

How do Chinese firms adjust their financial leverage? An empirical investigation using multiple GMM models

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Given the unique market setting and institutional environment of China, this study tries to investigate targeting behavior of Chinese firms towards leverage and the determinants of leverage policy in China at various levels. For this purpose, we use an extensive set of data of 760 firms over a period from 2001 to 2013. To investigate the adjustment behavior towards target leverage policy, this study uses the GMM (Generalized Method of Moments) models of Arellano and Bover (1995) / Blundell and Bond (2000) to estimate the adjustment behavior and adjustment speed towards a target level of leverage. The study finds that Chinese firms have a target level of leverage and try to adjust to their target. We find that adjustment rate of Chinese state-owned enterprises is higher than Chinese non-state-owned enterprises, indicating an aggressive leverage policy for SOEs (state-owned enterprises). Further, we find that some firm-level factors like firm size and growth opportunities have significant and positive effect on firms leverage. Profitability and firm liquidity is found to have a negative relationship with firm leverage. At country level, GDP is found to have positive impact of firm leverage policy. The negative relationship of lending rate with leverage shows that firms in China reduce debt financing when lending rates in the market increase. All these findings indicate significant policy implications for Chinese firms. At adjustment level, regulatory bodies should ensure that all firms are at ease while raising their debt and thus avoid a pecking order in lending policy. At industry level, institutions should try to curtail industry concentration to provide an equal ground of debt issuing to the firms.

Keywords: target leverage, multilevel determinants, GMM, Chinese firms

1. Introduction

China being the world second largest economy provides a unique market setting in terms of institutional setting, development of capital markets and ownership concentration. Chinese companies are highly concentrated in term of ownership concentration. A single largest owner held about 36% of an average company share,

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while 52% shares are held by five largest owners (Guo *et al.*, 2013). Compared to western economies Chinese firms have a very unique ownership structure. Shares are divided into three categories, i.e., state, legal and shares held by individuals under Chinese company law. Central and provincial governments and their respective ministries hold the state shares. State-owned and non-state-owned enterprises hold the legal entity shares. Individual investors hold the individual shares. Moreover, before 2004, shares of state-owned and legal entities could be traded in stock exchange. This situation is further complicated by the fact that control rights remain with Chinese government. Shares held by state-owned shareholders exceed other shares held by other shareholders (individuals and NSOEs) in Chinese companies. Guo *et al.* (2013) report that by the end of September 2006, largest shareholders who hold 56% of shares were state shares controlled by Chinese government and other state asset management companies.

Our econometric approach is based on the assumption that firms in China have a target level of capital structure and that firms financing policy is influenced by multilevel determinants. To account for institutional setting we conduct separate analysis for state-owned and non-state-owned enterprises.

The remainder of this paper is organized as follows. Section “Literature review” discusses an extensive review of literature about the determinants of capital structure at various levels and the target adjustment of leverage policy. This is followed by data description, methodology, model specification and the estimation strategy. Section “Discussion of results” provides extensive analysis of results with respect to adjustment speed of Chinese firms towards leverage and leverage’s determinants at various levels. At the end, conclusions provide some policy implications.

2. Literature review

The essence of capital structure decisions exists in the arguments put forward by Modigliani and Miller (1958). They argue that in ideal markets, business value is not influenced by firms financing decisions. However, this is not the case in real markets. Due to the existence of taxes, transaction costs and other factors, financing decisions become relevant to business valuation. One important study in this regard is the study of Byoun and Xu (2013). They examine financing policy of debt free firms. They find that debt free firms have the ability to raise funds through high dividend payments. Dividend payment enables these firms to raise equity funds on flexible terms and also help them in maintaining good reputation in equity markets. This greatly reduces the agency costs of free cash flow. While analyzing financing decisions in Korean firms, Jung and Kim (2008) report that firms having larger cash reserves have better chance of exploiting benefits of interest tax shield in Korea.

In following section we review both static as well as dynamic nature of two very

famous theories of capital structure, i.e. tradeoff theory and pecking order theory.

In their paper Modigliani and Miller (1963) study financing decisions of firms having tax exemption of interest payments on debt. Bradley *et al.* (1984) further report evidence in support of static trade off theory. They argue that across different industries, firms tends to raise debt until a point is reached where tax shield becomes equal to marginal costs of debt financing which also include the financial distress premium due to increase probability of default. Thus firms tend to achieve an optimal static debt level which is referred as target capital structure.

Bris *et al.* (2006) further argue that benefits of tax shield increase with increase in profitability, increase in tax rate and decrease in depreciation. They estimate that costs associated with financial distress could be 2-20% of assets. Andrade and Kaplan (1998) empirically find financial distress costs to be 10 to 20 percent of assets. Jalilvand and Harris (1984) include transaction costs and other forms of market imperfections in their research. This shows that capital structure is dynamic in nature and if it does not correspond to a target level, there must be a convergence strategy to achieve a target capital structure. Thus few important questions with regard to capital structure decisions might be how transaction costs influence capital structure? Secondly, what factors determine the speed of adjustment towards a target level of capital structure? How firms react to capital structure shocks? These implications extend the static approach of capital structure and form the foundation and framework for a dynamic capital structure policy.

Dynamic trade off theory of capital structure is tested by Frank and Goyal (2007) by using the target adjustment hypothesis. The target of capital structure varies across firms and is influenced by various exogenous and endogenous factors. Fischer *et al.* (1999) put forward a theory of dynamic capital structure choices and report leverage ratio is influenced by firm specific factors. Flannery and Hankins (2007) come up with important findings that speed of adjustment depends upon expenditure needed by firm to adapt to a new capital structure policy and, the deviation costs associated with the policy. They further report that adjustment costs are influenced by transaction cost and market valuation of equity, while costs of deviation from an optimal policy is a function of probability of financial distress and level of tax shield of the firm. Leland and Toft (1996) put forward a dynamic model considering the endogeneity level of financial distress. They further explain optimal level of leverage and debt maturity structure. Hennessy and Whited (2005) analyzes trade off model in the presence of leverage and real investment and report that leverage follows a path and decreases with liquidity. Leary and Roberts (2005) and Byoun (2008) argue that during adjustment decisions to a target level of capital structure firms make a tradeoff between costs of adjustment and benefits associated with adjustment to a new capital structure policy. According to Uysal (2011) there exists correlation between financing and investment decisions. In such case best optimal strategy for a firm will not be to return

immediately to a target level of capital structure depending on the nature of investing decisions. Hovakimian and Li (2009) suggest an ex post and ante comparison of capital structure with respect to transaction costs to find out that firms do not have unique debt ratios, instead firms follow a target capital structure and firms rebalance to an optimal capital structure depending upon the adjustment costs associated with capital structure.

Rajan and Zingales (1995) analyze capital structure choices at G7 countries find that there exists similar correlation between capital structure and the determinants across different countries. Fan *et al.* (2008) conduct a thorough analysis of capital structure of 39 countries. They find that countries having weak shareholders protection exhibit a strong correlation between leverage and profitability. For developed capital markets like USA there exist a strong positive relationship of leverage with size, tangibility, inflation and industry median. Equity is positively related to positive shocks in profitability and negatively correlated with debt. As argued in literature that firms do not immediately adjust to optimal capital structure policy due to transaction costs so there is a negative correlation between profitability and leverage. Ang *et al.* (1997) analyze capital structure in Indonesian firms. They find that that trade off theory has a very weak support in the Indonesian market and thus firms operate as there is no optimal leverage level. They find that leverage is influenced by non-debt tax shield, firm liquidity and information about firm's share price.

