Managerial Finance

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Received 3 June 2015
Revised 3 March 2016
Accepted 4 March 2016

Abstract

Purpose – The purpose of this paper is to investigate the determinants of leasing decisions for a sample of China's non-financial small and medium-sized enterprises (SMEs).

Design/methodology/approach – Pooled ordinary least squares and Tobit models are used to analyze five years of data (2009-2013) on the sample units, to find the determinants of leasing decisions after controlling for industry. In order to assess the robust of the results, the authors further apply instrumental variables methods.

Findings – The results suggest that CEO ownership, tax rate, financial distress potential, and firm size are positively related to the operating lease share, whereas debt ratio, profitability, and tangibility are negatively linked to the operating lease share. In contrast, capital lease share increases with debt ratio, profitability, firm size, and strong corporate governance; it decreases with CEO ownership and financial distress potential.

Research limitations/implications – Using a small sample might not be enough capture industry effects. Future research may gain more insights using sufficient sample and considering the types of leases as well as leased assets.

Practical implications – This study offers evidences to the policy-makers who may adopt the practices to promote the development of leasing market. Furthermore, these results provide important implications to lessors in making operating strategy decisions and to potential lessees in making financing decisions.

Originality/value – To the authors' limited knowledge, this is the first study on leasing relies on publicly traded Chinese SMEs. The results of this study enrich the literature on the determinants of leasing in several ways.

Keywords China, Leasing, Small and medium size enterprises, Developing countries, Corporate financing

Paper type Research paper

1. Introduction

China has become the largest emerging market and the second largest economy in the world. The great success of its economic development is driven primarily by small and medium-sized enterprises (SMEs) which account for 98 percent of all firms and contribute 60 percent of the country's GDP[1]. Nonetheless, a lack of appropriate external financing channels has become the major constraint in the development of Chinese SMEs (Shen *et al.*, 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.

The authors would like to thank two anonymous referees for helpful and insightful comments and the Editor for his guidance and encouragement. Any remaining errors are the authors' own.

Managerial Finance
Vol. 42 No. 8, 2016
pp. 763-780

0307-4358
DOI 10.1108/MF-06-2015-0166

Therefore, understanding the determinants of SMEs' leasing decisions in China is vitally important not only for academia but also for policy-makers.

Over the past several decades, different theories have been developed explaining the determinants of firms' leasing decisions, including the tax differential theory, the debt substitutability theory, and the agency cost theory (Lasfer and Levis, 1998; Lasfer, 2007; Callimaci *et al.*, 2011; Neuberger and Räthke-Döppner, 2013; Cosci *et al.*, 2015). However, both theoretical and empirical studies have focussed on developed countries. Little work has been done to understand leasing decisions in developing economies, particularly China. Although the findings derived from developed countries are relevant to emerging markets, the distinct legal and institutional features as well as financial environments may potentially lead to significant differences (Demirgüç-Kunt and Maksimovic, 1998; Beck *et al.*, 2008). In recent years, the compulsory disclosure of leasing information in annual reports among the listed Chinese companies offers us an opportunity to understand more about leasing decisions in emerging economies.

Specifically this study aims to answer what and how the factors obtained from previous research in developed countries affect the Chinese SMEs' leasing decisions. To conduct the analysis, we employed a panel data set which consists of 1,675 firm-year observations comprising 335 companies listed on the Shenzhen Stock Exchanges (SZSE) SMEs Board for the period between 2009 and 2013. The results show that Chinese SMEs with high tax rates tend to use more operating leases, suggesting a tax transferring effect which has been found in industrialized countries is non-existent in China. Therefore, this result provides important evidence for policy-makers who wish to boost development of the Chinese leasing market through tax regulations. We also find that the use of leases is affected by other firm-level characteristics, including debt ratio, financial distress potential, profitability, size, and tangibility, as well as CEO ownership, board independence and size. For the lessors and potential lessees, these findings might help them to get a better understanding of leases, thereby easily adjusting operating strategies (for lessors) and financing decisions (for lessees).

Furthermore, this study fills a gap in previous empirical research to help examine whether the theories and findings about leasing derived from developed countries also work in developing countries. Our findings provide valuable comparisons with existing studies, enriching the literature on leasing determinants by showing how the distinct characteristics of China's institutional features affect lessees' leasing decisions.

The rest of this paper proceeds as follows: Section 2 contains the literature review and discusses theoretical predictions. Section 3 describes data and methodology. Section 4 reports the descriptive statistics and empirical results and Section 5 provides our discussion and conclusion.

2. Literature review and theoretical predictions

Previous studies in this area, as have been suggested above, have outlined three main rationales concerning the determinants of leasing decisions, mainly in the developed countries. Based on these theoretical frameworks, they have shown that firm characteristics such as tax, debt, financial distress potential, asset specificity, growth opportunities, size, tangibility, and corporate governance factors play significant roles in shaping leasing decisions. In what follows, we briefly review the results of previous research literature relating to the above factors, propose our expectations, and discuss how we will measure these variables. The summarized descriptions of these variables are provided in Table I.

Variable	Symbol	Definition
Operating lease share	OPLS	Rental commitments/total capital coast, where total capital costs = rental commitments+depreciation expense + interest rate × net PPE
Capital lease share	CLS	Net capital leases/net PPE
Total lease share	TLS	Operating lease share + (1 − operating lease share) × capital lease share
Debt ratio	DEBT	(Book value of total debt − capital leases)/total assets
Tax rate	TAX	15%, 20%, 25%, and others
Financial distress	ZSCORE	Altman's Z-score = 0.517 − 0.460 × (total liabilities/total assets)+ 9.320 × (net profits/average total assets) + 0.388 × (working capital)/ (total assets) + 1.158 × (retained earnings/total assets)
Profitability	PROFT	Operating profits/net sales
Capital intensity	C_INCTY	Total capital costs/total number of employees
Growth opportunity	Q	Tobin's Q = (market value of equity+book value of liability)/total assets
Firm size	SIZE	Natural Log of sales
Tangibility	TANG	Fixed assets/total assets
Ownership	OWNER	Percentage of shares owned by the CEO
Board independence	B_INDEP	Proportion of independent directors on the board
Board size	B_SIZE	Total number of directors
State	STATE	Equals 1 if a firm is ultimately controlled by the government

Table I.
Variable definitions

2.1 Firm characteristics

2.1.1 Tax. The initial theoretical model of operating leasing, such as Smith and Wakeman (1985) (SW), has focussed on the differences between the lessee and the lessor tax positions as the primary rationale for leasing. The fundamental argument is that an operating lease provides a mechanism that allows the transfer of tax benefits from lessees to lessors, in exchange for lower lease payments. Smith and Wakeman (1985) also argue that assets which generate investment tax credits are more likely to be leased. Graham *et al.* (1998), based on the SW model, show that use of accelerated depreciation schedules tends to favor the conditions under which the low tax rate companies are the lessees. However, Chinese firms are restricted to applying accumulated depreciation and tax credits for operating leasing[2].

