgüç-Kunt & Maksimovic, 1999). Therefore, a growing number of recent studies have intensively examined whether the classic theories as well as evidence derived from developed countries also work in emerging-market countries. However, to date, little attention has been paid on investigating the role of individual executives in affecting corporate financing policies, particularly in developing countries (Jiraporn, Chintrakarn, & Liu, 2012; Liu & Jiraporn, 2010). This is surprising given the capital structure decision is one of the main decisions made by executives (Bertrand &

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Schoar, 2002). Thus, this study aims to examine the effects of CEO characteristics on firms' financing decisions, specifically, the relationship between CEO power and Chinese SMEs' capital structure.

The imperfect alignment of interests between executives of the firm and owners of the firm can lead to agency costs (i.e. type I agency problem). For example, CEOs may be subject to self-serving behaviours such as using corporate resources to enhance their own benefits instead of investing in good investment projects that can benefit shareholders. One prescription for alleviating such agency problem is to use more debt-type financing, because interest payments impose constraints on CEOs' control over the free cash flows (Jensen, 1986). In addition, the use of debt-type financing can increase the probability of bankruptcy and job loss. As a result, the additional risk might motivate the CEO to work efficiently (Grossman & Hart, 1982). However, CEOs with more power might manipulate the level of debt ratio to avoid the potential risk as well as constraints. The contradict arguments suggest a non-monotonic association between CEO power and capital structure. A firm with less powerful CEO tends to use more debt or high leverage. However, as CEO having more power and beyond a certain threshold, he/she might impose significant influence on firm's financing decisions, thereby using less debt-type financing. In line with this, previous study by Chintrakarn, Jiraporn, and Singh (2014) shows an inverted U-shape relationship between CEO power and leverage in US firms.

The present paper provides new evidence that sheds light on the impact of CEO power on capital structure through employing the dataset outside US. Specifically, we explore whether there exist threshold levels of index in the CEO power-capital structure relationship. To this end, this paper uses the instrumental variables threshold regressions approach proposed by Caner and Hansen (2004). This method does not split the sample of firms according to some predetermined rule, but allows the data to determine which regime a firm belongs to. Apart from debt, our study also takes into account lease financing. Lease is perceived as a fixed-claimed financing which can help reduce agency costs by forcing pay-out of free cash as well as exposing greater personal risk, thereby ensuring CEOs to use corporate resources more efficiently and work harder (Mehran, Taggart, & Yermack, 1999). In addition, treating leases as taking a similar role to debt is in line with the lease-debt substitutability theory (Minhat & Dzolkarnaini, 2015).

Our study extends the emerging literature in the following ways. First, we use instrumental variable threshold regression model of Caner and Hansen (2004) to analysis the nonlinear impact of CEO power on firm financing decisions. The attractiveness of this approach stems from the fact that it treats the sample split value (threshold parameter) as unknown. That is, it internally sorts the data on the basis of some threshold determinants into groups of observations, each of which obeys the same model. While threshold regression is parsimonious it also allows for increased flexibility in functional form. This sample-splitting methodology has the advantage of endogenously determining the threshold, as opposed to simple parametric approaches that set the threshold exogenously (for instance as a function of a third variable). To the best of our knowledge, ours is the first major study of this subject by employing this method. Second, we study the relationship between CEO power and capital structure containing both debt and lease. The previous literature heavily raised the issue of debt in SMEs; the ignorance of lease in capital structure in previous studies may affect the findings on capital structure decisions (Huang & Yildirim, 2006). Third, our study focuses on Chinese firm data, thus adding to current discussion on capital structure in emerging market. By focusing on China, where the institutional background is vastly different from that of developed markets, we test the boundaries of important claims in the capital structure literature, and extend the existing literature on CEO power and capital structure that focuses mainly on developed countries (Chintrakarn et al., 2014)). Leasing can be more important to emerging economies compared to developed economies because the insufficiency of capital goods investment and lack of financial resources are more common among small- and medium-sized enterprises (SMEs) in these emerging economies. By developing additional financial tools such as leasing, emerging economies are able to deepen the financial activities by introducing new products and/or industry players. Having recognized this fact, the International Finance Corporation (IFC) has been introducing, leading, and imple- menting programs to develop leasing worldwide and, accordingly, has invested over 100 leasing companies in 50 countries (Fletcher, Freeman, Sultanov, & Umarov, 2005).

The paper is organized as follows. Section 2 provides the overview of Chinese firms and institutional features. In Section 3, we review the related studies and develop the hypotheses. Section 4 describes the sample selection and the methodology. Section 5 reports the research findings, and Section 6 provides the conclusion.

2. Chinese institutional environment

China has become the largest emerging market and the second largest economy after United States of America (USA) in the world. The great success of its economic development is driven primarily by small and medium-sized enterprises (SMEs). In China, Small and medium enterprises (SMEs) account for over 99% of the total number of firms and play an important role in economic growth and make substantial contribution to employment and outputs. According to a report in 2013 from the National Bureau of Statistics of China, SMEs provide around 80% of total employment, contribute 50% of fiscal and tax revenue, account for 60% of GDP in China. However, by the end of 2008, lots of SMEs were already forced to close their shops as impacted by financial crisis. After nearly 3 years of recovery, when China's general economic condition has been observed to start bottom up, the SMEs, in contrary to the expectations by many, seem still to be in a situation even harder than in 2008.

Cultural and institutional difference may affect a company's capital structures and their performance in different area. There are significant differences in capital structure for a company in different countries. China institutional features provides new insights for number of reasons. First, capital markets in China are young and less sophisticated as compared to

other developed countries. Shanghai and Shenzan Stock exchanges were established in 1990, and it marks the beginning of securities market in China. China securities regulatory commission (CSRC) was introduced in 1992. Shares are classified as A shares, which are designated for domestic investors, and B shares, which are designated for overseas investors, although the B share market opened to the local citizens in March 2001. The A shares typically consist of state shares owned by either the central government or the local governments, legal-person shares owned by the state-owned institutions, or negotiable shares owned by individual domestic investors. State shares and legal-person shares account for almost two third of the total share issues, and they are not tradable in the stock markets. Negotiable shares are the only class of A shares that can be publicly traded in stock exchanges.

The second important institutional feature is that state ownership dominates listed companies in China. Since 2005 when Chinese government started to implement share split reform, the percentage of state ownership started to decline. However, government still maintains its ownership control and exerts great influence on the capital structure of Chinese listed firms. third, similar to many other Asian countries, listed companies in China have a highly concentrated ownership structure, so ownership structure, especially the largest shareholding also have an important influence on the capital structure choices of Chinese listed firms as it can affect agency incentives (Booth et al., 2001). Fourth, China's financial sector has been under the strong grip of the state. The state monopoly of the financial sector has hindered the development of China's capital markets and the growth of nonstate financial institutions, in particular the bond market. The access of Chinese firms to long-term debt provided by state banks has been strictly controlled by the state and the risk of default is high. In such a situation, bankruptcy, even if enforced, may not be very efficient (Chen, 2004). lastly, the investor protection legal system in China is still imperfect, for example, China does not provide comprehensive laws and regulations regarding external investors, or cannot effectively implement the existing laws of administrating operation of the corporate or securities markets.

2.1. China's leasing industry and SMEs

China's first modern financial leasing company, China Eastern Leasing Company Ltd.—a joint Sino-Japan venture—was established in 1981 when China's reform and opening-up policy was initiated. Compared to other industries, leasing had an early start and has long been one of two innovative products in China's financial market other than bank loans (the other is trust) before the financial reform initiated in the 1990s. This fact, on the one hand, has made leasing a very important window in China's reform and opening up process and provided Chinese enterprises with knowledge of leasing at a very early stage. However, on the other hand, this fact has also led to a lot of setbacks suffered by the leasing industry in the following years; when the leasing industry was imported, the Chinese economy was a completely centrally planned economy without adequate legal infrastructures in place for its sustainable development (Shi & Xu, 2015).

In 1980s many foreign leasing companies, financial groups or banks, mostly from Japan, entered China's financial market due government policy towards joint ventures with approval from concern authorities. Leasing had been very successful and played a very important role in using foreign capitals during the 1980s: about 10–20% of the foreign capital in China was contributed by leasing projects at that time (Shi, 2005).

Because most of the lessees were state-owned companies and many local governments provided guarantees to leasing transactions as required by the lessors, lessors deemed leasing businesses as low risk. However, because of a lack of supervisory policies, many domestic lessors began to initiate high-risk investments other than their main business, leasing. Thus, after a short-term boom during 1980s and 1990s many lessees failed to pay their rents, and lessors experienced severe liquidity problems. Many lessors found getting protection from local governments, as they previously expected, difficult. Although the Chinese government did eventually pay off a significant amount of debt owed to lessors in the early 1990s, many lessors still went out of business (Sha, 2007).