Another alternative model with respect to trade off theory is the pecking order theory. The pioneers of pecking order theory included the studies of Donaldson (1962), Myers (1984) and Myers and Majluf (1984). Pecking order theory suggests that firms financing choices follow a path defined by firm's preferences. Firms prefer internal financing over external financing and debt is normally preferred over equity. Thus firms do not possess a strategy of a target capital structure. Myers (1984) further argues that there exists information asymmetry between managers and shareholders which results in costs of adverse selection. These factors compel firms to follow a pecking order in their financing. Financing through debt may increase the financial distress risk. Because of this, firms follow a preference strategy by first relying on internal funds. In the absence of any internal funds, firm then issues the safest securities which imply that firms should issue debt in absence of internal funds. Halov and Heider (2006) argue that adverse selection is a major problem for small firms because large firms have fewer costs in time of adverse selection by considering the possibility of a risky or mispriced value of debt. Hovakimian *et al.* (2001) argue that firms follow pecking order theory and they find empirical results where firms used to finance short term investment through a pecking order model. This implies firms prefer internal funds to finance small projects. Welch (2007) finds that to finance bigger projects, firms usually use external funds by first going for the cheapest debt.

The examples of testing pecking order model in developed countries include studies conducted by Bessler *et al.* (2008) and Welch (2004). As far as Asia is concerned it

shows a mixed reaction regarding trade off and pecking order models. Analyzing firms in Thailand, Wiwattanakantang (1999) finds that financing decisions in Thai firms are shaped by tax shields effects, signaling mechanism and agency conflicts thus showing a tendency towards a pecking order. Fattouh *et al.* (2005) find enormous nonlinear relationship between capital structure and its determinants while analyzing Korean firms over a period from 1992 to 2001. This nonlinearity accounts for the presence of information asymmetry. Colombage (2005) reports findings in support of pecking order model while analyzing Sri Lankan firms. On the other hand there are studies which report findings contrary to pecking order theory. These include study conducted by Yau *et al.* (2008) in Malaysian Market. They find a negative relationship between long term debt and firm's financing requirements. Thus contemporary studies on capital structure decisions of a firm in Asian markets have no clear picture. This fact motivates us to conduct a study on capital structure decisions and adjustment behavior of Chinese firms with respect to their leverage.

2.1. Target adjustment hypothesis

Getzmann *et al.* (2014) argue that there are three important questions related to adjustment of firms to an optimal level of capital structure. How much time a firm takes to adjust to its target level? What is the cost of adjustment and how firms respond to capital structure shocks? These questions are beyond the scope of a traditional static trade off model and thus come under the dynamic target adjustment hypothesis (Frank and Goyal, 2007). Flannery and Hankins (2007) argue that the speed with which a firm adjusts to its target capital depends on cost of adjustment and costs associated with deviations from a target capital structure. Adjustment costs depend on transaction costs and market value of firms' equity. Flannery and Hankins (2007) further argue that cost of deviating from a target capital structure depends on chances of financial distress and tax shield associated with deviating policy. Faulkender *et al.* (2008) further report that adjustment speed of firms with volatile or negative cash flows is significantly different from firms with free cash flows.

2.2. Institutional environment in China and capital structure

Chinese market has incorporated numerous reforms and has been considerably restructured over the last thirty years. This has led to an increase in the number of listed companies. However, the state-owned and non-state-owned enterprises differ in the nature of their ownership, agency relationships and bankruptcy costs and associated risks. One important reform in this regard is the corporatization of previously state-owned enterprises. After corporatization the government still holds the status of majority shareholder and have two important rights: appointment of key organization posts like

chief executive officer, and government has the optimal right of decisions of assets disposals, and merger and acquisitions (Qian, 1995). In the light of this fact of state involvement in asset disposal and mergers and acquisitions state-owned enterprises may have low bankruptcy risk and they can get bail out packages from government in time of financial distress (Faccio *et al.*, 2006). The government, in effect, serves as an insurance provider for SOEs. Another important implication with respect to the appointment of CEO by state is that CEO thus appointed may have some divergent goals. Their promotion and compensation are measured by various political and social objectives.

Moreover, SOEs and NSOEs have a differential access to bank loans which is the predominant financing alternative in Chinese market. SOEs are advanced abundant of loans because of political, employment, and tax reasons other than profitability (Brandt and Li, 2003). In contrast, banks' loan granting decisions to NSOEs are based largely on financial rather than on political considerations. The institutional environment with respect to SOEs and NSOEs has important implications for the adjustment speed of these firms towards an optimal leverage policy.

As for as state-owned enterprises in China are concerned they are expected to adjust to a target level of capital structure, however the political pecking order of loans towards SOEs may increase the speed of adjustment towards a target leverage policy in SOEs. Thus SOEs are expected to report a higher adjustment rate as compared to NSOEs.

On the basis of above discussion the following two hypotheses are formulated.

H1: Chinese firms show adjustment towards a target leverage policy.

H2: The adjustment towards leverage policy is higher in Chinese SOEs than that in Chinese NSOEs.

2.3. Determinants of capital structure

This study analyzes the determinants of capital structure at three levels, i.e., firm level, industry level and country level determinants. Explanation of each level of determinants is given as follows.

2.3.1. Firm level determinants of capital structure

2.3.1.1. Growth opportunities

This study employs market to book ratio to measure growth opportunities. Jensen (1999) argues that if firms possess high growth opportunities, they can mitigate the agency costs associated with free cash flow thus reducing their dependence on debt. In this way the disciplinary role of debt can be reduced. Due to higher growth opportunities firms may invest in innovative and riskier projects that will increase their cost of debt and, thus investment in risky projects may leads to asset substitution problem. Thus firms are more attracted to internal financing or equity financing in

case of high growth opportunities. Debt servicing associated with debt financing may warrants additional risk that makes debt more vulnerable. Thus a lower leverage is expected for firms having high market to book ratio. This negative relationship is further confirmed by Wiwattanakantang (1999) and Kayo and Kimura (2011) who based their discussion on trade off and agency cost theories. On the other hand Chen (2004) finds a positive relationship between growth opportunities and leverage for Chinese firms. Thus the relationship between leverage and growth opportunities is unclear and it can be both ways.

H3: Growth opportunities significantly affect leverage policy in Chinese Firms.

2.3.1.2. Profitability

Profitability is measured through the ratio of earnings before interest and taxes to total assets. Pecking order theory of capital structure suggests that due to information asymmetry between managers and outside investors retained earnings are preferred by managers to finance their projects. Moreover, in time of high profitability firms may tend to retain their earnings rather than investing in risky securities. Potential dilution of ownership associated with equity financing may also compel managers not to raise equity. Titman and Wessels (1988) report a negative relationship between profitability and leverage. Bevan and Danbolt (2002) while analyzing firms in UK also found a negative relationship between firm's leverage and profitability. Their findings are consistent with pecking order theory of capital structure.

Thus the relationship is not clear. According to pecking order theory there exists a negative relationship between leverage and profitability. On the other hand trade off and agency cost theories advocate a negative relationship between leverage and profitability.

H4: There is a significant relationship between profitability and leverage in Chinese firms.

2.3.1.3. Size

This study takes natural log of assets as proxy for size of the firm. Trade off theory of capital structure advocates that firm's size and its leverage are positively related. Firms having larger size are more differentiated which make them less vulnerable to bankruptcy as compared to smaller firms. Additionally, larger firms issue more information and thus larger firms exhibit lower monitoring costs consequently reducing the agency cost associated with debt for larger firms. Furthermore, larger firms have better access to markets, stable cash flows and take benefits from the tax shield associated with debt financing. Analyzing capital structure across a cross section of countries, Deesomsak *et al.* (2004) find a positive relationship between leverage and size of the firm except for Singapore. Their arguments were based on trade off theory of capital structure. Hence leverage is expected to show positive relationship

with firm's size. In accordance with agency theory, Kayo and Kimura (2011) report the same empirical findings based on the agency theory. Chakraborty (2010) and Muradoglu and Sivaprasad (2011) find a negative relationship for leverage and size of firm. They report their findings based upon pecking order theory of capital structure. Thus relationship between leverage and size is an ambiguous one and thus it can be both positive and negative.