Empirical findings on the relationship between tax and operating lease propensity are mixed (Beattie *et al.*, 2000; Cosci *et al.*, 2015). Callimaci *et al.* (2011) find that Canadian firms with high tax rates are more likely to use leases. They conclude that firms with high tax rates might prefer the tax and income smoothing ability of leasing. This is in line with the argument of Graham *et al.* (1998), who demonstrate that it is possible to devise situations in which the high rate firm functions as the lessee when large lease payments are received early in the term with depreciation tax shield occurring later in the term. Based on the above theoretical analysis and mixed findings in the empirical research, we do not expect a relationship to be displayed between tax rate and operating leases for Chinese SMEs.

Compared to operating lease, capital lease is treated in a different way for tax purposes. According to China Accounting Standards No. 21, lessee firms depreciate the leased assets and amortize the debt liabilities; the only tax deductible part is the interest of the lease payments. Therefore, the treatment of capital lease contracts is identical to that of debt for tax purposes. Trade-off theory suggests that firms with higher tax rates

should borrow more because a high tax rate increases the value of tax shields. Prior studies have shown a negative relationship between tax rate and debt ratio for Chinese firms, in support of trade-off theory (Chang *et al.*, 2014). Accordingly, we anticipate that firms with high tax rates are more likely to use capital leases. In this study, tax rate is defined as the corporate practical tax rate which is compulsory to report in firms' annual reports.

2.1.2 Debt and financial distress. Traditional finance theory identifies leasing as an alternative to borrowing since lease payments, similar to debt payments, are fixed obligations that can reduce the firm's debt capacity. In addition, according to trade-off theory, an increase in leases can also lead to increases in the marginal costs of financing, thus the lessees are optimal to reduce non-leasing debt when they utilize more leases (Yan, 2006). As a consequence, leasing is a substitute for debt financing. Empirical evidence on the relationship between leases and debt is mixed. Ang and Peterson (1984), Finucane (1988), Krishnan and Moyer (1994), Lasfer and Levis (1998), and Callimaci *et al.* (2011) find a complementary relation between leases and debt. In contrast, a great number of studies show that leases and debt are substitutes (Deloof and Verschueren, 1999; Beattie *et al.*, 2000; Yan, 2006; Lin *et al.*, 2013; Cosci *et al.*, 2015).

Lewis and Schallheim (1992), based on tax benefits transferring theory, argue that since leasing provides a mechanism for selling excess tax shields, as the non-debt tax shields are reduced, the marginal benefit of non-lease-debt financing will increase. As a result, leasing motivates lessees to increase the proportion of debt in their capital structure. In this study, we predict that Chinese SMEs that lease more also tend to have more debt (i.e. positive relationship between operating leases and debt), if the negative relationship between operating lease share and tax rate can be found.

From the perspective of tax and accounting treatments, capital leasing in China is similar to debt financing but with higher costs due to the separation of ownership and control. Adedeji and Stapleton (1996) argue that the agency costs incurred by the separation will transfer to the lessees in the form of higher financing charges. According to the pecking order theory, the adding of costs will lead to the lower ranking level of leasing. Therefore, leasing might be employed as a secondary measure after the firms have used up their debt capacity (Adedeji and Stapleton, 1996; Callimaci *et al.*, 2011). This indicates that the relationship between debt and capital leases should be positive.

Additionally, Eisfeldt and Rampini (2009) argue that it is a trade-off between agency costs and repossession benefits when using lease financing, because leasing presents an advantage in repossessing the assets in case of default. Consequently, leases can offer higher funding capability than debt. This higher debt capability of leasing is more valuable for financially distressed firms which are likely to have a higher degree of leverage and cash-flow problems. Empirically, Krishnan and Moyer (1994) find that the lessee firms tend to have a higher potential for financial distress and bankruptcy than the non-lessee firms, meanwhile with higher debt ratio. Accordingly, we predict that capital leases and debt are complements in Chinese SMEs. We also predict that firms with great financial distress potential tend to use more lease financing.

Following Beattie *et al.* (2000), debt ratio is defined as total debt (long-term debt and short-term debt) net capital leases divided by the total assets (book value). We adopt two variables to measure financial distress potential. Krishnan and Moyer (1994) and Schallheim *et al.* (2013) find firms with a lower Altman's *Z*-score, which means higher financial distress potential or higher risk of bankruptcy, tend to use more financial

leasing. The *Z*-score of this study is derived from Altman *et al.* (2007). Profitability is another measurement of financial distress potential. Beattie *et al.* (2000) argue that firms with high profitability will have a lower risk of bankruptcy. Profitable firms will also have more internal cash to finance investment thus reducing the amount of external financing.

Moreover, in China, state-owned enterprises (SOEs) can more easily obtain financing sources and support (e.g. subsidies). Although they have high leverage and high financial distress potential, protection will be offered by the government to prohibit bankruptcy. In contrast, private firms have been facing severe financing problems since more bank loan resources are concentrated on SOEs (Bhattacharjee and Han, 2014). As a consequence, leasing might become a more attractive financing instrument for private SMEs. To control for state influence, we add a dummy variable that is 1 if a SME's ultimate owner is the government.