In 2004 the Government have decided that, the foreign investors could establish wholly foreign-owned leasing enterprises in China. It attracted large multinationals such as Caterpillar, GE Capital, and Siemens into the Chinese leasing market in the same year. Meanwhile, the Chinese government opened the leasing market to domestic investors with nine domestic pilot lessors licensed at the end of 2004. In 2007, the China Banking Regulatory Commission (CBRC) also opened the leasing market to local commercial banks. Since then, the leasing industry has entered into a double-digit growth period in China with both lessor numbers and lease volumes increasing dramatically each year. By the end of 2013, China's lessor numbers increased to more than 1000, the total leasing investment reached RMB 828.613 bn, and the total leased assets reached 1885.066 bn (Shi & Xu, 2015).

Although China has experienced high growth in the past 30 years, its economy relies heavily on infrastructure constructions, the real estate industry, and other energy-consuming, highly pollutant industries. Furthermore, it currently faces a severe structural problem that impedes its further development. Therefore, the Chinese government now urges an economic transformation to meet these challenges, and it has come to this crucial moment to shift the enormous Chinese economy from a state-controlled, investment-led growth model to a market-led, consumption-based model while its economic growth is slowing down (Shi & Xu, 2015). So far, China's financial resources have been highly concentrated to a few large-scale, and often state-owned, groups and companies. It has been very difficult for SMEs to access affordable financial resources such as bank lending. Also, it is almost impossible for SMEs to get finance directly from capital markets, which are also dominated by state-owned commercial groups and enterprises. While it is well known that SMEs are the backbone of an economy, China's SMEs are still a minor part of the economy because of a lack of funding resources and other supporting infrastructures.

Nonetheless, a lack of appropriate external financing channels has become the major constraint in the development of Chinese SMEs (Shen, Shen, Xu, & Bai, 2009). In response to this problem, the Chinese government has implemented a series of policies to improve the financial environment, which includes promotion of the leasing market. Moreover, the government has recognized the development of the leasing market as an important action in deepening financial reform. Therefore, understanding the determinants of SMEs' leasing decisions and capital structure in China is vitally important not only for academia but also for policy-makers.

3. Literature review and hypotheses development

3.1. The influence of CEO power on debt financing

In current corporate managerial hierarchy, CEOs take charge of firm management and response to the board of director. This managerial structure leads to a phenomenon that the ownership of a firm and its control right can be separated. Agency theorists argue that this separation will incur costs because CEOs have a tendency to engage in non-optimal actions that enhance their own benefits while destroying firm value. Traditionally, the costs arising from such actions have been widely referred to as agency costs of outside equity (i.e. type I agency problem).[1] The detrimental effects of such behaviours have been documented in many previous empirical studies. For example, Yermack (2006) finds that for the US firms that have disclosed the information of CEOs' personal use of company planes, the average shareholder returns underperform market benchmarks by more than 4% annually. Xu, Li, Yuan, and Chan (2014) show that executives in Chinese state-owned firms are more likely to withhold bad news for extended periods in order to enjoy excess perks, which has resulted in higher future share price crash risk. Therefore, mitigating this agency problem is beneficial for owners.

Agency theorists also propose a prescription to reduce agency costs, which is to closely align the interests of CEOs and shareholders by increasing their ownership in the firms (Jensen & Meckling, 1976). Jiraporn et al. (2012) suggest that increasing the use of debt financing is a valid way to fulfil the above proposition, because high leverage can effectively displace equity capital, and shrink the equity base, thereby enhancing the proportion of equity owned by management. They also present other two ways that leverage can be used to alleviate agency costs. First, the obligation associated with debt financing can help reduce the free cash available for CEO's personnel utility (Jensen, 1986). CEOs in the firms with more free cash flows have an incentive to build a "management empire" and enjoy excess perks. Second, the high leverage can increase probability of bankruptcy and job loss, thereby motivating CEOs to work harder and effectively as well as to decrease their consumption of perks (Grossman & Hart, 1982). These arguments indicate that a firm should maintain its leverage at a relatively higher level.

However, it is argued that the CEO power might influence the leverage level of a firm heavily. In other words, the strength of CEO power should be related to financing decisions (Jiraporn et al., 2012). In firms with weak CEOs (i.e. CEOs hold less power), the financing decisions might be dominated by board of director and other top executives. To mitigate the conflict between CEOs and owners, firms tend to use more debt. As CEOs having more power, they become more entrenched. In this case, CEOs can impose more influence on firm financing decisions and tend to adopt sub-optimal levels of leverage that can promote their own benefits. On one hand, CEOs may avoid debt to preserve their managerial opportunism. Berger, Ofek, and Yermack (1997) find that firms with stronger managerial power are more likely to adopt less debt. Moreover, Zwiebel (1996) argues that self-interested CEOs also tend to decrease leverage to avoid the constraints resulting from debt financing (or disciplining role of debt), the threat of a bankruptcy and job loss.

On the other hand, however, powerful CEOs may also voluntarily use higher rather than optimal firm debt levels. Stulz (1988) proposes that fixed claims can reduce equity base thus consolidating CEO voting power as well as control power. The potential bankruptcy has been deemed as a way to commit credibly and to forgo inefficient investment, thereby preventing a takeover (Sun, Ding, Guo, & Li, 2015). Berger et al. (1997) find that firms with entrenched executives will raise debt when their managerial security is challenged by the possibility of failure in tender offers or involuntary CEO replacement. In addition, Jiraporn et al. (2012) suggest that debt levels should be higher in firms with powerful CEOs than those with weak CEOs. They argue that higher leverage can substitute for owners' diminished ability to remove the CEO when a CEO plays a dominant role in firm. This notion relies critically on the fact that firms need to raise funds in capital markets. To do this, a firm needs to establish a good reputation for moderation in expropriating from owners. One way to establish such reputation is to adopt high leverage because large fixed payments can reduce what is left for expropriation. They also argue that this reputation for good treatment of owners is more valuable for firms with more powerful CEOs as they are better to exploit the owners. By contrast, the need for such reputation is weaker in firms with weaker CEOs, thereby less need for higher leverage.

Align with the above competing arguments, Chintrakarn et al. (2014) find a hump-shaped relationship between CEO power and firm leverage. When CEO's power is relatively low, firms tend to use large amount of external financing to reduce

[1] Moreover, other theories suggests that bank oversight can reduce asymmetric information conflicts between management agents and investors. For instance, Datta, Iskandar-Datta, and Patel (1999) claim that banks have comparative advantage in monitoring loan agreements, as a result these institutions can help to reduce the moral hazard costs of new debt financing. One explanation is based on Fama (1985) that due to having superior (insider) information, banks provide more efficient monitoring which lessen the monitoring costs of debt claimants. On the other hand, banks benefit from scale economies and thus comparative cost advantage in information production, enabling to provide superior debt-related monitoring (Diamond, 1984, 1991).

CEO's tendency of engaging in non-optimal actions, thereby aligning the interests between owners and CEO. However, when CEO power exceeds the threshold point, he/she becomes more entrenchment, therefore can impose heavy influence on firm financing decisions and manipulate debt levels according to their own needs. Under this scenario, CEOs are more likely to use less debt to avoid constrains associating with obligations, and to reduce the potential bankruptcy as well as possibility of employment loss. Motivated from the above competing arguments and empirical findings, we develop the following hypothesis:

Hypothesis 1. The relationship between CEO power and firm leverage is non-monotonic. The relation is positive for lower degrees of CEO power and negative at higher degrees.

3.2. The relationship between debt financing and leasing

Traditionally, leases are treaded as the substitutes of debt. Leasing can be more important to emerging economies compared to developed economies because the insufficiency of capital goods investment and lack of financial resources are more common among small- and medium-sized enterprises (SMEs) in these emerging economies. By developing additional financial tools such as leasing, emerging economies are able to deepen the financial activities by introducing new products and/or industry players.

In the theory of finance, leases are viewed as one form of external financing, which provides an important source of funds, enabling firms to invest in property, plant, and equipment (Cosci, Guida, & Meliciani, 2015). Most theoretical models of leasing have assumed that leases substitute for debt in the sense that more leasing should result in less debt because leases use up debt capacity. However, not all theoretical models have made this assumption. The leasing models presented by Lewis and Schallheim (1992) and Eisfeldt and Rampini (2009) predict the possibility that debt and leases can be complements, and that leases can actually increase debt capacity, by utilizing theories based on taxes or bankruptcy costs, respectively. However, comparing to debt financing, leasing has an advantage of repossessing the leased assets, because it allows the separation of ownership and use of an asset. Due to this point, some studies argue that firm risk is lower when financing assets using leases rather than debt (Minhat & Dzolkarnaini, 2015). For instance, firms that purchase assets through debt financing facing a potential problem that they must engage in high disposal costs of the objects meanwhile must simultaneously pay out fixed payments, if the assets are disposal before the contracts terminated. However, if the firms obtain the asset using leases, especially operating leases, they will not bear the obsolescence risk since the risk is shifted to the lessors which are the owners of the leased assets. Therefore, the repossession advantage indicates that leasing can provide high debt capacity than debt financing. Eisfeldt and Rampini (2009) provide a model, based on this argument, in which more financially constrained firms value the additional debt capacity more, hence they are willing to use more leases than less constrained firms. As a consequence, debt and leases tend to be complements (Schallheim, Wells, & Whitby, 2013). A great number of empirical studies also have shown a positive relationship between debt and leases (e.g. Ang & Peterson, 1984; Finucane, 1998; Lasfer & Levis, 1998; Yan, 2006) and conclude that debt and lease appears to be complement.