H5: Size and leverage are significantly related in Chinese firms.

2.3.1.4. Ownership concentration

Degree of ownership concentration is measured through shares held by five largest shareholders of the firm. Agency cost associated with ownership can be mitigated through high ownership concentration since concentrated ownership results in higher level of monitoring by large shareholders (Wiwattanakantang, 1999). According to Pound and Zeckhauser (1990), existence of active monitoring in presence of large shareholders reduces the chances of asset substitution problem. Thus ownership concentration is expected to negatively affect firm's leverage. Pandey (2001) and King and Santor (2008) advocate a negative relationship between ownership concentration and leverage.

H6: There is a negative relationship between ownership concentration and leverage in Chinese Firms.

2.3.1.5. Non-debt tax shield (NDTS)

Non-debt tax shield is measured through the ratio of depreciation to total assets. Potential tax benefits associated with debt financing are reduced by non-debt tax shields. Thus the expected relationship between NDTS and leverage is negative. Chang and Rhee (1990) and Chakraborty (2010) report a positive relationship between non-debt tax shield and leverage. However, Miguel and Pindado (2001) and Deesomsak *et al.* (2004) advocate a negative relationship between non-debt tax shield and leverage of a firm. They based their findings on trade off theory that firm makes tradeoff between the benefits of NDTS and financial distress risk.

H7: Non-debt tax shield significantly affects firms' leverage in China.

2.3.1.6. Firms asset liquidity

This study uses networking capital as a proxy for firms' liquidity. Based on trade off theory Alves and Ferreira (2011) suggest that firm asset liquidity is positively correlated with leverage. However, Deesomsak *et al.* (2004) suggest a negative relationship. Their arguments are based on pecking order theory. Moreover, they argue that managers may change liquid assets to give preference to shareholders instead of debt holders and thereby increasing the associated agency costs. This implies a negative relationship between assets' liquidity and leverage. Thus the relationship between leverage and firm's asset liquidity is an unclear one and it can be positive as well as negative.

H8: There is a significant relationship between firm's asset liquidity and firm's leverage in Chinese Firms.

2.3.1.7. Tax to earnings ratio

After comprehensive comparative statistical analysis, Scott (1976) finds that optimal debt level is increasing function of corporate tax rate. A significant reason for firms' preference of debt over equity is tax shield attained through interest payments (Modigliani and Miller, 1963). So firms with high corporate tax rate are expected to raise more debt than firms with lower corporate tax rate.

On the other hand, Korajczyk and Levy (2003) report a negative relationship and argue that firms have lower target leverage if they have large tax shields. Their arguments are based on trade off theory of capital structure. Thus the relationship between leverage and corporate taxes is an unclear one and can be both positive as well as negative.

H9: Corporate tax ratio significantly affects firm's leverage in Chinese Firms.

2.4. Industry level determinants

Industry leverage is expected to positively affect firm's policy of issuing debts and thus a positive and statistically significant relationship is expected between firm's leverage and industry leverage. However, industry liquidity is a sign of good prospect of internal funds for the whole industry and thus it is expected to negatively affect firms' leverage.

MacKay and Phillips (2005) report higher leverage for firms which constitute a concentrated industry. They also find a stronger strategic interaction between leverage and industry concentration. One explanation might be that highly concentrated industries have firms that are powerful and some might enjoy monopolistic status that increases their chances of raising debts more frequently and in larger amounts.

On the other hand Kayo and Kimura (2011) find a negative relationship between leverage and industry concentration. They find this relationship while analyzing firms from emerging markets. This relationship can be due to different characteristics of industries based on industry concentration. Firms in highly concentrated industries have higher size and profitability and have usually higher risk profile (MacKay and Phillips, 2005). This higher risk can be related to the incentives provided to equity holders in case of high bankruptcy chances due to higher risk. This accounts for the negative relationship between industry concentration and leverage of the firm. Hence the relationship between leverage and industry concentration is an ambiguous one and it can be both positive as well as negative.

H10: Industry leverage positively affects firm's leverage in China.

H11: There is a negative relationship between industry liquidity and firm's leverage

in China.

H12: Industry concentration significantly affects firm's leverage in Chinese Firms.

2.5. Country level determinants

2.5.1. Gross domestic product

De Jong *et al.* (2008) suggest a positive relationship between capital structure and GDP. They argue that countries having better legal environment and having healthier growth rate are likely to take more debt. They further argue that macroeconomic indicator like GDP not only significantly affects capital structure of a firm but also influences the firm specific factors affecting capital structure. Bond market is highly developed in richer countries and firms have easy access to prevalent loans in the market and thus firms raise more capital through debt because of access and ease of getting loans.

However, Cheng and Shiu (2007) find a negative relationship between leverage and GDP. They suggest that richer countries having high GDP growth rate report less leverage than poor countries having a sluggish GDP growth rate. Kayo and Kimura (2011) find a negative relationship as well and argue that firm specific factors are more significant in affecting capital structure than country level factors. Thus relationship between leverage and GDP is unclear and it can be inferred that GDP significantly affects leverage of a firm.

H13: There is a significant relationship between country's GDP and firm's leverage.

2.5.2. Inflation rate

Inflation has a significant influence on capital structure choices. Taggart (1985) argues that inflation enhances the influence of tax advantage on capital structure. This combined interaction between inflation and tax is a better explanation of capital structure patterns and thus inflation has a greater influence on leverage policy than tax alone. He further argues that influence of inflation is also depicted in considering the real GNP price deflator. High inflation rate interacts with high tax shield incentives and thereby increases the corporate debt financing ratios.

On the other hand, Cheng and Shiu (2007) argue that indirect influence of inflation on leverage policy is unclear. They highlight the work of Fisher who predicted the relationship between forecasted inflation rate and unadjusted interest rates. Cheng and Shiu (2007) argue that high inflation rate may increase debt cost on one hand, however with increasing inflation rate firms tend to increase their debt financing by exploiting the residuals they get from inflated assets and fixed liabilities. Based on these arguments it becomes clear that inflation affects leverage policy of a firm significantly,

however the relationship is unclear and can be both positive as well as negative.

H14: Inflation rate has a significant effect on firms' leverage in China.

2.5.3. Lending rate

Muradoglu and Sivaprasad (2011) empirically find that leverage and lending rate are negatively related. This study uses the data of World Bank Databank for lending rate.

H15: Lending rate negatively affects firms' leverage in China.

3. Data and methodology

3.1. Data and data sources

The study uses a rich data set of 760 A listed firms, listed on Shanghai and Shenzhen Stock Exchanges. Data span is from 2001 to 2012. Data is collected from RESET Chinese database. Data belongs to nonfinancial firms. All financial and regulatory firms are excluded from analysis. The codes for company ranges from C00002 to C600898. Firms having at least seven years of data are included in the analysis. The data is then categorized into state-owned and non-state-owned enterprises. Analyses are done for overall date and subsamples of SOEs and NSOEs.