2.1.3 Asset specificity. The separation of ownership and use of assets can create agency conflicts between the lessees and the lessors. This problem is exacerbated when the leased assets are highly specific to the lessees. In these leasing cases, when the lessees are insolvent or they cancel the leasing contracts, the lessors may have difficulty redeploying the specific leased assets. Therefore, the leasing may occur more easily if the lessees have higher reputations or the lessors have a higher market power and the channels to dispose of specific assets (Smith and Wakeman, 1985). Empirically, Finucane (1988) and Krishnan and Moyer (1994) find that leasing activity is more prevalent in transportation services and retailing industries. Consequently, we predict a negative relationship between asset specificity and leasing propensity in Chinese SMEs.

In this study we follow Sharpe and Nguyen (1995) and Robicheaux *et al.* (2008) in using capital costs divided by total number of employees (so-called capital intensity) to measure asset specificity. Capital-intensive firms might use more specialized equipment that is less appropriate for leasing. Although the ratio of research and development (R&D) expense to sales is an alternative measure of asset specificity (Krishnan and Moyer, 1994), we are unable to employ it in this study because only a few Chinese SMEs disclose R&D expenses (see, e.g. Chang *et al.*, 2014 on this issue). In addition, following Krishnan and Moyer (1994), several industry dummies are employed to capture industry effects on leasing.

2.1.4 Growth opportunity. Theoretical arguments exist regarding the relationship between growth opportunity and firm leverage. Firms with high-growth opportunities are easily subject to small free cash-flow problems and high costs of debt. In the agency cost framework, these firms should apply less debt financing to reduce the underinvestment problems (Myers, 1977). Trade-off theory also suggests that debt financing decreases with growth opportunities. However, the previous researchers argue that leasing is effective in reducing agency costs. Barclay and Smith (1995) and Lasfer and Levis (1998) find that firms with high-growth opportunities tend to employ more leases. Given the imperfect financial markets in China, Chinese SMEs with high-growth opportunities might not be able to obtain adequate funds from the equity and debt markets (Shen *et al.*, 2009; Chang *et al.*, 2014). As a result, rapid growth firms have to fund themselves through alternative financial means. Due to the custom-tailored features, leasing is generally deemed as a more flexible way of financing assets than traditional borrowing (Callimaci *et al.*, 2011). Consequently, we assume that the SMEs with higher growth opportunities tend to use more lease financing. In this study,

growth opportunity is proxied by the Tobin's *Q* (market-to-book ratio of total assets) which is extensively used in previous literature (Lasfer and Levis, 1998).

2.1.5 Firm size. Sharpe and Nguyen (1995) argue that the quality of information on a company's performance and future prospects is negatively related to firm size. As a result, the asymmetric information problems will exacerbate as firm size decreases. This is in line with Grinblatt and Titman (1998) who argue that the conflict between firm and debt holders may be worse for small firms. Small companies are usually more flexible and thus better able to increase the risk of their investment projects. In such a situation, lenders might be reluctant to provide debt finance to small firms, because the potential return from firm operations, especially from those of risky investment projects accrues to shareholders only, while the increased risk is shared by debt-providers (Beattie *et al.*, 2000). Additionally, although lenders provide funds to small firms, the high information cost premiums and debt level will enhance the small firms' probability of bankruptcy as well as managers' personal risk. Both arguments suggest that small firms should have lower debt levels.

Nevertheless, firm size might have a differential influence on leasing relative to debt-type finance (Beattie *et al.*, 2000). Grinblatt and Titman (1998) suggest that small firms have a higher tendency to use more leases rather than debt, since leasing can reduce personal and asset-specific risks as well as the other costs generated from information asymmetry. Empirical evidence supporting this prediction is also reported by Graham *et al.* (1998), Eisfeldt and Rampini (2009), Callimaci *et al.* (2011), and Cosci *et al.* (2015) in their studies of leasing determinants among USA, Canadian, and European-based firms, respectively. However, Lasfer and Levis (1998), Deloof and Verschueren (1999), and Mehran *et al.* (1999) find a significant positive relationship between leasing and size. Given the mixed results in the empirical literature, we do not predict the sign of coefficient on firm size in Chinese SMEs. Following Sharpe and Nguyen (1995) and Mehran *et al.* (1999), a natural logarithm of sales is used to measure firm size in this study. Here, sales rather than total assets are used to avoid potential endogeneity (Sharpe and Nguyen, 1995).

2.1.6 Tangibility. Tangible assets can be used as collateral to diminish agency costs of debt because overinvestment can transfer wealth from creditors to shareholders. Traditional theories suggest that the debt ratio of firms increases with tangibility of assets. Previous studies of Chinese firms also highlight that tangibility is positively related to leverage in samples of listed companies (Chang *et al.*, 2014). As a consequence, in the absence of leasing, tangibility reflects the debt capacity of firms. However, if leasing is available, firms should compare the costs of purchased assets with the costs of leased assets and then make a financial decision (Lin *et al.*, 2013). Hence, there is a trade-off between these two types of costs. Given the advantage in repossession and priority claims, leasing might be treated as a strong form of collateral. As a consequence, the costs of leasing would be lower than the costs of purchasing assets through borrowing for firms with lower tangibility. Lin *et al.* (2013) and Cosci *et al.* (2015) find a significantly negative relationship between leasing and tangibility. Based on the theoretical arguments and empirical evidence, we assume that Chinese SMEs with lower tangibility tend to use more lease financing. In this study, tangibility is measured as fixed assets scaled by total assets (book value).

2.2 Corporate governance factors

The conflicts between managers and shareholders can result in agency costs which are referred to as agency costs of outside equity. Financial economists suggest that aligning

the interests of managers and shareholders can mitigate agency costs of equity (Robicheaux *et al.*, 2008). Executives who have substantial ownership shares are more closely aligned with shareholders (Mehran *et al.*, 1999). However, Smith and Wakeman (1985) argue that "ownership of the capital assets make it more difficult for the proprietor to reduce risk through diversification." Leasing might be an effective mechanism to alleviate this problem since the lessors bear some of the risk associated with the leased assets. Therefore, CEOs with high ownership should have a greater incentive to use leasing. Mehran *et al.* (1999) obtain similar results by employing a sample of US firms in their empirical research. However, firms which exhibit concentrated managerial ownership may be more likely to purchase, rather than to lease, assets because they are less risk-averse (Callimaci *et al.*, 2011). Given the contradictory argument, we do not predict the sign of the coefficient for ownership in Chinese SMEs.