However, although leases can reduce firms' disposal cost and bankruptcy cost as well as increase funding capacity, both leasing and debt financing entail a commitment to a set of fixed, contractual obligations (Myers, Dill, & Bautista, 1976). Both lease and debt can reduce firms' funding capacity, as a result, greater use of lease financing should be associated with less non-debt financing. Traditional finance theory, for this reason, has considered lease as a substitute of corporate debt. Previous empirical studies by Bayless and Diltz (1986), Beattie, Goodacre, and Thomson (2000), Yan (2006) report a substitutable relationship between lease and debt.

Moreover, Mehran et al. (1999) argue that fixed obligations, such as debt and leases, in general expose management to greater personal risk, but they are deemed as a common mechanism for alleviating the agency costs of debt through forcing the pay-out of free cash. Therefore, powerful CEOs might be willing to adopt less debt and leases to avoid the discipline role of fixed claims and reduce personal exposure.

There have been extensive efforts to understand why firms use operating lease (Deloof, Lagaert, & Verschueren, 2007; Sharpe & Nguyen, 1995). One traditional approach for verifying the reasons behind utilizing operating lease was based upon tax benefits (Miller & Upton, 1976). Lessees transfer tax-shields to lessors because lessors officially own leased assets and could depreciate them, thus obtaining the tax benefits from the depreciation of leased assets. Accordingly, lessors can lower lease payments through transferred tax shields and thus lessees can enjoy the lower lease payments compared to bank loans. From this tax perspective, some studies examined whether lease and debt are substitutes or complements (Miller & Upton, 1976). Other empirical studies have been conducted to understand why firms use lease, based on information asymmetry (Sharpe & Nguyen, 1995), agency cost (Smith & Wakeman, 1985), and pecking-order theory (Krishnan & Moyer, 1994).

The financial market in the china is highly regulated. State controlled commercial banks can provide cheaper loans since the profits are from the wide spread between state controlled deposit and lending rates. When CEOs are more powerful and a firm has bargaining power with banks, a bank loan is always the first choice. This implies that they are eager to choose leases only after reaching their credit quotas. Therefore, when the firms need to obtain assets, the reason for their seeking of leases is that they cannot get more funds from the bank in the short term. This probably suggests that those firms using leases are accompanied by high liability. However, China's financial institutions are quite bureaucratic, especially in the conservative lending policy. To minimize risk, China's commercial banks only lend to the firms with a full amount of collateral due to less

powerful CEO, because of his non bargaining position. Lacking stable and sufficient capital providers, small firms may seek lessors when they face an urgent financing demand. They may require a necessary debt coverage ratio to make sure the lessee can repay the rent.

Summarizing the above discussed lease-debt complimentary and substitutability theories, which show positive and negative relationship, i.e. a nonlinear relationship. Apart from debt, lease is another fixed claimed financing which can be viewed as another disciplinary mechanism to ensure managers use corporate resources more efficiently. Treating leases as playing a similar role to debt is consistent with the lease-debt substitutability theory. Therefore, building upon the claim, lease-debt can substitute each other, this leads to following hypothesis:

Hypothesis 2. The relationship between CEO power and leasing share is non-monotonic. The relation is positive for lower degrees of CEO power and negative at higher degrees.

4. Data and methodology

4.1. Sample selection

To test the hypotheses regarding the relationship between CEO power and debt as well as CEO power and leases in Chinese SMEs, we select all firms on the Shenzhen Stock Exchange (SZSE) SMEs Board at the end of 2012 as an initial sample and exclude the firms that became public after 2009 and those firms without enough historical data. We also exclude firms in the finance industry from our total population because in general these firms have an extremely different structure of balance sheet in comparison with those non-financial firms. The firms with special treatment (ST is short for Special treatment, flagged with ST and *ST) status from our sample are omitted. ST and *ST firms are those that have financial or operational problem which may contaminate the results given the financial or operational trouble. In China, publicly-listed firms which are experiencing financial distress are required to use the prefix special treatment ('ST') in front of their trading stock code by the China Securities and Regulatory Commission (CSRC) in 1998. The ST system was initiated to detect poorly-performing firms and therefore to release an early warning signal to both the firm and to investors. Under this system, a listed company is labeled an ST firm if it has experienced financial losses for two consecutive fiscal years or is technically insolvent. If it cannot return to profit-making status within two years after being labeled an ST firm, then it is labeled a particular transfer (PT) firm, the shares of which can only be traded on Friday, or may even face de-listing. Furthermore, in order to avoid any issues related to missing values and other empirical modeling, we used balanced panel data. As a result, our final sample available for analysis consists of 1188 firm-year observations over the period 2009–2012, representing 297 firms. The data are sourced in two main ways. Share prices are collected from SINA Finance (http://vip.stock.finance.sina.com.cn/mkt/). Data of debt- and lease-related variables, and CEO characteristics are manually collected from the annual reports of listed SMEs.

4.2. Measurement of variables

4.2.1. Dependent variables

The main dependent variables in this analysis are the leverage and the lease share. Leases, in general, take several different forms, the most important of which are operating leases and capital leases. These two types of leasing differ in their tax, accounting and legal treatments, they are all viewed, in the theory of finance, as part of the financing decisions of the firm (Lasfer & Levis, 1998; Graham, Lemmon, & Schallheim, 1998; Beattie et al., 2000). Operating leases are also generally recognized as "true leases" which allow the transfer of tax benefits from leases to lessors (Graham et al., 1998; Mehran et al., 1999). While capital leases are deemed as "nonture leases". Since only true leases allow transfer of non-debt tax shields, the tax-based theory usually predicts that capital leases, alike with debt financing, are positively related to tax rate. Moreover, most of prior studies acknowledge that capital leases are identical with debt financing.[2] Therefore, following the previous empirical studies of capital structure (e.g. Berger et al., 1997; Chang, Chen, & Liao 2014; Huang & Song, 2006; Jiraporn et al., 2012), we measure leverage as the book value of total debt (including capital leases) divided by the book value of total assets. We follow Sharpe and Nguyen (1995) to measure operating lease share as total rental commitments divided by total capital costs. The operating lease share is continuous variable that varies from 0 to 1. The detailed definition of lease share is provided in the Appendix A.

4.2.2. Independent variables

Previous studies have broadly utilized four sources of power identified by Finkelstein (1992): structural power, ownership power, expert power, and prestige power. However, this definition does not lend itself to natural and unequivocally capture CEO dominance (Luo, 2015). In addition, CEO power is not directly observable, and might come from many formal and informal sources (Pfeffer, 1992). In this study, we define the powerful CEOs as those who can consistently influence corporate financing decisions in their firms. Following Liu and Jiraporn (2010), Jiraporn et al. (2012), and Veprauskaitė and Adams

[2] Most of previous studies relevant to capital structure did not differentiate debt financing and capital leasing (i.e., they did not subtract the capital leases from total debt).

(2013), we construct a power index using four normalized CEO power-related variables, including CEO-Founder, CEO-Chair, CEO-Ownership, and CEO-Pay slice, to represent the degree of decision-making autonomy held by the CEO using the data reduction technique Principle Component Analysis (PCA).

Prior studies find that CEO who is the founder tends to be more influential on financing decision-making process. For instance, Pour (2015) shows that Chinese founder-CEO seems to have the most robust influence on the survivability of IPOs, suggesting IPOs are more likely to survive if their CEOs are one of the firms' founders. Fischer and Pollock (2004) argue that agency costs might be lower for firms with founder-CEOs since they have more ability to guide a firm as the founder status reduces the conflict within the firm. In this study, CEO-Founder is a dummy variable that is defined as 1 if the CEO is one of the company founders and 0 otherwise. Hermalin and Weisbach (1998) argue that simultaneously hold the CEO and Chair (President) positions is one of the ways of increasing power for the same person. Davis, Schoorman, and Donaldson (1997) suggest that CEO-Chair duality could enhance firm performance by, for instance, improving decision-making efficiency as well as reducing conflicts of opinions amongst board members. In the present study, we use a dummy variable that is coded as 1 if the CEO also serves as board Chair (President) and 0 otherwise. CEO-Ownership is another proxy of CEO power. Pathan (2009) argues that the CEOs who hold high proportion of the corporate shares are more powerful. Traditional theory also recognises that share ownership providing the CEO with an incentive to maximize firm values since they represent both owners and managers (Fama & Jensen, 1983). However, the CEOs with significant ownership might be more likely to pursue self-interest. Ruan, Tian, and Ma (2011) find that managerial ownership is non-monotonically affecting capital structure in context of Chinese firms. We follow Luo (2015) to use a dummy variable to gauge CEO ownership power, which takes value of 1 if CEO owns more than (or equal to) 10% of the firm's shares, and 0 otherwise.