3.2. Model specification

Flannery and Rangan (2006) argue when there are no market frictions; firms maintain a target level of leverage. In this context we develop a static model based on our variables. The static model is given as follows.

$$\begin{aligned} LEV_{it} = & \beta_0 + \beta_1 PROF_{it} + \beta_2 SIZE_{it} + \beta_3 NWC_{it} + \beta_4 OC5\%_{it} + \beta_5 NDTs_{it} \\ & + \beta_6 BSIZE_{it} + \beta_7 MTB_{it} + \beta_8 TR_{it} + \beta_9 INDLEV_{it} + \beta_{10} INDLIQ_{it} \\ & + \beta_{11} INDHHI_{it} + \beta_{12} GDP_t + \beta_{13} INF_t + \beta_{14} LR_t + e_{it} \end{aligned} \quad (1)$$

In equation (1), LEV_{it} is the leverage of a firm i at time t . It is measured through the ratio of debt and assets. $PROF_{it}$ is the profitability of a firm i at time t . $SIZE_{it}$ is the size of a firm i at time t . NWC_{it} is the networking capital of a firm i at time t . It is used as a proxy for firm liquidity. $OC5\%_{it}$ is the ownership dispersion at 5% of a firm i at time t . $NDTs_{it}$ is the non-debt tax shield of a firm i at time t . $BSIZE_{it}$ is the board size of a firm i at time t . MTB_{it} is the market to book ratio of a firm i at time t . It is used as a proxy for measuring growth opportunities. TR_{it} is the tax to earnings ratio of a firm i and at time t . $INDLEV_{it}$ is the industry leverage of an industry i at time t . $INDLIQ_{it}$ is the industry liquidity of a an industry i at time t . $NDHHI_{it}$ is the industry concentration of

an industry i at time t . It is measured by using Heirschman Herfindhal Index. GDP_{it} is the gross domestic product of China at time t . INF is the inflation rate of China at time t . LR_t is the lending rate in China at time t .

Two important implications related to static model of equation (1) are the problem of endogeneity (Adrian and Boyarchenko, 2015; Juselius and Drehmann, 2015) and cost associated with adjustment to a target level of leverage. Endogeneity can be prevented by introducing proper instruments. On the other hand a firm cannot immediately adjust to its target level of capital structure due to associated costs. In this context the relationship between current and target leverage can be expressed through the following equation.

$$LEV_{it} - LEV_{it-1} = \gamma(LEV_{it} - LEV_{it-1}^*) \quad (2)$$

In equation (2) $(LEV_{it} - LEV_{it-1}^*)$ shows the adjustment required by a firm to adjust to a target level. γ is the coefficient of adjustment. A value of this coefficient ranges from 0 to 1. If γ is equal to zero then $LEV_{it} = LEV_{it-1}$. This implies that the firm does not try to achieve an optimal level of a leverage due to the associated costs and wants to remain with its current policy. However, if γ is equal to 1 then $LEV_{it} = LEV_{it}^*$. In this case the firm wants to achieve a target level of leverage.

By putting equation (1) into equation (2) we get the following equation.

$$\begin{aligned} LEV_{it} = & \gamma\beta_0 + (1 - \gamma)LEV_{it-1} + \gamma\beta_1 PROF_{it} + \gamma\beta_2 SIZE_{it} + \gamma\beta_3 NWC_{it} + \gamma\beta_4 OC5\%_{it} \\ & + \gamma\beta_5 NDT S_{it} + \gamma\beta_6 BSIZE_{it} + \gamma\beta_7 MTB_{it} + \gamma\beta_8 TR_{it} + \gamma\beta_9 INDLEV_{it} \\ & + \gamma\beta_{10} INDLIQ_{it} + \gamma\beta_{11} INDHHI_{it} + \gamma\beta_{12} GDP_t + \gamma\beta_{13} INF_t + \gamma\beta_{14} LR_t + \eta_i \\ & + \lambda_t + \gamma e_{it} \end{aligned} \quad (3)$$

η_i in equation (3) corresponds to firm specific effects while λ_t are the time specific effects. Simplifying equation (3), we get the following equation.

$$\begin{aligned} LEV_{it} = & \gamma\beta_0 + \rho LEV_{it-1} + \delta_1 PROF_{it} + \delta_2 SIZE_{it} + \delta_3 NWC_{it} + \delta_4 OC5\%_{it} + \delta_5 NDT S_{it} \\ & + \delta_6 BSIZE_{it} + \delta_7 MTB_{it} + \delta_8 TR_{it} + \delta_9 INDLEV_{it} + \delta_{10} INDLIQ_{it} + \delta_{11} INDHHI_{it} \\ & + \delta_{12} GDP_t + \delta_{13} INF_t + \delta_{14} LR_t + \eta_i + \lambda_t + v_{it} \end{aligned} \quad (4)$$

In equation (4) $\alpha = \gamma\beta_0$; $\rho = (1 - \gamma)$; $\delta_k = \gamma\beta_k$; and $\lambda_t v_{it} = \gamma e_{it}$

Due to problem of endogeneity and firms' option for a target level of leverage OLS is inconsistent to estimate equation (4). To cope with these issues this study uses two steps generalized method of moments (GMM) following Rehman *et al.* (2016). The study uses GMM models of Arellano and Bover (1995) / Blundell and Bond (2000) to estimate equation (4). To estimate the static model of equation (1), the study uses

OLS technique and fixed effects models with an added AR term to account for serial correlation. These estimation methods were more recently used in research studies of Getzman *et al.* (2014) and Rehman and Wang (2015).

3.3. Description of the sample

Table 1 shows descriptive statistics of the sample. A total of 760 firms over a period from 2001 to 2013 are selected for analyses. Firms having at least 7 years of data are selected for analysis in order to avoid the issues of survivorship bias. Firms are then categorized into state-owned enterprises and non-state-owned enterprises.

Table 1
Descriptive statistics

Variables	Overall firms			SOEs			NSOEs		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
<i>LEV</i>	9728	0.573245	0.241387	4677	0.714205	0.134716	5061	0.64035	0.102187
<i>PROF</i>	9728	0.026066	0.258414	4677	0.020109	0.351002	5061	0.031582	0.12034
<i>SIZE</i>	9728	21.44831	1.259129	4677	21.44514	1.284653	5061	21.45124	1.235146
<i>NWC</i>	9728	0.16854	0.187912	4677	0.167508	0.181677	5061	0.169496	0.193519
<i>OC5%</i>	9262	1.18352	1.20283	4474	1.211944	1.250436	4788	1.156961	1.156075
<i>NDTS</i>	9342	0.026311	0.019057	4515	0.026319	0.019601	4827	0.026303	0.018536
<i>BSIZE</i>	8912	11.93817	4.56154	4286	12.06463	4.600621	4626	11.82101	4.522372
<i>MTB</i>	9195	1.955092	0.983543	4392	1.970821	0.989267	4803	1.940708	0.978161
<i>TR</i>	9712	0.19621	1.151021	4670	0.189865	0.703934	5042	0.202086	1.446778
<i>INDLEV</i>	9729	0.58723	0.86453	4677	0.58769	0.864977	5062	0.58818	0.86428
<i>INDLIQ</i>	9729	0.279566	0.116911	4677	0.278149	0.116506	5062	0.280877	0.117282
<i>INDHHI</i>	9697	6.616584	0.677652	4661	6.621999	0.68801	5036	6.611572	0.667951
<i>GDP</i>	9729	10.02401	1.737035	4677	10.0241	1.73844	5062	10.02393	1.735906
<i>INFL</i>	9729	2.301725	2.138121	4677	2.302562	2.139277	5062	2.30095	2.137261
<i>LR</i>	9729	5.84974	0.591671	4677	5.849925	0.592364	5062	5.849568	0.591087

Notes: *LEV* is leverage measured through the ratio of debt to asset. *PROF* is the profitability measured through the ratio of Return on Equity. *SIZE* is firm's size measured through natural log of firm's asset. *NWC* is networking capital used as a proxy for firm's liquidity. *NWC* is measured by subtracting accounts payable from the sum of accounts receivables and inventory. The value is then scaled by total assets. *OC5%* is ownership concentration. *NDTS* is non-debt tax shield measured through the proportion of sum of amortization and depreciation to total assets. *BSIZE* is board size measured through number of directors on firm's board of directors. *MTB* is market to book ratio used as a proxy for growth opportunities. *TR* is tax to earnings ratio used a proxy for corporate tax rate and it is measured as proportion of taxes to earnings before taxes. *INDLEV* is median industry leverage as median of total debt to total asset ratios of involved companies in an industry. *INDLIQ* is industry liquidity. *INDHHI* is Herfindahl–Hirschman Index (HHI) as sum of the squares of firm's sales to industry's total sales. *GDP* is real annual gross domestic product. *INFL* is inflation rate in China. *LR* is lending rate in China.