Nonetheless, in firms with highly concentrated ownership, strong corporate governance structures might mitigate the problem of less diversification in financing options because of its monitoring role in corporate business operations. Chen and Al-Najjar (2012) argue that more debt-type financing might result in a higher likelihood of fraud, thus increasing a need for internal control mechanisms (e.g. strong corporate governance). They find that board independence is positively related to firm diversification in Chinese firms. Likewise, Robicheaux *et al.* (2008) suggest that firms might simultaneously attempt to mitigate two types of agency problems, specifically agency cost of debt and agency cost of equity. They show that strong corporate governance and leasing are complementary. Based on the discussion, we assume that Chinese SMEs with strong corporate governance tend to use more lease financing.

Following Chen and Al-Najjar (2012) and Shan (2015), we define strong corporate governance of Chinese SMEs as consisting of a high percentage of independent directors and a large board size. The ownership is measured by the proportion of shares that the CEO holds in the company.

3. Data and methodology

3.1 Data

Our sample consisted of the firms listed on the SZSE SMEs Board between 2009 and 2013. We selected 2009 as the beginning of our sample for two reasons. First, the Chinese government implemented the new income tax law in 2008, which unifies the tax rate and introduces rules to classify the types of leasing clearly. Second, this might mitigate the effect of the global financial crisis on firm financing. The data were obtained and computed from the firms' annual reports[3]. Data of stock prices were collected from SINA Finance[4]. We excluded financial firms since they have unique financial characteristics and accounting standards as well as any firms with missing variables. We also excluded firms under "special treatment" (flagged with ST or *ST) because of their abnormal financial situations. Thus, the final sample consists of a balanced panel of 335 firms with a total of 1,675 firm-year observations.

3.2 Empirical model

The estimation model to investigate the determinants of leasing decisions is based on the Ang and Peterson (1984) debt-to-lease replacement equation:

$$\begin{aligned}\text{Debt Ratio}_{NL} &= \text{Debt Ratio}_{L} + \alpha \text{Lease Share}_{L} \\ &= f(\text{explanatory variables}) \end{aligned} \quad (1)$$

where, Debt Ration$_{NL}$ is the debt ratio of the firm without using lease. Debt Ration$_L$ is the debt ratio of a similar firm that uses lease. Lease Share$_L$ is lease share of the lessee. α is the lease-debt substitution coefficient. If $\alpha > 0$, leases and debt are substitutes, and if $\alpha < 0$, leases and debt are complements. Rearranging the above equation according to the research need, we get the following model:

$$\begin{aligned}\text{Lease Share}_L &= \frac{-1}{\alpha}\text{Debt Ratio}_L + \frac{1}{\alpha}f(\text{explanatory variables}) \\ &= \gamma_0 + \gamma_1\text{DEBT}_{it} + \gamma_2\text{TAX}_{it} + \gamma_3\text{ZSCORE}_{it} + \gamma_4\text{PROFT}_{it} + \gamma_5\text{C\_INCTY}_{it} \\ &\quad + \gamma_6 Q_{it} + \gamma_7\text{SIZE}_{it} + \gamma_8\text{TANG}_{it} + \gamma_9\text{OWNER}_{it} + \gamma_{10}\text{B\_INDEP}_{it} \\ &\quad + \gamma_{11}\text{B\_SIZE}_{it} + \gamma_{12}\text{STATE}_{it} + \sum_{j=1}^{n}\delta_j\text{INDUM}_j + \varepsilon_{it} \end{aligned} \quad (2)$$

where, γ_0 is the constant; $\gamma_{1\text{-}12}$ and δ_j are estimated coefficients for explanatory variables; if $\gamma_1 > 0$, leases and debt are complements, and if $\gamma_1 < 0$, leases and debt are substitutes. INDUM$_j$ is a set of industry dummies. ε is the disturbance term. Following Sharpe and Nguyen (1995), this study divides the lease share (Lease Share$_L$) into three measures: operating lease share, capita lease share, and total lease share. Their values vary from 0 (lowest) to 1 (highest). The detailed definitions of each of the variables (excluding industry dummies) used in this study are presented in Table I. To eliminate the effect of outliers, all the continuous variables are winsorized at the 1 percent and 99 percent levels.

4. Results

4.1 Descriptive statistics

Table II shows the descriptive statistics of the sample. The average operating lease share and capital lease share are, respectively 7.075 and 0.564 percent. The capital lease share is similar to that of the North American firms reported in Lin *et al.* (2013), whereas the operating lease share is slightly lower. The relative unimportance of capital leases

Variable	Mean	SD	Min	Median	Max	Skew	Kurtosis
OPLS (%)	7.075	14.529	0.000	0.849	81.591	3.078	12.987
CLS (%)	0.564	3.158	0.000	0.000	28.138	6.898	53.376
TLS (%)	7.664	14.790	0.000	1.233	81.591	2.904	11.969
DEBT (%)	38.255	19.105	2.219	37.063	85.403	0.190	2.268
TAX (%)	16.299	4.916	0.000	15.000	25.000	0.628	4.281
ZSCORE	1.195	0.645	−0.436	1.128	3.524	0.677	4.153
PROFT (%)	10.455	11.417	−28.459	8.676	57.045	0.718	5.574
C_INCTY (ln)	10.431	0.850	8.200	10.393	13.256	0.268	3.531
Q	1.812	0.947	0.875	1.532	6.960	2.494	10.925
SIZE	20.807	1.025	18.534	20.755	23.636	0.299	2.902
TANG (%)	23.511	14.129	0.324	21.394	68.140	0.632	3.008
OWNER (%)	11.178	16.458	0.000	1.380	66.187	1.486	4.205
B_INDEP (%)	36.746	5.400	12.500	33.333	66.667	1.195	6.250
B_SIZE	8.762	1.559	5.000	9.000	17.000	0.257	4.644
STATE	0.215	0.411	0.000	0.000	1.000	1.388	2.927

Table II. Descriptive statistics

Notes: Variable definitions appear in Table I. All continuous variables have been winsorized at 1st and 99th percentiles

indicates that the results for total lease share are driven heavily by the operating lease share results, consistent with Robicheaux *et al.* (2008). Meanwhile, operating lease share and capital lease share are positively skewed. The mean of debt ratio is 38.255 percent, which is lower than that of Chinese listed companies reported in Huang and Song (2006). The average profitability is 10.455 percent, which might imply that the Chinese SMEs exhibit good performance. The mean of *Z*-score 1.195 indicates that on average the listed SMEs are "healthy" in terms of financial management. Chinese listed SMEs show a high percentage of CEO ownership: on average 11.178 percent of shares are held by CEOs, with a maximum of 66.187 percent. Table II also presents that the average size of the board of directors is nine members with a maximum of 17. The average proportion of independent directors is 36.746 percent, reflecting the requirement introduced to have one-third of the board as independent directors (Chen and Al-Najjar, 2012).