Finkelstein (1992) and Bebchuk, Cremers, and Peyer (2011) argue that CEO-Pay slice (CPS) is a more direct way to gauge CEO power. This measurement has also been used by a great number of existing empirical studies (e.g. Bebchuk et al., 2011; Chintrakarn et al., 2014; Jiraporn et al., 2012). Chintrakarn et al. (2014) find a hump-shaped relationship between CEO-Pay slice (CPS) and corporate leverage using a sample of US companies. Indeed, CEO-Pay slice (CPS) is also most closely related to agency problems (Bebchuk et al., 2011). Follow the previous studies, we calculate the CEO-Pay slice (CPS) as the percentage of the total compensation of the top-five executives that goes to the CEO. China's listed companies disclose only cash compensation without breaking it into base salary, bonus, and commissions.

4.2.3. Control variables

Literature suggests that debt financing and leasing decisions are affected by a series of firm-specific characteristics. In this study, we control for tax rate, firm size, profitability, financial distress, growth opportunity, tangibility and earning volatility. The effect of each of these control variables on financing decisions are well documented in the context of Chinese firms (Chang et al., 2014; Chen, 2004; Huang & Song, 2006). For instance, the impact of tax on corporate financing is the main theme of previous studies. The official tax rate (TAX) is used to measure tax effect on leverage and lease share in this study. In general, the natural logarithm of firm value is deemed as a standard measurement of firm size. However, it is inappropriate here to examine lease share because of its endogeneity (Sharpe & Nguyen, 1995). The trade-off theory predicts an inverse relationship between size and the probability of bankruptcy, i.e. a positive relationship between size and leverage. Berger et al. (1997) find the positive relationship between leverage and company size. Rajan and Zingales (1995) argue that larger firms tend to be more diversified and fail less often, so size may be an inverse proxy for the probability of bankruptcy. Large firms are also expected to incur lower costs in issuing debt or equity. Thus, large firms are expected to hold more debt in their capital structure than small firms. Following the prior studies (e.g. Huang & Song, 2006; Mehran et al., 1999; Sharpe & Nguyen, 1995), we use the natural logarithm of sales as a measure of firm size.

The pecking order theory predicts a negative correlation between the profitability of a company and its total level of debt based on the idea that companies first turn towards internal financing resources (for instance, profit) (Myers & Majluf, 1984). Even though the trade-off theory establishes a positive correlation between these variables given that a higher profitability implies a higher income that can be exempted from taxes (Kraus & Litzenberger, 1973), most empirical studies have indicated a negative influence of profitability on capital structure. Profitability is measured by the ratio of operating profits to net sales. Financial distress in general is used to measure the level of firm operation or bankruptcy risk. Financial distress is a condition where a company has difficulty paying off its financial obligations to its creditors. The chance of financial distress increases when a firm has revenues that are sensitive to economic downturns, high fixed costs or illiquid assets. In this study, we use the Altman's Z-score (Altman, Zhang, & Yen, 2007) to measure firm financial distress potential.

Growth opportunity is the chance of growth of a firm in the future. The growth opportunity is the measure of how far earnings per share of a firm can be increased by leverage. Firms with rapid growth sometimes must increase its fixed assets. Therefore, firms with rapid growth need more fund in the future and more retained earnings. Retained earnings from firms with rapid growth will increase and those firms will deal more with debt to maintain the targeted equity ratio. Empirically, the growth opportunity influences positively toward the capital structure. Following most of capital structure studies, we use Tobin's Q to access the growth opportunity of firm. Tobin's Q is calculated as the ratio of the book value of total liabilities plus the market value of equity to the book value of assets.

The type of assets owned by a firm may motivate the financing behaviour of firm. Myers and Majluf (1984) propose a positive relation between the collateral value of assets (tangibility) and leverage. They argue that firms may be better-off selling secured debt as means to reduce information asymmetries. It may be more costly for firms to sell a security about which outside investors have little information. Rajan and Zingales (1995) suggest that the collateral value of assets should

serve to reduce the agency costs of debt and equity such as risk shifting. Lenders would thus be more willing to provide credit to firms having high asset tangibility. Asset tangibility is the ratio of fix asset to total assets. On the contrary, Grossman and Hart (1982) propose leverage to be negatively correlated with asset tangibility in line with the agency theory. Higher levels of debt can be undertaken to align the interests of the managers and the shareholders. Higher leverage would induce higher bankruptcy costs and thus limit the expropriation of private benefits by managers. Grossman and Hart (1982) argue that agency costs maybe higher for firms having lower collateralizable assets as it is more difficult to monitor the capital outlay of such firms. It may thus be the case that firms with low collateral value of assets may be more levered in an attempt to discipline managers.

The next variable is the volatility of earnings. The riskier the firm, the higher are the costs of financial distress and greater is the probability of default. The Trade-off theory predicts that riskier firms would then be less levered due to high bankruptcy costs. Also, firms having volatile earnings may not be able to fully benefit from the tax advantage of debt. Similarly, Titman and Wessels (1988) state optimal debt level to be a decreasing function of earnings volatility. The pecking order theory also suggests the negative relationship between leverage and earnings volatility. In this paper, the standard deviation of return suggested by Booth et al. (2001) is used to measure earnings volatility. The Appendix A provides definitions for all variables.

4.3. Econometric model

To test our hypotheses, we use a panel-threshold regression model to analysis the data. In this section, we first present the non-threshold models, then we demonstrate the panel models with threshold variable.

4.3.1. The non-threshold model

To investigate the relationship between CEO power and financing decisions (proxied with leverage and lease share), we develop the following two empirical models based on Mehran et al. (1999):

$$\mathrm{DEBT}_{it} = \alpha_i + \beta POWER_{it} + \phi_1 TAX_{it} + \phi_2 SIZE_{it} + \phi_3 PROFT_{it} + \phi_4 RISK_{it} + \phi_5 GRWOTH_{it} + \phi_6 TANG_{it} + \phi_7 EVOL_{it} + \varepsilon_{it} \quad (1)$$

$$\mathrm{LEASE}_{it} = \alpha_i + \beta POWER_{it} + \phi_1 DEBT_{it} + \phi_2 TAX_{it} + \phi_3 SIZE_{it} + \phi_4 PROFT_{it} + \phi_5 RISK_{it} + \phi_6 GROWTH_{it} + \phi_7 TANG_{it} + \phi_8 EVOL_{it} + \varepsilon_{it} \quad (2)$$

where the dependent variables, DBET, is the book leverage; LEASE, is the operating lease share. *POWER* represents CEO power which is measured as power index constructed by using PCA technique. The control variables include tax rate (*TAX*), firm size (*SIZE*), profitability (*PROFT*), financial distress (*RISK*), growth opportunity (*GROWTH*), asset tangibility (TANG) and earnings volatility (EVOL). The detailed definitions of variables are provided in the Appendix A. ε_i is an error term. $i = 1, \ldots, N$ represents the firm and $t = 1, \ldots, T$ represents index the time.

4.3.2. The panel data model with threshold variable

This study is based on the assumption that CEO power will impact firm leverage and operating lease share in a nonlinear way. When we try to determine if a nonlinear relation exists between some characteristics of the firms and leasing, we cannot use the techniques traditionally used in finance. This is to determine if the existence of threshold effects between two variables is different from the traditional approach, in which the threshold level is determined exogenously. If the threshold level is chosen arbitrarily, or is not determined within an empirical model, it is not possible to derive confidence intervals for the chosen threshold. The robustness of the results from the conventional approach is likely to be sensitive to the level of the threshold. The econometric estimator generated on the basis of exogenous sample splitting may also pose serious inferential problems (for further details, see Hansen, 1999, 2000).

The critical advantages of the endogenous threshold regression technique over the traditional approach are as follows: (1) it does not require any specified functional form of non-linearity, and the number and location of thresholds are endogenously determined by the data; and (2) asymptotic theory applies, which can be used to construct appropriate confidence intervals. A bootstrap method to assess the statistical significance of the threshold effect is also available in order to test the null hypothesis of a linear formulation against a threshold alternative.

Although the Hansen (2000) approach is commonly used in cross-sectional analysis, it can also be extended to a fixed effect panel, provided that no endogenous problem exists. Specifically, the method requires that all explanatory variables are exogenous. In some circumstances, especially in empirical growth and finance models, the key variables are likely to be endogenous. In an economic model, a variable is endogenous when there is a correlation between the variable and the error term. Endogeneity can arise as a result of measurement error, autoregression with auto correlated errors, simultaneity, omitted variables, and sample selection errors. The problem of endogeneity occurs when one or more regressors are correlated with the error term in a regression model, which implies that the regression coefficient in an OLS regression is biased. Thus, the Hansen (2000) approach will no longer be applicable. In order to overcome the endogeneity problem, instrumental variable estimation threshold model introduced by Caner and Hansen (2004) is used in this paper. Since Caner and Hansen (2004) do not apply their procedure to panel data we first have to make their frame-work suitable to panel data.