3.4. Estimation strategy

A total of four models are used to estimate equation (1) and (4). In order to estimate the static model of equation (1), we use pooled OLS and GLS fixed effect estimation. However, due to the inconsistency of OLS, to estimate equation (4), the study uses generalized method of moments. For this purpose two methods are adopted. The study uses GMM models of Arellano and Bover (1995) / Blundell and Bond (2000) to estimate equation (4). Two step GMM is used in order to get robust and consistent estimation. Column 1 and 2 of Tables 3, 4 and 5 represent coefficient of static model of equation (1) for overall firms, state-owned enterprises and non-state-owned enterprises respectively. While column 3 and 4 show coefficients for Blundell and Bond (2000) and Arellano and Bover (1995) respectively.

Table 2 shows correlation between different variables. *VIF* is the variance inflation factor. Correlation coefficients and *VIF* are well in accepted range and there is no serious issue of correlation between independent variables and error term.

4. Discussion of results

4.1. Adjustment speed

Column 3 and 4 of Tables 3, 4 and 5 correspond to dynamic model estimation of equation 4. Table 3 indicates coefficients for overall firms. One of the significant results in Tables 3, 4 and 5 is the lagged leverage variable. The value of *LEV* (L1) for overall, SOEs and NSOEs is positive and is statistically significant. These results correspond to the findings of Rehman *et al.* (2015). Rehman *et al.* (2015) report a stationary behavior for leverage policy in China, using Fisher Unit root testing to an extended period data of leverage ratios. This infers that Chinese firms show behavior towards a target level of leverage. Coefficient of *LEV* (1) is positive and significant for both GMM1 and GMM2. Adjustment coefficient for overall firms with respect to GMM1 (Arellano and Bover, 1995) is 0.325 and with respect to GMM2 (Blundell and Bond, 2000) it is 0.30. Adjustment coefficient is calculated by subtracting the coefficients of GMM estimates from 1. These two findings of GMM1 and GMM2 have no significant difference. This adds robustness to our findings. It implies that Chinese firms take 3 years (approximately) to adjust their leverage policy.

Columns 3 and 4 of Table 4 correspond to dynamic model estimation of equation 4 for state-owned enterprises. GMM1 reports an adjustment coefficient of 0.3912(1–0.6088) while GMM2 reports a coefficient of 0.4749(1–0.526) for state-owned enterprises. Similarly columns 3 and 4 of Table 5 represent GMM results for non-state-owned enterprises. Table 5 shows that adjustment coefficient for non-state owned-enterprises is 0.37(1–0.63) and 0.46(1.52) with respect to GMM1 and GMM2 respectively.

Table 2
Correlation matrix

	LEV	PROF	SIZE	NDTS	NWC	OC5%	BSIZE	MTB	TE	INDLEV	INDLIQ	INDHHI	GDP	INF	LR	VIF
LEV	1															
PROF	-0.0229*	1														1.15
SIZE	0.3156*	0.1655*	1													4.09
NDTS	0.0470*	-0.1844*	0.0719*	1												1.47
NWC	-0.0705*	0.0569*	-0.0402*	-0.4184*	1											1.48
OC5%	-0.01	0.0447*	-0.0990*	-0.0876*	0.013	1										1.04
BSIZE	0.0882*	-0.0688*	0.1456*	0.0511*	-0.0215	0.0572*	1									1.06
MTB	-0.1807*	0.0457*	-0.3705*	-0.0122	-0.0259*	0.1101*	-0.0687*	1								1.37
TE	0.0258*	0.0222*	-0.004	-0.0201	-0.0018	0.0183	-0.0171	-0.005	1							1
INDLEV	0.4340*	0.0123	0.2253*	0.0985*	-0.0322*	-0.0743*	0.0882*	-0.1430*	0.0118	1						1.4
INDLIQ	0.1725*	0.0236*	0.0600*	0.4352*	-0.4884*	-0.0694*	0.002	-0.0858*	0.0003	0.3774*	1					1.87
INDHHI	0.0991*	0.2053*	0.8307*	0.1417*	-0.0795*	-0.0765*	0.1193*	-0.2975*	0.0021	0.0278*	0.0254*	1				3.78
GDP	-0.0196	0.0011	-0.0632*	0.0660*	-0.0077	0.0484*	0.0454*	0.0474*	-0.0024	0.0061	0.0897*	-0.0240*	1			1.55
INF	0.0266*	-0.0053	0.1529*	0.0184	0.0293*	0.0052	0.1126*	-0.1519*	-0.0247*	0.0223*	-0.1136*	0.1619*	0.2153*	1		1.42
LR	0.0232*	0.0375*	0.1394*	-0.0118	0.0148	0.0023	0.0253*	0.1538*	-0.0021	0.0087	-0.0922*	0.1320*	0.5380*	0.4675*	1	2.02

Notes: * shows significance at 95 %. VIF stands for Variance Inflation Factor. LEV is leverage measured through the ratio of debt to asset. PROF is the profitability measured through the ratio of Return on Equity. SIZE is firm's size measured through natural log of firm's asset. NWC is networking capital used as a proxy for firm's liquidity. OC5% is ownership concentration. NDTS is non-debt tax shield measured through the proportion of sum of amortization and depreciation to total assets. BSIZE is board size measured through number of directors on firm's board of directors. MTB is market to book ratio used as a proxy for growth opportunities. TR is tax to earnings ratio used a proxy for corporate tax rate and it is measured as proportion of taxes to earnings before taxes. INDLEV is median industry leverage as median of total debt to total asset ratios of involved companies in an industry. INDLIQ is industry liquidity. INDHHI is Herfindahl–Hirschman Index (HHI) as sum of the squares of firm's sales to industry's total sales. GDP is real annual gross domestic product. INF is inflation rate in China. LR is lending rate in China.

Both of the dynamic panel data models report a higher adjustment coefficient for state-owned enterprises than non-state-owned enterprises. This shows that state-owned enterprises are faster in their adjustment policy of capital structure and take less time than non-state-owned enterprises to adjust to a target level of capital structure. One reason might be the pecking order of loans by banks towards state-owned enterprises. And because of easy access and prevalent bank loans in the market state-owned enterprises might be rapid in achieving a target level of capital structure. Poncet *et al.* (2010) argue that capital market imperfections are prevalent in Chinese capital markets. Until 1998, the largest Chinese banks (most of them were state-owned) were advised not to give credit to Chinese private companies. It was because of low political stature of these companies. Since 1998 these impediments in financing due to political pecking order should have been alleviated. However, research evidence suggests that financing constraints for private Chinese companies are still there due to social and political factors (Huang, 2003). Thus state-owned enterprises have easy access to bank loans and this might account for their high speed of adjustment. In the institutional environment and unique Chinese market setting, state-owned firms are at ease to raise or shed funds for a speedy adjustment to an optimal leverage. However, the implications of institutional environment are all too different for non-state-owned firms. The political and social pecking order towards SOEs, and limited financing alternatives, slow up the adjustment speed for non-state-owned enterprises. Two different approaches and alternatives to adjust leverage to an optimal level have important consideration for both managers (especially in NSOEs) and regulators. Regulating bodies should harmonize the legal system and ensure the equal access to financing alternatives.