Table III reports the average lease share grouped by the industry categories. As depicted by the table, lease share varies greatly among the industry groups. Retail, wholesale and transportation industries represent the highest average operating lease share (44.670 percent) and lowest capital lease share (0 percent), while the mining industry has both the lowest operating lease share (1.691 percent) and capital lease share (0 percent). In contrast, construction sector firms make significantly more use of capital leasing than firms in other industries. They also have the second highest total lease share.

4.2 Pairwise correlation

To measure the relevance of any two variables, we employed the Pearson correlation coefficient test. The correlation analysis in Table IV reports the relationship among the dependent and independent variables. It illustrates that operating lease share and total lease share are highly correlated (0.972), but capital lease share has a weak correlation with total lease share (0.176). These findings further indicate that total lease share is heavily influenced by operating lease share. As expected, capital lease share is positively and significantly correlated with debt ratio, tax rate, and board size, and exhibit negative correlations with *Z*-score and profitability. The correlations between operating lease share and capital intensity, tangibility, ownership, and board independence are consistent with our expectations. We also find that the *Z*-score is positively and significantly correlated with operating lease share. The positive correlation between lease share and firm size indicates that firms which have high sales are more likely to use leasing. In addition, capital lease share is negatively and significantly correlated with capital intensity and ownership.

In general, the results are consistent with our expectations, and roughly demonstrate that multicollinearity would not be a problem for the subsequent regression analysis. We also calculate the Variance Inflation Factors (VIF) to

Industry	Variable code	No. of firms	OPLS (%)	CLS (%)	TLS (%)
Services and utility	INDUM_1	47	11.209	0.387	11.676
Mining	INDUM_2	3	1.691	0.000	1.691
Constructions	INDUM_3	11	5.774	5.839	12.098
Manufacturing	INDUM_4	265	5.181	0.402	5.579
Retail, wholesale, and transportation	INDUM_5	9	44.670	0.000	44.670

Notes: OPLS, operating lease share; CLS, capital lease share; TLS, total lease share. All the three variables have been winsorized at 1st and 99th percentiles

Table III.
Lease share by industry groups

Table IV.
Correlation matrix

	Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1.	OPLS	1														
2.	CLS	−0.062**	1													
3.	TLS	0.972***	0.176***	1												
4.	DEBT	−0.010	0.221***	0.040	1											
5.	TAX	0.175***	0.090**	0.193***	0.210***	1										
6.	ZSCORE	0.090***	−0.184***	0.048*	−0.640***	−0.161***	1									
7.	PROFT	0.006	−0.110***	−0.019	−0.432***	−0.079***	0.769***	1								
8.	C_INCRY	−0.132***	0.122***	−0.102***	0.176***	0.069***	−0.221***	−0.119***	1							
9.	*Q*	0.004	−0.094***	−0.018	−0.281***	−0.146***	0.3997***	0.289***	−0.055**	1						
10.	SIZE	0.145***	0.159***	0.178***	0.498***	0.264***	−0.118***	−0.156***	0.198***	−0.176***	1					
11.	TANG	−0.278***	0.038	−0.266***	0.122***	0.059**	−0.260***	−0.229***	0.505***	−0.037	0.024	1				
12.	OWNER	0.189***	−0.102***	0.164***	−0.067***	0.015	0.096***	0.060**	−0.181***	−0.032	−0.034	−0.172***	1			
13.	B_INDEP	0.093***	−0.003	0.091***	−0.010	0.028	0.014	−0.020	−0.010	0.044*	0.026	−0.071***	0.263***	1		
14.	B_SIZE	−0.064***	0.152***	−0.030	0.143***	0.026	−0.061**	0.021	0.135	−0.095***	0.127***	0.136***	−0.219***	−0.446***	1	
15.	STATE	−0.036	0.106***	−0.0119	0.129***	0.088***	−0.110***	−0.019	0.197***	−0.023	0.061**	0.105***	−0.219***	−0.040	0.173***	1

Notes: Variables are defined the same as Table I. All continuous variables have been winsorized at 1st and 99th percentiles. *,**,***Significant at 10, 5 and 1 percent, respectively

detect multicollinearity issues formally. The average VIF of 1.75 and the maximum VIF of 4.64 suggest that multicollinearity among the regressors is not a problem in model specification.

4.3 Regression results

In this section, we present the results of empirical analysis on the determinants of leasing. We estimate the Equation (2) using ordinary least squares regression for both operating lease and total lease variables. Since many of the firms have no capitalized leases, we employ the Tobit model for the capital lease share variable to address the truncated dependent variable problem. In accordance with Petersen (2009), we adjusted the standard errors by clustering at both the firm level and the year level. Table V reports the empirical results, in which the dependent variables are operating lease share, capital lease share, and total lease share, respectively. Since operating lease and capital lease differ extremely in their legal, tax, and accounting treatments in China, our interpretations mainly focus on them.