Thus, to allow for nonlinear threshold effects in the relationships, Eq. (1) and (2) are extended into a nonlinear two–regime threshold model as first introduced by Hansen (1999, 2000):

$$y_{it} = \begin{cases} u_i + \beta_1 d_{it} + \phi' z_{it} + \varepsilon_{it}, & \text{if } d_{it} \leqslant \gamma \\ u_i + \beta_2 d_{it} + \phi' z_{it} + \varepsilon_{it}, & \text{if } d_{it} > \gamma \end{cases} \tag{3}$$

where, y_{it} is the book leverage or operating lease share; u_i denotes the level of firm i fixed-effect; d_{it} (CEO power) represents the explanatory variable and also the (exogenous) threshold variable; γ denotes the threshold parameter; the impact of CEO power on leverage or lease share will be β_1 and β_2 for companies with a low (Regime I) or high regime (Regime II); z_{it} represents the control variables; ϕ' are the coefficient estimates of the control variables; ε_{it} are the error terms; i represents different firms and t represents different periods. Actually, the non-threshold model (Eqs. (1) and (2)) becomes a special case of the panel threshold model (Eq. (3)) when β_1 is equal to β_2.

The determination of the estimated threshold $\hat{\gamma}$ is based on a two-step procedure using the ordinary least square (OLS) method. In the first step, for any given γ, the sum of squares of errors are computed separately. In the second step, the estimate of the threshold value$\hat{\gamma}$ is obtained by minimizing the concentrated sum of squares of errors $S_1(\gamma)$, and the residual variance $\hat{\sigma}^2$ is saved. Once the estimates of the threshold valueγ, and β_1 and β_2 are obtained, the next question is to check whether the threshold effect is statistically significant. To test the threshold effect, the null hypothesis of the no threshold effect is tested: $H_0 : \beta_1 = \beta_2$. The test statistic is based on the likelihood ratio of $F_1 = (S_0 - S_1(\hat{\gamma}))/\hat{\sigma}^2$ where S_0 and S_1 are the sum of squared errors under null and alternative hypotheses, respectively. However, the asymptotic distribution of the likelihood test is non-standard. To address this issue, Hansen (1999) provides a heteroscedasticity-consistent Lagrange Multiplier (*LM*) bootstrap procedure to compute the *p*-value for F_1 under the null hypothesis. If F_1 rejects the above null hypothesis of no threshold, we then test again the threshold model to discriminate between one and two thresholds.

However, the estimation technique proposed in Hansen (1999, 2000) are restricted to the regression model where the explanatory variables and control variables are exogenous. Since CEO power and capital structure choices as well as debt and leasing both are highly likely to be endogenous (Lewis & Schallheim, 1992; Mehran et al., 1999; Robicheaux, Fu, & Ligon, 2008; Jiraporn et al., 2012; Lin, Wang, Chou, & Chueh, 2013; Chintrakarn et al., 2014), the Hansen (1999) estimation method might be invalid for the estimation of Eq. (3). To address this issue and account for the threshold nonlinearity simultaneously, the instrumental variable threshold regression approach of Caner and Hansen (2004) is employed, where Eq. (3) can be expressed as follows:

$$DEBT_{it} = (\psi_1 X_{it} + \delta_1 Z_{it}) I(POWER_{it} \leqslant \gamma) + (\psi_1 X_{it} + \delta_1 Z_{it}) I(POWER_{it} > \gamma) + \varepsilon_{it} \tag{4}$$

$$LEASE_{it} = (\phi_1 DEBT_{it} + \beta_1 Z_{it}) I(POWER_{it} \leqslant \gamma) + (\phi_2 DEBT_{it} + \beta_2 Z_{it}) I(POWER_{it} > \gamma) + \varepsilon_{it} \tag{5}$$

where Z_{it} is a vector of control variables; $I(\cdot)$ is the indicator function taking on the value of 1 if the value of the threshold series *POWER* index is below a specific threshold value γ; X_{it} denotes a vector of instrument variables.

According to Caner and Hansen (2004), the estimation procedure includes three essential steps. The initial step is similar to the two-stage least squares (2SLS) approach to estimate the linear regression model with endogenous variables. So that, we firstly regress the $DEBT_{it}$ (or $LEASE_{it}$) on the valid instrument variables by the OLS method and obtain the fitted values of $\widehat{DEBT}_{it}$ (or $\widehat{LEASE}_{it}$). In the second step, we use the fitted value of debt ratio (or lease share) to estimate the threshold parameter γ with the OLS approach. Finally, based on the estimate of γ, we implement the generalized method of moments (GMM) on the split subsamples to estimate the slope parameters. Moreover, Caner and Hansen (2004) propose a supremum Wald (Sup-Wald) statistic to test for the existence of threshold effect and implement the bootstrap approaches to obtain the asymptotic *p*-value.

In present study, we follow Jiraporn et al. (2012) and Chintrakarn et al. (2014) to use the industry-median of POWER as our instrumental variable. Jiraporn et al. (2012) argue that although firm-level leverage might influence POWER in an individual firm, it is unlikely related to industry-level POWER. This is because managers in each given firm can influence their own firm's financing policies but they probably have little, if any, influence on other firms' policies in the industry. Additionally, a similar technique based on industry structure is employed by a great number of recent empirical studies (Jiraporn et al., 2012). Following Robicheaux et al. (2008), the instrument variable for leverage is the age of property, plant and equipment (PPE) which is calculated as accumulated depreciation divided by PPE. If the corporate PPE is almost fully depreciated this may constrain its ability to borrow (including capital leasing) relative to the book values of debt and equity, thus affecting the leverage. However, older PPE need not constrain the use of operating leasing.

5. Results

5.1. Descriptive statistics and correlation matrix

Table 1 reports the descriptive statistics for all dependent, explanatory, and control variables used in this study (definitions of all the variables are provided in the Appendix A). Panel A shows the statistics for leverage and lease share. Our mea-

Table 1
Summary statistics of main variables for Chinese listed SMEs.

Variable	Obs.	Mean	Median	St. Dev	Min	Max
Panel A: Dependent variables						
Leverage (DEBT)	1,188	0.378	0.366	0.191	0.018	0.896
Operating lease share (LEASE)	1,188	0.070	0.008	0.145	0	0.873
Panel B: CEO power variables						
CEO-Founder (FOUNDER)	1,188	0.452	0	0.498	0	1
CEO-Chair (CHAIR)	1,188	0.331	0	0.471	0	1
CEO-Ownership (ONERSHP)	1,188	0.380	0	0.485	0	1
CEO-Pay slice (CPS)	1,188	0.263	0.250	0.074	0.017	0.624
Panel C: Control variables						
Tax rate (TAX)	1,188	0.165	0.150	0.044	0	0.250
Firm size (SIZE)	1,188	21.263	21.192	0.846	19.243	25.056
Profitability (PROFT)	1,188	0.064	0.056	0.060	−0.224	0.413
Financial distress (RISK)	1,188	1.237	1.175	0.674	−1.909	6.491
Growth opportunity (GROWTH)	1,188	2.186	1.791	1.297	0.909	12.395
Asset tangibility (TANG)	1,188	0.213	0.201	0.113	0.012	0.552
Earnings volatility (EVOL)	1,188	4.20	3.34	3.99	0.02	58.94

Notes: This table presents the number of observations, mean, median, standard deviation, minimum, and maximum for each variable. The sample consists of 297 listed Chinese SMEs during 2009–2012. Variable definitions are provided in the Appendix A.

sure of leverage – book-value based debt ratio is 37.8% which is similar to that of the Chinese firms reported in Huang and Song (2006). The mean value for the operating lease share is 7.0%, which is much lower than those of firms from the developed countries reported in prior studies. This might indicate that the development level of lease industry in China lags behind the developed countries.

In Panel B, we report the measurements of CEO power separately. As can be seen, in 45.2% firm-years, the CEO is one of the corporate founders. In 33.1% of firm-years, the CEO also holds the Chair (President) position, indicating that CEO-Chair the CEO-Chair functions are highly concentrated in Chinese listed SMEs. This figure is also much higher than those of firms from US and UK reported in Adams, Almeida, and Ferreira (2005), Florackis and Ozkan (2009), and Veprauskaitė and Adams (2013). Table 1 further shows that CEOs in Chinese listed SMEs hold a great proportion of the firms' shares. In our sample, 38.0% of firm-year observations have a CEO who has more than (or equal to) 10% of firm share capital. The average of CEO-Pay slice (CPS) is 26.3%, which is much lower than the findings from the US as reported in previous studies (e.g. Bebchuk et al., 2011; Chintrakarn et al., 2014; Jiraporn et al., 2012), implying that the compensation gap between CEO and other executives among Chinese listed firms is inconspicuous. Panel C presents the descriptive statistics on firm-level control variables, including tax rate, firm size, profitability, financial distress, growth opportunity, asset tangibility and earnings volatility. The reported results are comparable to those described in prior studies related to capital structure (e.g. Chang et al., 2014; Chen, 2004; Huang & Song, 2006).