4.2. Multilevel determinants of capital structure in China

4.2.1. Firm specific determinants (Overall firms)

The discussion focuses on columns 1, 2 of Tables 3 and 5. OLS and GLS fixed effects coefficients in Table 3 for overall firms report a positive and significant coefficient for size while a negative and statistically significant coefficient for growth opportunities. Large firms with higher growth opportunities are at ease as far as funds accessibility and availability is concerned. One important finding for overall firm is the negative and statistically significant coefficient of ownership concentration. Moreover, board size (*BSIZE*) also reports a positive and significant coefficient. Berger *et al.* (1997) and Deesomsak *et al.* (2004) argue that larger companies with high concentration and large board size have a reduced disciplinary role of debt. Ownership concentration is found to have a negative relationship with leverage for overall firms (Table 3). This shows the agency mechanism is associated with decreased risk since ownership concentration in Chinese firms is very high. This is in accordance with the explanation provided by Wiwattanakantang (1999).

Zaukaur (1990) elaborates that large shareholders instill an active monitoring and control mechanism, which results in reduced the debt level. Market to book ratio or growth opportunities show a positive relationship and it implies that Chinese firms use debt as prefer mode of financing to finance their future projects (Chen, 2004).

Table 3 indicates that tax rate (*TR*) has significant positive effect on leverage. This shows that optimal debt level is the increasing function of corporate tax rate (Scott, 1976). A significant reason for firms' preference of debt over equity is tax shield attained through interest payments (Modigliani and Miller, 1963).

Table 3
Regression output for overall firms

	OLS	GLS Fixed effects	GMM1	GMM2
<i>Lev</i> (L1)			0.675***	0.70***
<i>PROF</i>	-0.0331***	-0.023***	-0.0204	-0.0335
	-0.0094	-0.0086	-0.0192	-0.0203
<i>SIZE</i>	0.0434***	0.0453***	0.026***	0.02***
	-0.0016	-0.0022	-0.0044	-0.0048
<i>NWC</i>	-0.0402***	-0.0246**	0.0029	0.0038
	-0.0065	-0.0079	-0.0165	-0.017
<i>OC5%</i>	-0.0036***	-0.0012**	-0.0024	-0.0024
	-0.0008	-0.0009	-0.0014	-0.0015
<i>NDTS</i>	-0.0066	-0.1055	-0.2677**	-0.27**
	-0.0584	-0.0733	-0.1539	-0.1705
<i>BSIZE</i>	0.0004*	0.0008**	0.0003	0.0005
	-0.0002	-0.0003	-0.0003	-0.0003
<i>MTB</i>	0.0059***	0.0017	0.0036**	0.0025*
	-0.0012	-0.0011	-0.0014	-0.0015
<i>TR</i>	0.0019**	0.0015**	0.0001	0.0001
	-0.0007	-0.0006	-0.0006	-0.0006
<i>INDLEV</i>	0.6364***	0.5375***	0.365***	0.37***
	-0.0222	-0.0295	-0.0631	-0.0657
<i>LNDLIQ</i>	-0.0048	-0.0508*	-0.0454	-0.0284
	-0.0103	-0.0202	-0.0325	-0.0347
<i>INDHHI</i>	-0.0540***	-0.0394**	-0.018**	-0.01**
	-0.0027	-0.0037	-0.0061	-0.0064
<i>GDP</i>	0.0003	0.0022***	0.003***	0.003***
	-0.0007	-0.0006	-0.0007	-0.0007
<i>INFL</i>	-0.0008	-0.0008**	-0.0001	-0.0001
	-0.0005	-0.0004	-0.0004	-0.0004
<i>LR</i>	-0.0019	-0.006***	-0.009***	-0.009***
	-0.0021	-0.0018	-0.002	-0.0021
Constant	-0.5308	-0.6217	-0.4935	-0.49
Adj R	0.3015	0.2608		
F Stat	120.73	94.62		
Abond Test			0.7901	
Wald chi2			2092.9**	593.0***
Sargan Test			0.531	0.375
Hausman Test		47***		

Notes: ***, ** and * show significance at 99%, 95% and 90% respectively. Standard errors are given in parentheses.

Table 4
Regression output for state-owned enterprises

	OLS	GLS Fixed effects	GMM1	GMM2
<i>Lev</i> (L1)			0.6088***	0.526***
			−0.0332	−0.0581
<i>PROF</i>	−0.0214*	−0.0137	−0.0471**	−0.044**
	−0.0116	−0.0114	−0.0194	−0.0187
<i>SIZE</i>	0.0459***	0.0510***	0.0374***	0.032***
	−0.0022	−0.0033	−0.0074	−0.0075
<i>NWC</i>	−0.0289**	−0.0052	−0.0348	−0.0222
	−0.0092	−0.0118	−0.0214	−0.0208
<i>OC5%</i>	−0.0027**	−0.0006	−0.0019	−0.002
	−0.0011	−0.0014	−0.0016	−0.0015
<i>NDTS</i>	−0.0003	−0.0007	−0.0708*	−0.1124*
	−0.0003	−0.0004	−0.2026	−0.2127
<i>Bsize</i>	−0.0057	−0.0023*	−0.0001	−0.0002
	−0.0016	−0.0017	−0.0004	−0.0004
<i>MTB</i>	0.0063**	0.0063	0.0014	0.0008
	−0.0017	−0.0015	−0.0018	−0.0017
<i>TR</i>	0.0006***	0.006***	0.0007	0.0008
	−0.032	−0.0451	−0.0005	−0.0005
<i>INDLEV</i>	0.62***	0.547***	0.2207**	0.2634**
	−0.0144	−0.0302	−0.088	−0.0875
<i>LNDLIQ</i>	−0.119	−0.0243	−0.053	−0.0321
	−0.0808	−0.106	−0.0475	−0.0447
<i>INDHHI</i>	−0.0574***	−0.0453***	−0.0257**	−0.030**
	−0.0038	−0.0056	−0.0094	−0.0096
<i>GDP</i>	0.0004	0.0023**	0.0015	0.0012
	−0.0009	−0.0009	−0.0011	(0.00100
<i>INFL</i>	−0.0017**	−0.0013**	0	0
	−0.0007	−0.0006	−0.0005	−0.0005
<i>LR</i>	−0.0046	−0.0043	−0.0063**	−0.004**
	−0.003	−0.0027	−0.0027	−0.0026
Constant	−0.5853	−0.7331	−0.6201	−0.4767
Adj R	0.3015	0.2817		
F Stat	120.73	50.88		
Abond				
Wald chi2			826.62***	135.42**
Sargan Test			0.237	0.614
Hausman Test		49.56***		

Notes: ***, ** and * show significance at 99%, 95% and 90% respectively. Standard errors are given in parentheses.