4.3.1 Operating lease share. As represented in Model 1, the coefficient of tax rate for the operating lease share is positive and significant at the 1 percent level, indicating

	Pooled OLS		Tobit	Pooled OLS
	Model 1	Model 2	Model 3	Model 4
DEBT	−0.055 (−2.24)**	−0.034 (−1.44)	0.232 (3.00)***	−0.045 (−1.79)*
TAX	0.276 (3.07)***	0.274 (3.06)***	0.106 (0.56)	0.300 (3.25)***
ZSCORE	2.723 (2.44)**	4.059 (3.92)***	−16.389 (−4.30)***	2.159 (1.93)*
PROFT	−0.199 (−4.15)***	−0.241 (−5.30)***	0.467 (3.35)***	−0.190 (−3.95)***
C_INCTY	−0.636 (−1.03)	−0.790 (−1.34)	−0.275 (−0.25)	−0.358 (−0.58)
Q	0.041 (0.12)	0.211 (0.64)	1.288 (0.90)	0.023 (0.07)
SIZE	1.108 (3.30)***	0.553 (1.72)*	3.198 (3.26)***	1.225 (3.49)***
TANG	−0.206 (−7.55)***	−0.195 (−7.62)***	−0.014 (−0.22)	−0.211 (−7.53)***
OWNER	0.131 (4.70)***	0.114 (4.10)***	−0.367 (−4.25)***	0.118 (4.21)***
B_INDEP	0.088 (1.07)	0.129 (1.54)	0.565 (3.42)***	0.138 (1.65)*
B_SIZE	0.192 (0.90)	0.311 (1.48)	2.315 (4.14)***	0.445 (1.87)*
STATE	0.111 (0.14)	0.565 (0.78)	1.500 (0.80)	0.381 (0.45)
INDUM_2	−4.515 (−2.82)***	−5.076 (−3.21)***	19.811 (4.12)***	−5.139 (−3.28)***
INDUM_3	−5.848 (−5.29)***	−5.716 (−5.23)***		−5.741 (−5.07)***
INDUM_4	−8.150 (−3.76)***	−7.476 (−3.45)***	18.218 (4.31)***	−2.883 (−1.09)
INDUM_5	29.527 (6.23)***			28.409 (6.00)***
Constant	−10.509 (−1.01)	−2.251 (−0.22)	−146.676 (−6.27)***	−19.479 (−1.87)*
F-test	19.20***	14.63***	9.04***	16.90***
R^2	0.311	0.176	0.158	0.290
n	1,675	1,630	1,675	1,675

Notes: The dependent variables for Model 1 and Model 2 are operating lease share, for Model 3 is capital lease share, and for Model 4 is total lease share. INDUM_2, equals to 1 if firm is in the mining sector, 0 otherwise; INDUM_3, equals to 1 if firm is in the construction sector, 0 otherwise; INDUM_4, equals to 1 if firm is in the manufacturing sector, 0 otherwise; INDUM_5, equals to 1 if firm is in the retail, wholesale, or transportation sectors, 0 otherwise. INDUM_1 is omitted to avoid multicollinearity. INDUM_2, INDUM_3, and INDUM_5 are merged together in the CLS regression due to sample size. The definitions of other variables are provided in Table I. All continuous variables have been winsorized at 1st and 99th percentiles. *t*-statistics are in parentheses, computed using the robust standard errors that adjusted for clustering at both the firm level and the year level. For CLS regression, the *F*-test value reported is the Wald χ^2. *,**,***Significant at 10, 5 and 1 percent, respectively

Table V.
Determinants of lease share: regression results

that the firm which has a higher tax rate uses more operating leasing. This finding is consistent with Callimaci *et al.* (2011). The possible explanation is that the tax shield transferring effect does not exist in listed Chinese SMEs given the distinct tax law systems and financial environment. Debt ratio has a negative and significant relationship with operating lease share, which is in line with the findings of Deloof and Verschueren (1999), Beattie *et al.* (2000), Lin *et al.* (2013), and Cosci *et al.* (2015). Besides the non-existence tax arbitrage, this finding can be interpreted in two ways: it is cheaper for these lessee SMEs to lease the assets, such as real estate, than to borrow and buy it (Lasfer, 2007); as an off-balance-sheet financing tool, operating leasing has higher flexibility through the advantage of cancellability.

Other firm characteristics also play significant roles in effecting operating leasing decisions. The negative coefficient on profitability supports our expectation that firms with less internal cash tend to use more external financing, such as operating leases. In contrast, when using *Z*-score as the measurement of financial distress potential, we obtain a positive relationship between operating lease share and *Z*-score. This finding indicates that firms with less financial distress potential are more likely to use operating leases, which is in line with the Graham *et al.* (1998) argument that firms with large expected costs of financial distress tend to finance with leases. A significant and positive relationship can be seen between operating lease share and firm size, supporting studies by Deloof and Verschueren (1999) and Mehran *et al.* (1999). This result suggests that larger SMEs in China are more likely to use operating leases. Tangibility is significantly and negatively related to operating lease share, providing support for the findings of Lin *et al.* (2013) and Cosci *et al.* (2015). If the firm's tangibility is low this may constrain its borrowing ability, thus motivating firms to use more operating leases.

There is a positive relationship between operating lease share and CEO ownership, consistent with the study of Mehran *et al.* (1999). This finding suggests that CEOs try to reduce the agency costs of debt by using more operating lease financing (Robicheaux *et al.*, 2008). Moreover, this finding can be also explained in that CEOs with high ownership are more likely to use leasing to reduce their personal risk.

This study classifies firms into five industries and estimation results show a significant industry effect on operating lease share as expected, suggesting that the uniqueness of an industry potentially affects the firms' leasing decisions. The coefficients on mining (INDUM_2), construction (INDUM_3), and manufacturing (INDUM_4) are negative and significant, indicating that firms within these industries tend to buy, rather than to lease, assets. A positive relationship exists between retail, wholesale, and transportation (INDUM_5) and operating lease share, suggesting that these firms are more likely to use operating leases, which is consistent with our previous findings (see Table III). Since INDUM_5 firms have an extremely higher average operating lease share in comparison with firms within other industries, we re-estimate the operating lease share regression by eliminating the 9 firms. The results, detailed in Model 2 of Table V, confirm the findings in the full sample model, except for debt ratio, which became insignificant related to operating lease share.

4.3.2 Capital lease share. Model 3 presents the results of the regression on capital lease share. Due to the small sample size on INDUM_2, INDUM_3, and INDUM_5 (see Table III), we merged the firms in these industries into one group. The results demonstrate that tax rate is insignificantly related to capital lease share, so our expectation is not supported. The positive coefficient on debt ratio indicates that capital leases and debt are complements, consistent with our expectation and greater numbers

of previous findings (e.g. Ang and Peterson, 1984; Finucane, 1988; Krishnan and Moyer, 1994; Lasfer and Levis, 1998; Schallheim *et al.*, 2013). The possible reason for this is that capital lease is employed as a secondary financing resource after the Chinese SMEs have used up their debt capacity or are unable to obtain funds from other forms of debt-type financing.