Table 2 reports the correlation matrix of the variables employed in the analysis. It illustrates that both book leverage and operating lease share are statistically correlated with most of the explanatory and control variables. More specifically, debt ratio is negatively related with CEO power variables, profitability, Z-score, and growth opportunities, except asset tangibility. While, operating lease share are positively related with CEO power variables and control variables, except tangibility and earnings volatility. The special case is that CEO-Pay slice (CPS) has a negative correlation with operating lease share. Moreover, the correlation coefficients between the independent variables are generally less than 0.4 suggesting that there is little risk of multicollinearity problem in the data.

5.2. Principal component analysis

Our goal is to test whether there exists non-linearity relationship between CEO power and corporate financing decisions (i.e. leverage and operating lease share). To do this we create an index of the CEO power based on the four CEO dominance variables. To combine these variables into a one-dimensional index of power, we extract components, using principal component analysis. Using a single aggregate factor rather than four related different variables individually, we can increase the power of the regression tests by avoiding the problem of multicollinearity[3] and minimize measurement error.

Table 3 presents the results of the principal component analysis for the proxies of CEO power. As can be seen in Panel A, the first component is the only one with an eigenvalue exceeds 1 which explains about 52.5% of the variation of the CEO power. The second component has the eigenvalue that slightly smaller than 1 and it explains about 24.9% of the variation. The third component explains another 12.5%, and the last principal component accounts for only 10.1% of the variation. Hence, it is clear that the first component has the strongest explanatory power. In addition, Kaiser (1960) suggests that it

[3] Table 3 shows that CEO-Founder dummy, CEO-Chair dummy, and CEO-Ownership are highly and statistically correlated.

Table 2
Pearson correlation coefficient matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. DEBT	1.00												
2. LEASE	−0.05*	1.00											
3. FOUNDER	−0.11***	0.14***	1.00										
4. CHAIR	−0.12***	0.06**	0.51***	1.00									
5. ONERSHP	−0.12***	0.09***	0.59***	0.54***	1.00								
6. CPS	−0.04	−0.08***	0.02	0.07**	0.04	1.00							
7. TAX	0.20***	0.18***	−0.03	−0.06**	−0.04	0.04	1.00						
8. SIZE	0.49***	0.07**	−0.14***	−0.05*	−0.05**	0.01	0.26***	1.00					
9. PROFT	−0.39***	0.12**	0.04	0.05*	0.07**	0.02	0.01	0.04	1.00				
10. RISK	−0.64***	0.12***	0.11***	0.13***	0.15***	0.01	−0.14***	−0.12***	0.84***	1.00			
11. GROWTH	−0.32***	−0.01	0.05	0.07**	0.03	0.02	−0.17***	−0.29***	0.44***	0.49***	1.00		
12. TANG	0.12***	−0.26***	0.035*	0.015	−0.13***	0.030	0.06**	0.14***	−0.19***	−0.27***	−0.06	1.00	
13. EVOL	−0.21**	−0.11***	0.32**	0.21*	0.11**	−0.19**	0.07***	−0.31**	−0.15*	−0.21**	−0.29***	−0.11*	1.00

Notes: This table reports the Pearson correlation matrix of the main variables of Chinese listed SMEs during 2009–2012. Variable definitions are provided in the Appendix A. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 3
Principle components analysis.

Panel A: Principle component weight

Principal component	Eigenvalue	Difference	Proportion%	Cumulative%
Comp 1	2.099	1.102	0.525	0.525
Comp 2	0.997	0.496	0.249	0.774
Comp 3	0.501	0.097	0.125	0.899
Comp 4	0.404	–	0.101	1.000

Panel B: Index weights

	FOUNDER	CHAIR	ONERSHP	CPS
POWER	0.578	0.560	0.589	0.071

Panel C: Principal component descriptive statistics

	Mean	St. Dev	Min	Q1	Median	Q3	Max
POWER	0.000	1.449	−1.574	−1.531	−0.229	1.137	2.482

Notes: This table reports the results of applying principle components analysis to four proxies of CEO power. Panel A presents the eigenvalue of each component. Panel B shows the index weights of CEO power. Panel C presents the principle component descriptive statistics. POWER is for the first principle component. The detailed definitions of variables are provided in the Appendix A.

is better to retain only the factors that have eigenvalues greater than 1 for interpretation. Accordingly, we use the first principal component therefore as our CEO power indicator in this study.

Panel B of Table 3 reports principle component loads for the first principle component. This component is mainly characterized by CEO-Founder dummy, CEO-Chair duality and CEO-Ownership, as the value of their loadings greater than 0.5. All of the positive signs of the loadings are in line with our expectations, suggesting that CEO who holds Chair (President) position and high proportion of corporate shares, accounts for high percentage of the total compensation of the top-five executives, and is one of the founder that has higher degree of decision-making power. Panel C reports the descriptive statistics for the first principal component.

5.3. Empirical results

5.3.1. CEO power and debt financing

Table 4 shows the results of estimating Eq. (4) in which the threshold variable is the CEO power index constructed by using principle components analysis technique. 10,000 bootstrap replications are performed. The threshold test statistics (= 16.631) along with the bootstrap *p*-values shows that the null hypothesis of a no regime switch is rejected at the 1% significance level, indicating a significant presence of a threshold effect on the nexus between CEO power and debt financing. Specifically, the point estimate of the threshold value is 2.150, which is much higher than its 75th percentile value.

Once the threshold is obtained, we turn now to determine how precise this is. To do this, we employ likelihood ratio (LR) test to examine the confidence interval around the threshold estimate. The 95% asymptotic confidence region is as [2.126, 2.155]. Fig. 1 presents the plots of the concentrated likelihood ratio test statistics ($LR_n^*(\gamma)$) as a function of the threshold variable (POWER) for Eq. (4). The estimated threshold is the value at which the likelihood ratio hits the zero axis (2.150). The asymptotic 95% critical value 7.35, which is significant at 1% level, is shown by the dotted line and at where it crosses $LR_n^*(\gamma)$ displays the confidence interval [2.126, 2.155]. This result implies that the above threshold estimates are very precise. Thus, there is significant evidence supporting one threshold in the relationship between CEO power and leverage.

Table 4
Summary of the test results of threshold effects for leverage.

Test Hypothesis	Sup-Wald test	Bootstrap *P*-value	Threshold Estimates ($\hat{\gamma}$)	95% Confidence interval
H_0: no threshold	16.631	0.000	2.150	[2.126, 2.155]

Notes: This table reports the summary of the test results for threshold effects. The dependent variable is leverage. The threshold variable is the indicator of CEO power (POWER). The instrumental variable for the CEO power is the median value of industry-level POWER. Following Caner and Hansen (2004), we perform the Supremum Wald (Sup-Wald) statistic to test for the presence of threshold effects. The corresponding *p*-values are calculated using 10,000 bootstrap replications.

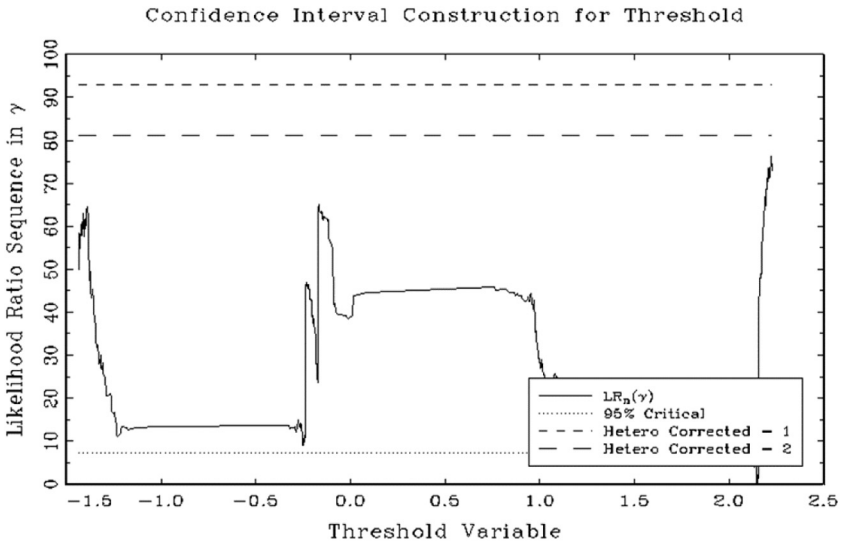

Fig. 1. Confidence interval construction in a single threshold model for leverage.