Table 5
Regression output for non-state-owned enterprises

	OLS	GLS Fixed effects	GMM1	GMM2
<i>Lev</i> (L1)			0.6381***	0.5994***
			−0.0315	−0.0569
<i>PROF</i>	−0.0518**	−0.0510**	−0.0423*	−0.0514**
	−0.016	−0.0158	−0.0275	−0.0275
<i>SIZE</i>	0.0410***	0.0393***	0.0312***	0.0301***
	−0.0022	−0.0033	−0.0066	−0.0071
<i>NWC</i>	−0.051***	−0.0393**	−0.0063	−0.014
	−0.0092	−0.0117	−0.0207	−0.0213
<i>OC5%</i>	−0.0048**	−0.0033**	−0.0004	−0.0009
	−0.0011	−0.0013	−0.0019	−0.002
<i>NDTS</i>	−0.0005	−0.0005	−0.0523	−0.0753
	−0.0003	−0.0004	−0.1607	−0.1608
<i>BSIZE</i>	−0.0059	−0.0008	−0.0004	−0.0002
	−0.0017	−0.0016	−0.0004	−0.0004
<i>MTB</i>	0.0008***	0.0007	0.0014	0.0016
	−0.0008	−0.0007	−0.0021	−0.002
<i>TR</i>	−0.0007	−0.5752	−0.0004	0.0002
	−0.0309	−0.0428	−0.0012	−0.0011
<i>INDLEV</i>	0.64***	0.573***	0.4519***	0.4642***
	−0.0147	−0.0296	−0.077	−0.0798
<i>LNDLIQ</i>	−0.004	−0.1031**	−0.0142	−0.0174
	−0.1449	−0.115	−0.0383	−0.0393
<i>INDHHI</i>	−0.050***	−0.0319***	−0.0056	−0.0053
	−0.0038	−0.0055	−0.0072	−0.0072
<i>GDP</i>	0.0004*	0.0022**	0.0020*	0.0019**
	−0.0009	−0.0008	−0.0011	−0.0011
<i>INFL</i>	−0.0001	−0.0003	−0.0008**	−0.0007
	−0.0007	−0.0006	−0.0005	−0.0005
<i>LR</i>	−0.0007	−0.0085**	−0.0038	−0.0039
	−0.003	−0.0026	−0.0027	−0.0027
Constant	−0.4816	−0.523	−0.6262	−0.5921
Adj R	0.2726	0.2461		
F Stat	113.56	41.34		
Abond Test				
Wald chi2			730.58***	194.9***
Sargan Test			0.397	0.418
Hausman Test		49.32***		

Notes: ***, ** and * show significance at 99%, 95% and 90% respectively. Standard errors are given in parentheses.

4.2.2. Firm specific determinants (SOEs and NSOEs)

The discussion of firm specific determinants for SOEs and NSOEs focuses on columns 1 and 2 of Tables 4 and 5. Profitability and firm liquidity (*NWC*) have significant negative effect on the leverage policy of SOEs and NSOEs. This implies both SOEs and NSOEs depend on internal source of financing before going for debt financing. Firm size and tax to earnings ratio report a significant positive effect on leverage for both SOEs and NSOEs. However, the effect of tax to earning (*TR*) is not statistically significant in case of non-state-owned enterprise. *Size* emancipates the fact that bigger firms enjoy a reputation and have access to financing alternatives. The positive tax rate and leverage relationship instill the insight of greater tax shield in case of debt financing. Ownership concentration (*OC5%*) shows a statistically significant negative relationship with leverage, confirming the monitoring role of largest shareholders in curtailing the leverage level. This negative affect of ownership concentration on leverage is reported both for SOEs and NSOEs. Table 4 and 5 indicate that Board size (*BSIZE*) has a negative effect on leverage for both SOEs and NSOEs. However, this relationship lacks statistical significance. Growth opportunities (*MTB*) report a negative relationship with leverage for both SOEs and NSOEs, thus indicating use of high leverage of both SOEs and NSOEs to finance their future projects.

4.2.3. Industry specific determinants (Overall, SOEs and NSOEs)

The discussion focuses on columns 1 and 2 of Tables 3, 4 and 5 for overall firms, SOEs and NSOEs respectively. Table 3 suggests a strong positive relationship between industry leverage (*INDLEV*) and leverage of the firm for overall firms SOEs and NSOEs. This relationship is statistically significant in almost all the regressions. This shows that firm's leverage shows an increasing trend as industry leverage increases and vice versa. Industry liquidity (*INDLIQ*) reports a negative relationship with firm's leverage for all the regressions model, however, the relationship is not statically significant.

Although the negative relationship implies that in time of high liquidity, Chinese firms prefer internal sources and do not issue debt to finance their investments. Industry concentration (*INDHHI*) is found to have a negative relationship with firm leverage. The relationship is statistically significant for overall firms, SOEs and NSOEs.

This relationship can be due to different characteristics of industries, based on industry concentration. Firms in highly concentrated industries have higher size and profitability and have usually higher risk profile (MacKay and Phillips, 2005). This higher risk can be related to the incentives provided to equity holders in case of high bankruptcy chances due to higher risk (Brander and Lewis, 1986). This accounts for the negative relationship between industry concentration and leverage of the firm.

Table 6

Two steps GMM regression results for *OC1%*

	GMM1	GMM2	GMM3
<i>Lev</i> (L1)	0.653***	0.671***	0.653**
	−0.018	−0.032	−0.011
<i>PROF</i>	−0.029***	−0.028**	−0.013*
	−0.011	−0.011	−0.008
<i>SIZE</i>	0.026	0.026***	0.042***
	−0.003	−0.004	−0.002
<i>NWC</i>	−0.006	0	0.002
	−0.014	−0.014	−0.008
<i>OC1%</i>	0	0	0
	0	0	0
<i>NDTS</i>	0.01	0.012	0.016
	−0.001	−0.004	0
<i>Bsize</i>	0	0	0
	0	0	0
<i>MTB</i>	0.001	0	−0.001
	−0.001	−0.001	−0.001
<i>TR</i>	0	0	0
	0	0	0
<i>INDLEV</i>	0.316**	0.335***	0.252***
	−0.046	−0.047	−0.027
<i>LNDLIQ</i>	0.018	0.013	−0.016
	−0.024	−0.027	−0.02
<i>INDHHI</i>	−0.013	−0.012**	−0.034**
	−0.005	−0.005	−0.003
<i>GDP</i>	0.002**	0.002**	0.005***
	−0.001	−0.001	−0.001
<i>INFL</i>	−0.001**	−0.001**	−0.001**
	0	0	0
<i>LR</i>	−0.004**	−0.004**	−0.013**
	−0.001	−0.001	−0.002
Constant	−0.471***	−0.47***	−0.52***
Abond Test	0.175	0.185	0.135
Sargan Test	0.32	0.219	0.147
Wald chi2	131.02	178.21	133.15

Notes: ***, ** and * show significance at 99%, 95% and 90% respectively. Standard errors are given in parentheses.

Table 7
One step GMM regression results

	OC5%			
	GMM1	GMM2	GMM1	GMM2
<i>Lev</i> (L1)	0.655***	0.632***	0.655***	0.630***
	−0.026	−0.013	−0.025	−0.012
<i>PROF</i>	−0.037***	−0.03***	−0.03***	−0.03***
	−0.008	−0.007	−0.008	−0.007
<i>SIZE</i>	0.033***	0.032***	0.033***	0.033***
	−0.003	−0.003	−0.003	−0.003
<i>NWC</i>	−0.004	−0.005	−0.004	−0.005
	−0.01	−0.01	−0.01	−0.01
<i>OC</i>	0.001	0.002	0.001	0.001
	0	0	−0.001	−0.001
<i>NDTS</i>	0.003	0.001	0.007	0.009
	−0.001	−0.001	−0.003	−0.001
<i>BSIZE</i>	0.001	0.002	0.001	0.002
	0	0	0	0
<i>MTB</i>	0.001	0.001	0.001	0.001
	−0.001	−0.001	−0.001	−0.001
<i>TR</i>	0.001	0.0003	0.002	0.001
	0	0	0	0
<i>INDLEV</i>	0.335**	0.322***	0.335***	0.321**
	−0.04	−0.038	−0.04	−0.038
<i>LNDLIQ</i>	−0.054**	−0.063**	−0.052**	−0.061**
	−0.028	−0.026	−0.028	−0.025
<i>INDHHI</i>	−0.019***	−0.018**	−0.019**	−0.018**
	−0.004	−0.004	−0.004	−0.004
<i>GDP</i>	0.003***	0.003***	0.003***	0.003***
	−0.001	−0.001	−0.001	−0.001
<i>INFL</i>	−0.001**	−0.001**	−0.001**	−0.001**
	0	0	0	0
<i>LR</i>	−0.009**	−0.009**	−0.009**	−0.009**
	−0.002	−0.001	−0.002	−0.001
Constant	−0.56***	−0.55***	−0.57***	−0.56***
Abond Test	0.125	0.147	0.232	0.261
Sargan Test	0.561	0.784	0.217	0.328
Wald chi2	1014.21	596.09	783.21	794.13

Notes: ***, ** and * show significance at 99%, 95% and 90% respectively. Standard errors are given in parentheses.