Firm-specific factors, such as *Z*-score, profitability, and size, are also significantly related to capital lease share. The *Z*-score is negatively related to capital lease share, indicating firms with a high financial distress potential tend to utilize more leases, consistent with the Krishnan and Moyer (1994) argument that as bankruptcy potential increases, capital lease financing becomes an increasingly attractive financing option. The positive relationship between profitability and capital lease share suggests that firms with higher profitability are likely to use capital lease. The possible explanation is that Chinese SMEs need more external funding to expand investments and strengthen their market position because the profit margin is high. A positive and significant relationship can be seen between capital lease share and size, which contradicts our expectation. Large-sized Chinese SMEs might obtain capital leases with lower costs more easily, since they have greater diversification and a more stable cash flow.

CEO ownership is significantly and negatively related to capital lease share, suggesting that CEOs with higher ownership tend to use fewer capital leases. This relationship is different from the one for operating lease. We suggest two possible explanations for this. First, Chinese CEOs consider capital leasing as a sub-form of debt financing (complementary relationship in this study). Previous findings (e.g. Chang *et al.*, 2014) also show a negative relationship between debt ratio and managerial ownership. The interests of CEOs who hold a large percentage of shares are aligned effectively with owners, thereby reducing the need for using debt-type finance to alleviate agency problems. Second, this is different from operating lease, which is able to be canceled without penalty, as using more capital lease may increase the CEOs' personal risk.

As indicated in Model 3, both board independence and size are positively related with capital lease share, providing further support for Robicheaux *et al.* (2008) hypothesis, which argues that strong corporate governance structures (i.e. effective board) tend to use agency cost reducing capital structure, defined here as leasing use. Moreover, we find that the SMEs tend to use more capital lease, except for those within services and utility, which is omitted in the regression.

4.3.3 Total lease share. The results of total lease share regression are presented in Model 4. Since capital lease financing is a rare phenomenon in Chinese SMEs, the results for total lease share are heavily driven by the operating lease share, which is in line with Robicheaux *et al.* (2008). Model 4 shows similar signs of coefficient with operating lease share results, except for board structures and INDUM_4. Board independence and size are positively related to total lease share with lower statistical significance, consistent with findings of capital lease share regression. Although INDUM_4 is still negatively related to lease share, the estimation becomes statistically insignificant. These findings suggest that capital lease share is partially influential on total lease share results.

4.4 Robustness test

In this section, several different models are employed and tests are carried out to check the robustness of our results. Due to the non-normal distribution of operating lease share and total lease share (see Table II), we re-estimated Model 1 and 4 (as shown in Table V) using Tobit analysis. The results[5] generally confirm the findings in Model 1 and 4.

Endogeneity might exist in our research because leasing and capital structure decisions as well as executive ownership may be simultaneously determined (Robicheaux *et al.*, 2008). Lewis and Schallheim (1992) argue that ignoring the issue that leasing is simultaneously determined with capital structure can induce unreliable results. Lin *et al.* (2013) assert that the mixed results of previous empirical research on the link between lease and debt might be introduced by failing to consider the simultaneous relations. This study addresses the potential endogeneity problem using instrumental variable (IV) approaches.

Following Robicheaux *et al.* (2008), we used a founder dummy that equals one if the CEO is the founder of the firm, as an instrument of CEO ownership. The results (untabled) show that the founder-CEOs have higher proportion of shares (22.115 percent) on average than those non-founding CEOs (2.160 percent). Following Lin *et al.* (2013), we employ the lagged value of debt itself as the instrument for current debt ratio. Such a choice has been widely used in economic and finance literature. Some might argue that this instrument is not sufficiently strong, due to small changes across years. However, the weak identification test and the Shea Partial R^2 (0.531) indicate that our one year lagged debt ratio instrument is valid.

The operating lease share and total lease share regressions are estimated using a generalized method of moments (GMM). IV-Tobit model is employed for capital lease share regression. The results of the first-stage regressions and second-stage regressions are presented in Table VI. As the results in Column 1 and 2 indicate, both the instruments are positive and significant at 1 percent level. The results of the second-stage are generally consistent with those in Table V. Only *Z*-score and board independence become insignificant. In addition, we find INDUM_5 is significantly and negatively related to total lease share. These variations may be due to the reduced number of observations.

5. Discussion and conclusion

The difficulty of China's SMEs obtaining external finances has attracted a great deal of attention from the government and academics, as well as the general public due to their important role in economic growth. Accelerating the development of leasing market using a series of policies has been recognized as an important strategy for alleviating the above-mentioned issue. However, it is clear from previous literature that little is known about the determinants of leasing decisions in Chinese SMEs. Using panel data constructed from the SZSE SMEs Board, we evaluated how firm-level characteristics and corporate governance factors affect the leasing propensity. Ours is the first major study of this subject. Accordingly, the present findings have important implications for policy-makers, lessors, and potential lessees. Moreover, this study contributes valuable comparisons to the theoretical and empirical results to be found in existing literature.

Our results show tax rate is significantly and positively related to operating lease share, indicating that firms with high tax rates have a tendency to use more leasing. This finding is inconsistent with tax arbitrage theory. We suggest two likely explanations for this. First, the tax rate transferring effect is inconspicuous in China given strict requirements for applying to accelerate depreciation and receive tax credit. Second, lessees prefer the tax and income smoothing ability of leasing (Callimaci *et al.*, 2011). In order to support SMEs in China, a potential policy implication is to afford them tax privileges when using leases.