Regarding CEO power, we hypothesize in Hypothesis 1 that CEO power effect on leverage (measured as debt ration) is initially positive but becomes negative at higher levels of CEO power index. To test this hypothesis, Table 5 provides the estimation results of the relationship between CEO power and leverage for Chinese SMEs during 2009–2012. In our dataset 996 out of 1188 observations lower this threshold value, while 192 observations exceed the value. As can be seen, CEO power is significantly and positively associated with debt ratio at the 5% significant level when CEO power index is smaller than 2.150. On the other hand, if the CEO power is greater than 2.150, the impact on debt ratio is negative and statistically significant. Therefore, the results reveal that the association between corporate debt ratio and CEO power is in fact non-monotonic, consistent with our Hypothesis 1. Specifically, firms with less powerful CEOs tend to be in favor of higher debt ratio. However, when the power beyond a certain threshold, entrenched CEOs are more likely to adopt lower leverage to pursue their own self-interests. This finding supplements the evidence from Chintrakarn et al. (2014) in which a non-linear inverted U-shaped relationship exists between the level of CEO power and leverage in US firms. Thus, the results confirm that the effect of CEO power on debt financing is more complex than the simple monotonic relation documented in the prior literature (Chintrakarn et al., 2014).

In addition, the seven control variables considered in this study, tax rate, firm size, profitability, financial distress, growth opportunity, asset tangibility and earning volatility, might also influence corporate capital structure. As shown in Table 5, both firm size and growth opportunities significantly and positively related with leverage in the two regimes, consistent with Chen (2004) and Chang et al. (2014). Financial distress is measured by Altman's Z-score, which shows negative and significant relationship with the leverage, suggesting that Chinese SMEs with higher financial distress potential are more likely to use debt financing. This finding is align with the pecking order theory. Profitability exhibits different impacts on the leverage. It is positively associated with leverage in the first regime, while in the Regime II, it shows a significant and negative relationship with leverage. According to the agency theoretical framework, profitable firms tend to have severe free cash-flow problems, thus requiring also higher leverage to restrain management discretion. However, when CEOs become more powerful, they tend to manipulate firms' financing policies to pursue their own interests and avoid potential risk. As a result, they might be less likely to seek debt financing. Our regression result point out that tangibility has a statistically significant positive relationship with debt ratio in both regimes. These results are consistent with the trade-off and the pecking order hypotheses. The positive sign of the TANG coefficient demonstrates that firms with more tangible assets are more likely to use debt, which is in line with previous empirical studies of Chinese firms (Chen (2004), Huang and Song (2006) and Chang

Table 5
Threshold regression with instrumental variable results for leverage.

	Regime I (POWER ≤ 2.150)			Regime II (POWER > 2.150)		
Variable	Coeff.	Std. Error	*p*-value	Coeff.	Std. Error	*p*-value
POWER	0.142	0.059	0.016**	−3.172	1.397	0.024**
TAX	−0.124	0.194	0.522	−0.213	0.513	0.682
SIZE	0.172	0.024	0.000***	0.214	0.037	0.000***
PROFT	1.991	0.213	0.000***	−1.968	0.065	0.000***
RISK	−0.412	0.051	0.000***	−0.187	0.067	0.005***
GROWTH	0.021	0.007	0.002***	0.038	0.021	0.072*
TANG	0.099	0.043	0.021**	0.071	0.039	0.070*
EVOL	−0.002	0.001	0.046**	−0.002	0.001	0.047**
Constant	−2.176	0.364	0.000***	−7.246	2.849	0.012**
Obs.	996			192		

Notes: This table presents regression results of CEO power and leverage. The instrumental variable for the CEO power is the median value of industry-level POWER. The definition of variables are the same as in the Appendix A. The robust standard errors are reported. The estimation results correspond to trimming percentage of 15%. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

et al. (2014). Lastly, our result suggest that volatility in earning has a statistically significant negative relationship with leverage in two regimes. This is accordance with, both pecking order theory and agency theory suggesting negative relation of earnings volatility with leverage. These results suggest that volatility in earning translates into higher business risk that may lead to financial distress. This would become difficult for the firm to raise loans on favorable terms. Hence, in order to avoid cost of capital to rise too much, firms use internally generated funds to finance operations till they exhaust. This result is consistent with many prior studies postulate a negative relation between earnings volatility and debt structure (e.g., Bradley, Jarrell, & Kim, 1984; Wald, 1999).

5.3.2. CEO power and operating leasing

The second hypothesis, Hypothesis 2, assume that lease-debt is substitutable and/or compliment, therefore following the Hypothesis 1, there is non-monotonic relationship between CEO power and lease. To test this Hypothesis, we estimate Eq. (5) and report the results in following tables. We first test whether there are threshold effects for operating lease share. As shown in Table 6, the Sup-Wald test for the null hypothesis of no regime switch is rejected at the 1% significance level, suggesting that the CEO power-operating leasing relation shows significant threshold effect. Fig. 2 displays the computed likelihood ratio as a function of the CEO power index for Eq. (5), also providing strong evidence to suggest that there exists one threshold in the regression relationship. The estimated threshold point is −1.319, which is higher than 25th percentile value while much lower than the median value as well as the threshold value of above leverage equation, with which our sample can be spited into two regimes, i.e. the 'less CEO power' firms (Regime I) and the 'more CEO power' firms (Regime II).

Once the threshold value is confirmed, we now turn to estimate the effects of CEO power on operating leasing. Table 7 provides the regression coefficients and standard errors. We find that in our dataset 470 observations lie in the first regime and 718 observations lie in the second regime. As hypothesized, the relation between CEO power, debt ratio and operating lease was positive and significant when CEO power index is smaller than −1.319, consistent with the theoretical framework of debt-lease complements which suggests that the repossession advantage of leasing can provide high debt capacity than debt financing, hence it will motivate firms to use more leases. Our finding is also align with a great number of prior empirical studies which have shown a complementary relationship between debt and lease (Ang & Peterson, 1984; Finucane, 1998; Lasfer & Levis, 1998; Yan, 2006).

However, the substitute theory of debt-lease shows that greater use of lease financing should be associated with less debt financing, because both lease and debt are fixed obligations which can expose management to greater personal risk and are deemed as a mechanism to alleviate free cash problems. Due to this, powerful CEOs might be willing to adopt less debt and leases to avoid the discipline role of fixed claims and reduce personal exposure. As the Table 7 shown, when the CEO power index is greater than −1.319, the impact on operating lease share become negative and statistically significant. In addition, we observe a negative and significant relationship between debt ratio and operating lease share, confirming the debt-lease substitute theory. In summary, CEO power effect on lease share is initially positive but becomes negative at higher levels of CEO power index suggesting a nonlinear relation between these two variables. These findings are align with the Hypothesis 2 of this study.

The static tradeoff theory of capital structure suggests that firms will tradeoff the interest tax shield benefits of debt against the costs of financial distress such as bankruptcy. The theory suggests that leases and debt are substitutes because leasing involves a fixed claim obligation similar to debt and thus, consumes debt capacity. Therefore, an increase in debt (leases) will lead to a corresponding decrease in leases (debt). The empirical evidence on the lease-debt substitutability thus far has been mixed. While there is some evidence of a complementary relation (Ang & Peterson, 1984), others find evidence that is largely consistent with the tradeoff theory that leases and debt are substitutes (Adedeji & Stapleton, 1996; Bayless & Diltz, 1986; Beattie et al., 2000; Marston & Harris, 1988). In contrast, Mehran et al. (1999) find a complementary relation between debt and capitalized leases but no relation between debt and operating leases.

Table 6
Summary of the test results of threshold effects for operating lease share.

Test Hypothesis	Sup-Wald test	Bootstrap *P*-value	Threshold Estimates ($\hat{\gamma}$)	95% Confidence interval
H_0: no threshold	29.729	0.000	−1.319	[−1.343, −0.146]

Notes: This table reports the summary of the test results for threshold effects. The dependent variable is operating lease share. The threshold variable is the indicator of CEO power (POWER). The instrumental variable for the CEO power is the median value of industry-level POWER. Following Caner and Hansen (2004), we perform the Supremum Wald (Sup-Wald) statistic to test for the presence of threshold effects. The corresponding *p*-values are calculated using 10,000 bootstrap replications.

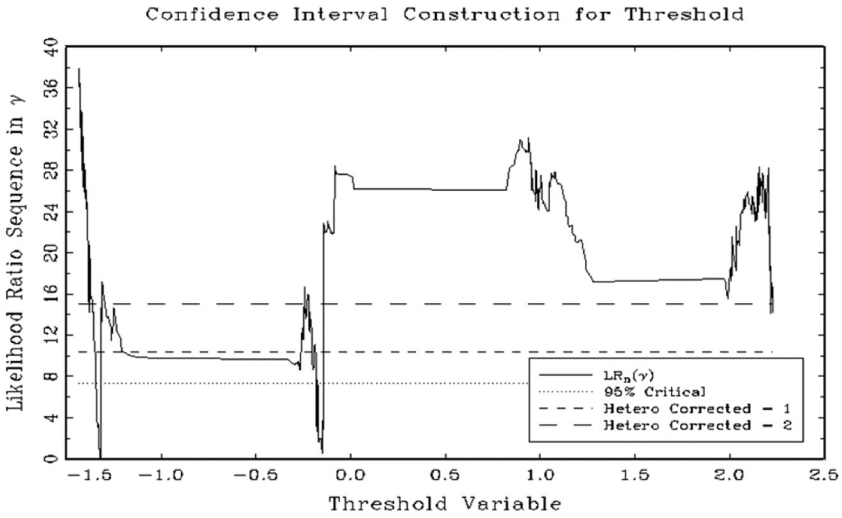

Fig. 2. Confidence interval construction in single threshold model for operating lease share.