Table 8
Regression results for state-owned enterprises for OC1%

	One step		Two steps	
	GMM1	GMM2	GMM1	GMM2
<i>Lev</i> (L1)	0.591*** -0.034	0.521*** -0.018	0.593*** -0.037	0.513*** -0.024
<i>PROF</i>	-0.028** -0.01	-0.027** -0.01	-0.025** -0.01	-0.022** -0.01
<i>SIZE</i>	0.027*** -0.004	0.027*** -0.004	0.024*** -0.004	0.022** -0.004
<i>NWC</i>	-0.006** -0.013	-0.006** -0.013	-0.013** -0.016	-0.014** -0.016
<i>OC</i>	0.001 0	0.001 0	0.002 0	0.002 0
<i>NDTS</i>	-0.255 -0.107	-0.215 -0.11	-0.214 -0.126	-0.159 -0.121
<i>BSIZE</i>	0.002 0	0.001 0	0.002 0	0.001 0
<i>MTB</i>	0.001 -0.001	0.001 -0.001	0.001 -0.001	0.001 -0.001
<i>TR</i>	0.001 0	0.002 0	0.001 0	0.002 0
<i>INDLEV</i>	0.346*** -0.057	0.375** -0.057	0.394*** -0.063	0.410*** -0.06
<i>LNDLIQ</i>	-0.080*** -0.039	-0.085** -0.038	-0.05*** -0.04	-0.069** -0.038
<i>INDHHI</i>	-0.011** -0.005	-0.012** -0.005	-0.005** -0.006	-0.004** -0.006
<i>GDP</i>	0.003*** -0.001	0.003*** -0.001	0.002*** -0.001	0.002*** -0.001
<i>INFL</i>	-0.001** 0	-0.001** 0	-0.001** 0	-0.001** 0
<i>LR</i>	-0.007** -0.002	-0.007** -0.002	-0.002** -0.002	-0.002** -0.002
Constant	-0.489	-0.501	-0.487	-0.469
Sargen test	0.249	0.179	0.478	0.343
Abond Test	0.125	0.239	0.614	0.398
Wild Chi2	1234.12	773.21	832.01	686.21

Notes: ***, ** and * show significance at 99%, 95% and 90% respectively. Standard errors are given in parentheses.

Table 9
Regression results for non-state-owned enterprises for OC1%

	One step		Two steps	
	GMM1	GMM2	GMM1	GMM2
<i>Lev</i> (L1)	0.692***	0.653***	0.673***	0.685***
	−0.036	−0.018	−0.042	−0.025
<i>PROF</i>	−0.094**	−0.088**	−0.074**	−0.067**
	−0.016	−0.015	−0.025	−0.024
<i>SIZE</i>	0.042**	0.042**	0.026**	0.032**
	−0.004	−0.004	−0.007	−0.006
<i>NWC</i>	−0.030**	−0.032**	−0.005**	−0.020**
	−0.016	−0.015	−0.019	−0.018
<i>OC</i>	0.001	0.001	0.001	0.001
	0	0	0	0
<i>NDTS</i>	−0.163	−0.097	−0.196	−0.052
	−0.127	−0.123	−0.167	−0.149
<i>BSIZE</i>	0.001	0.001	0.001	0.001
	0	0	0	0
<i>MTB</i>	0.001	0.001	−0.001	−0.001
	−0.002	−0.002	−0.002	−0.001
<i>TR</i>	0	0	0	0
	−0.001	−0.001	0	0
<i>INDLEV</i>	0.334***	0.279***	0.317***	0.241***
	−0.055	−0.051	−0.06	−0.055
<i>LNDLIQ</i>	−0.031**	−0.034**	−0.028**	−0.023**
	−0.041	−0.036	−0.032	−0.028
<i>INDHHI</i>	−0.024**	−0.024**	−0.016**	−0.020**
	−0.007	−0.007	−0.008	−0.007
<i>GDP</i>	0.004***	0.004***	0.002***	0.003**
	−0.001	−0.001	−0.001	−0.001
<i>INFL</i>	−0.001**	−0.008**	−0.005**	−0.009**
	0	0	0	0
<i>LR</i>	−0.011**	−0.011**	−0.015**	−0.006**
	−0.002	−0.002	−0.002	−0.002
Constant	−0.712	−0.703	−0.674	−0.516
Abond test	0.217	0.871	0.478	0.357
Sargan test	0.147	0.123	0.136	0.138
Wald Chi2	1132.23	1234.53	1478.32	1725.103

Notes: ***, ** and * show significance at 99%, 95% and 90% respectively. Standard errors are given in parentheses.

Table 10
ANOVA analysis for SOEs and NSOEs

Variable	SOE	NSOEs	F Value	Prob of F
Mean of leverage	0.714	0.64	31.07	0.000

4.2.4. Country level determinants of leverage (Overall, SOEs and NSOEs)

The discussion for country level determinants focuses on columns 1 and 2 of Tables 3, 4 and 5. Gross domestic product (*GDP*) is found to have a positive impact on firm leverage. This relationship accounts for overall firms, SOEs and NSOEs and has statistical significance. This is in accordance with De Jong *et al.* (2008) who suggests a positive relationship between capital structure and GDP. They argue that firms in countries having better legal environment and having healthier growth rate are likely to take more debt. Inflation shows a negative relationship with the leverage policy of China but it has mixed statistical significance. For inflation two of the models (Table 3) show significance for overall firms, while one shows significance for state-owned firms, however, for NSOEs this negative relationship lacks statistical significance. Inflation (*INF*) is found to have a negative relationship with the leverage policy of Chinese firms. This relationship accounts for overall, SOEs and NSOEs. A negative and statistically significant effect (Tables 3, 4 and 5) is exhibited by lending rate (*LR*) on debt financing of Chinese firms. This is in accordance with the findings of Muradoglu and Sivaprasad (2011) who empirically find that leverage and lending rate are negatively related. These findings indicate a significant impact of country specific indicators on Chinese firms and thus have important policy implications for managers with respect to different economic indicators of the country.

5. Conclusions

This study tries to investigate the adjustment behavior of Chinese firms towards a target leverage ratio. Overall results show that firm's level, industry level and country level factors have serious implication for firm's leverage in China. The loss of significance of various factors in GMM models accounts for the endogeneity of these factors. The use of Generalized Method of Moments is used solely to estimate the dynamic nature of leverage policy in China. The findings suggest significant policy implications. In terms of adjustment behavior, the government needs to articulate the lending policy towards overall firms, avoiding the pecking order preference towards state-owned firms in China. Foreign researchers can get a very significant insight from this research paper. Generally it will help foreign researchers to understand the peculiar and unique features of Chinese markets and the institutional environment

prevalent in China. In particular foreign researchers will benefit from this study to understand leverage policy and firms behavior to adjust to an optimal leverage policy. Furthermore, information and empirical findings provided by this study regarding SOEs and NSOE are of significant importance. These findings can be extrapolated to form foundations of studies constituting reforms in other countries.

Similarly managers in firms can get useful insight from these findings keeping their leverage in line with various factors such as industry average leverage and liquidity of firm as well as the industry. Industry concentration is providing extra ease to firms to raise more debts thus giving them an advantage. Regulatory body should seek to curtail that concentration, providing an equal debt raising opportunities to all the firms and thus avoiding the monopolistic debt raising.

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