Operating lease share is negatively related to debt ratio, suggesting that operating leases and debt are substitutes. According to Eisfeldt and Rampini (2009), the negative

Table VI.
Robustness test: instrumental variable regressions results

Variable	First-stage DEBT	First-stage OWNER	Second-stage OPLS	Second-stage CLS	Second-stage TLS
DEBT			−0.102 (−2.36)**	0.300 (2.90)***	−0.085 (−1.92)*
OWNER			0.193 (5.14)***	−0.382 (−3.24)***	0.189 (4.92)***
L_DEBT	0.655 (26.34)***				
F_DUMY		18.274 (24.43)***			
TAX	−0.020 (−0.41)	0.226 (2.58)**	0.300 (2.94)***	0.186 (0.87)	0.334 (3.19)***
ZSCORE	−10.786 (−10.72)***	0.127 (0.10)	1.438 (0.83)	−14.995 (−3.61)***	0.968 (0.56)
PROFT	0.141 (3.63)***	0.102 (1.93)*	−0.179 (−3.06)***	0.412 (2.86)***	−0.176 (−3.00)***
C_INCTY	−0.527 (−1.52)***	−0.663 (−1.15)	−0.349 (−0.49)	0.023 (0.02)	0.003 (0.00)
Q	1.828 (5.86)***	−0.868 (−2.38)**	0.448 (1.14)	1.460 (1.03)	0.430 (1.09)
SIZE	3.804 (10.30)***	0.441 (0.95)	1.647 (3.41)***	2.636 (2.30)**	1.696 (3.37)***
TANG	−0.020 (−0.91)	−0.027 (−0.78)	−0.204*** (−6.50)	0.014 (0.21)	−0.208*** (−6.41)
B_INDEP	0.011 (0.28)	0.457 (6.28)***	0.055 (0.63)	0.552 (3.01)***	0.104 (1.16)
B_SIZE	0.102 (0.69)	−0.865 (−3.10)***	0.208 (0.80)	2.228 (3.62)***	0.495 (1.68)*
STATE	0.403 (0.77)	−3.453 (−4.44)***	0.638 (0.70)	1.474 (0.76)	0.985 (1.04)
INDUM_2	−0.630 (−0.22)	−5.887 (−2.02)**	−4.132 (−2.20)**	17.512 (3.57)***	−4.873 (−2.69)***
INDUM_3	−1.292 (−2.26)**	−0.575 (−0.46)	−5.324*** (−4.47)***		−5.298 (−4.32)***
INDUM_4	1.487 (1.20)	0.640 (0.27)	−6.597 (−2.71)***	17.068 (4.03)***	−1.093 (−0.37)
INDUM_5	−1.558 (−1.17)	−4.138 (−1.36)	29.213 (5.55)***		−27.787 (5.30)***
Constant	−52.294 (−7.31)***	−10.512 (−0.99)	−23.188 (−1.95)*	−141.357 (−5.88)***	−32.314 (−2.70)***
F-test	689.94***	56.40***	14.77***	124.81***	13.08***
R^2	0.851	0.446	0.300	–	0.278
n	1,340	1,340	1,340	1,340	1,340

Notes: The dependent variables are operating lease share (OPLS), capital lease share (CLS), and total lease share (TLS). Debt ratio (DEBT) is instrumented by the first lagged value of itself (L_DEBT). CEO ownership (OWNER) is instrumented by the founder dummy (F_DUMY) which equals to 1 if the CEO is the founder of the firm. INDUM_2, INDUM_3, and INDUM_5 are merged together in the CLS regression due to sample size. Other variables are defined the same as previous. The OPLS and CLS models utilize generalized method of moments (GMM) regression. The CLS model utilizes Tobit regression. All continuous variables have been winsorized at 1st and 99th percentiles. *t*-statistics (for the first-stage) and *Z*-statistics (for the second-stage) are in parentheses, computed using the robust standard errors that adjusted for clustering at both the firm level and year level. For CLS regression, the *F*-test value reported is the Wald χ^2. *,**,***Significant at 10, 5 and 1 percent, respectively

relationship between debt and operating lease reveals that tax arbitrage theory is not supported in the context of China. This finding also indicates that it is cheaper for the Chinese lessees to lease the assets, such as real estate, than to borrow and buy it (Lasfer, 2007). In contrast, our evidence from the Chinese SMEs support the hypothesis that capital leases and debt are complements, which is in line with the argument of Adedeji and Stapleton (1996) that capital leasing might be employed as a secondary after firms have used up their debt capacity.

The positive relationship between operating lease share and CEO ownership suggests that closely held companies are more likely to use operating lease to reduce agency costs. However, the negative relationship between capital lease and CEO ownership indicates that Chinese CEOs avoid risk by using fewer capital leases. Our empirical results also strongly suggest that the corporate governance structure matters in determining Chinese SMEs' leasing decisions. In particular, we find that firms with large boards and a high percentage of independent directors are more likely to use capital lease. These findings support the view that leases and strong corporate governance are complementary to reducing agency costs of debt and equity (Robicheaux *et al.*, 2008).

Other firm-specific factors that affect Chinese SMEs' leasing decisions include financial distress, tangibility, and size. A positive relationship between lease share and size, suggests large Chinese SMEs are likely to benefit from leasing. Operating lease share is negatively related to tangibility, indicating that firms with fewer tangible assets tend to use operating lease as an important source of financing. Profitability and *Z*-score exhibit different influences on operating lease and capital lease. High profitable Chinese SMEs tend to use more capital leases and fewer operating leases, while firms with high financial distress potential are more likely to use capital leases.

We also observe a strong industrial effect on firm lease share. Manufacturing firms tend to use capital leases but with lower levels of capital lease share, suggesting it is essential for promoting the equipment lease market. Retail, wholesale, and transportation firms use considerably more operating leases than other firms. Construction firms use more of both operating leases and capital leases than that of mining and manufacturing firms. One should be cautious about these findings because the small handful of firms in the specific industrial groups in our sample might be inadequate to capture industry effects. This issue is even more serious for our capital lease models. Finally, although our analysis is controlled for industry effects, it does not take into account the type of leased assets and the characteristics of the lease contracts. Recent research by Lasfer (2007) and Schallheim *et al.* (2013) highlight the importance of considering these features when studying leasing determinants.

Notes

1. Source: http://finance.sina.com.cn/hy/20120426/100211929864.shtml
2. According to the Income Tax Law of PRC No. 100, tax credit only affects the firms that purchase the assets for self-use. The details (in Chinese) is available: www.gov.cn/zwgk/2007-12/11/content_830645.htm
3. Source: www.cninfo.com.cn/cninfo-new/disclosure/szse_sme#
4. http://money.finance.sina.com.cn/mkt/
5. For the sake of brevity, these results are not reported in this paper. However, they are available upon request.

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