Table 7
Threshold regression with instrumental variable results for operating lease share.

	Regime I (POWER ≤ −1.319)			Regime II (POWER > −1.319)		
Variable	Coeff.	Std. Error	*p*-value	Coeff.	Std. Error	*p*-value
POWER	0.613	0.061	0.000***	−0.142	0.003	0.000***
DEBT	0.374	0.031	0.000***	−0.503	0.287	0.080*
TAX	0.631	0.113	0.000***	0.926	0.132	0.000***
SIZE	−0.019	0.008	0.018**	0.024	0.013	0.065*
PROFT	0.298	0.013	0.000***	−0.009	0.216	0.966
RISK	0.011	0.032	0.344	0.168	0.002	0.000***
GROWTH	−0.008	0.005	0.110	−0.006	0.005	0.230
TANG	0.072	0.016	0.000***	0.055	0.025	0.028**
EVOL	−0.273	0.162	0.093*	0.201	0.109	0.066*
Constant	0.075	0.053	0.159	−0.110	0.060	0.068*
Obs.	470			718		

Notes: This table presents regression results of CEO power and operating lease share. The instrumental variable for the CEO power is the median value of industry-level POWER, and the instrumental variable for the debt ratio is the age of PPE. The definition of variables are the same as in the Appendix A. The robust standard errors are reported. The estimation results correspond to trimming percentage of 15%. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Other control variables also exhibit significant effect on operating leasing. In both the two regime regressions, tax rate is positively associated with operating leasing share, indicating that Chinese SMEs with higher tax rate are more likely to use operating leases. In Chinese case, the tax rate transferring effect is inconspicuous given strict requirements for applying to accelerate depreciation and receive tax credit. Moreover, lessees prefer the tax and income smoothing ability of leasing. This finding is consistent with Callimaci, Fortin, and Landry (2011) that lessees might prefer the tax and income smoothing ability of leasing. Firm size shows a differential effect on operating leasing, which is negatively related to leasing share in the first regime. Grinblatt and Titman (1998) suggest that small firms have a higher tendency to use more leases because leasing can reduce asset-specific risks as well as the other costs generated from information asymmetry. However, the positive

coefficient of the firm size is consistent with financial contracting theory, indicating that, as financial distress (Risk) decreases, firms use more leases (Mehran et al., 1999). In addition, align with the contracting theory, we also find that Z-score is significantly and positively related with operating lease share. Profitability is only significantly and positively associated with leasing share in the Regime I, indicating that profitable SMEs tend to use more leases. However, when CEO power index crosses the certain threshold the positive association with lease becomes negative and insignificance in regime II.

In both the two regime regressions, asset tangibility is positively related with operating leasing share, indicating that the availability of collateral may also affect a firm's financing policy because a firm can use its valuable assets to obtain more favorable financing at a lower cost and consequently increase its debt capacity. The estimated coefficient of earnings volatility has the predicted negative sign and is statistically significant. This suggest that the higher earnings volatility may also indicate the greater probability of a firm being unable to meet the contractual claims as they come due. A firm's debt capacity might also decrease with an increase in its earnings volatility which suggests a negative association between earnings volatility and firm leverage. Our results are quite consistent with previous studies that have shown a significant negative relationship between corporate leverage and earnings volatility (Booth et al., 2001; Bradley et al., 1984; Fama & French, 2002; Jong, Kabir, & Nguyen, 2008). This could force firms to use more lease since they are difficult to obtain debt financing.

6. Conclusion

There is a large literature on the firm financing decisions. However, less emphasis has been laid on the nonlinear impact of CEO power, especially for developing countries. To fill this research gap, this paper investigates the nonlinear effect of CEO power on firm leverage and operating lease share using a sample of 297 China's listed SMEs during the period 2009–2012. In other words, we aim at answering whether there exists a threshold in CEO power, above which the debt ratio and operating lease share impact of CEO power changes critically. To this end, we use the instrumental variable threshold regression approach developed by Caner and Hansen (2004) to test our hypotheses. The empirical results indicated that there is a power threshold in the CEO power-debt financing nexus. For CEO power index below the threshold, CEO power will exert a positive effect on debt ratio, suggesting firms with weak CEOs are more likely to use higher leverage. On the other hand, if the index exceeds the threshold value, the impact of CEO power on debt ratio will turn negative. This implies that powerful CEOs tend to manipulate firms' leverage levels to avoid the constraints resulting from debt financing (or disciplining role of debt), the threat of a bankruptcy and job loss. This finding is consistent with Chintrakarn et al. (2014) which report a hump-shaped relationship between CEO dominance and firm leverage for a sample of US firms. Therefore, our study provides new evidence on this non-linear relationship for a sample of Chinese SMEs firms listed on the Shenzhen Stock Exchange (SZSE).

Moreover, previous research has shown a mixed results about the relationship between debt and leases. Our results indicate that for the CEO power below the threshold, debt and leases are positively related, confirming the debt-lease complementary theory. However, when CEO power beyond the certain threshold, debt ratio becomes negatively related to operating lease share, consistent with debt-lease substitute theory. Align with the two contradicted theories, we also observe an inverted U-shaped relationship between CEO power and operating leasing.

Overall, our findings demonstrate that CEO power is indeed important factor in influencing firm financing policies. Specifically, we find evidence of a hump-shaped relationship between CEO power and leverage as well as CEO power and operating lease share. These results suggest that firms might fail to alleviate agency problems through using debt-type financing because CEOs with a high level of decision-making power are more likely to manipulate corporate capital structure to pursue their own benefits. We believe that our results are of potential importance to firms' owners in terms of optimising the CEO power that needs to be afforded to ensure that shareholders can effectively monitor executives or interfere their actions of own greed, hubris and personal ambition brought about the failure of the firm. In many of the cases, there was an overly dominant CEO, such as Tanzi at Parmalat, van der Hoeven at Ahold, Kozlowski at Tyco among others (Stewart, 2008). Specifically, an intermediate level of CEO power should be associated with optimal corporate capital structure that can maximise firm performance.

Finally, to the best of our knowledge, ours is the first major study of this subject by employing the instrumental variable threshold regression approach of Caner and Hansen (2004) and is among the first to study the effects of CEO power on lease financing. This paper contributes to the literature on capital structure and behavioural finance by documenting that CEO power is an important factor in effecting firm financing policies. In addition, prior studies show a mixed relationship between debt and leases. Our study enriches the existing debt-leases relationship research literature by providing direct evidence that this relationship varies with the levels of CEO power. However, this study focuses on Chinese listed SMEs. Future research may need to examine the nonlinear relationships for large-sized firms and other markets.

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Appendix A. Variable Definitions

Variables	Symbol	Definition
Leverage	DEBT	Book debt ratio, is defined in terms of debt ratio and calculated as the book value of total debt divided by the book value of total assets.
Operating lease share	LEASE	Rental commitments divided by total capital costs, where the total capital costs equal to sum of rental commitments, depreciation expense, and interest rate times net PPE.
CEO-Founder	FOUNDER	A dummy variable equals 1 if the CEO is one of the firm's founders and 0 otherwise.
CEO-Chair	CHAIR	A dummy variable equals 1 if the CEO also serves as board Chair (President) and 0 otherwise.
CEO-Ownership	ONERSHP	A dummy variable equals 1 if the CEO also is a major shareholders of the firm (i.e., with the ownership level greater than or equal to 10%) and 0 otherwise.
CEO-Pay slice	CPS	CEO's total compensation as a fraction of the combined total compensation of the top five executives (including the CEO) in a given firm.
CEO power indicator	POWER	First factor of applying principal components analysis of four proxies of CEO power: CEO-Founder, CEO-Chair, CEO-Ownership, and CEO-Pay slice.
Tax rate	TAX	Official tax rate, reported in firm's year-book compulsorily.
Firm size	SIZE	The natural logarithm of sales at the end of year.
Profitability		
Financial distress	RISK	China version of the Altman's zscore, based on Altman et al. (2007):where is the total liabilities to total assets, is the ratio of net profit to total assets, is the ratio of working capital to total assets, and is the ratio of retained earnings to total assets.
Growth opportunity	GROWTH	Tobin's Q, calculated as the sum of book value of total liabilities and market value of equity divided by book value of total assets.
Asset tangibility	TANG	Fixed assets divided by total assets.
Earnings volatility	EVOL	Standard deviation of the return/probability

Appendix B. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.najef.2017.08.011.

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