

**Shadow Banking and Investment:
Evidence from Credit Intermediation of Non-Financial Firms in China**

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Abstract

We investigate how credit intermediation (CI) conducted by Chinese non-financial firms differs from formal bank lending in affecting the link between leverage and investment. We identify credit intermediation by estimating elasticity of liquid financial assets to financial liabilities. The firms are then grouped by industries, by ownership, and credit intermediation. Accounting for endogeneity of leverage, our instrument-variable regressions yield the following results. First, the negative association between leverage and investment (debt overhang problem) is weaker in the “CI-active” industries, particularly those where CI is conducted by state-owned enterprises (SOE). Second, although personal political connection (PC) in general mitigates the debt overhang problem, this mitigation effect is smaller in “CI-active” industries. Third, the disciplinary effect of leverage on investment of low-performance firms is stronger in industries with active CI conducted by SOE; but the stronger disciplining effect only applies to private firms, but not SOE. The results suggest that state ownership and personal political connection influence the leverage-investment link under credit intermediation.

Keywords: Leverage, Investment, Shadow Banking, China, Political Connection, Credit Intermediation

JEL: G31, G32, P2

1. Introduction

In China, shadow banking has been regarded as an important element in the migration towards a more market-oriented financial system. Proponents of shadow banking system see it as an effort toward freeing the financing market from political influence and toward attaining higher efficiency of market-based transactions. Yet, even in developed market economies, firms seeking external finance may not achieve optimal investment decisions due to agency problems and information asymmetry (Stein, 2003). Specifically, firms may forgo projects with positive net present value because part of the investment return accrues to lenders (Myers, 1977). This agency problem, arising from insufficient interest alignment between lenders and firms, is known as debt overhang problem and can lead to underinvestment (Firth et al., 2008). Lenders, however, can also constrain the investment of low-performance firms by monitoring and disciplining the firms to which they lend (Jensen, 1986; Stulz, 1990).

Although empirical evidence in developed countries confirms both the debt overhang and disciplinary effects of leverage, the complex relationship between lenders and borrowers in transition economies like China may affect their applicability. For instance, Firth et al. (2008) show that in China's financing market where state banks are the suppliers of most credits, firms' relationship with the state could affect the link between leverage and investment. As relationship banking and its accompanying low transparency bear important implications on agency problems and information asymmetry, it remains an open question whether the surge in China's shadow banking activities in recent years, particularly after the 2008 crisis, brings the leverage-investment link closer to that exhibited in a market-based financial system.

Riding on the wave of massive government stimulus in 2009 in response to the global crisis, the scale shadow banking activities in China, has continued to surge to new records. Firms in China, regardless of ownership and sizes, have since primarily relied on various sources of external finance to fuel their investment frenzy. The share of credits, for example under trust and entrusted loans, created by non-bank intermediaries jumped from less than 10% of the total credits in the financial system in 2008 to almost 40% in 2013 (Dang et al., 2014). Shadow banking assets increased by 30% in 2015, reaching 54 trillion RMB, which is equivalent to about 78% of China's GDP in that year.¹ In this paper, we investigate whether credit intermediation (CI) conducted by non-financial firms in China, an important aspect of shadow banking, differs from formal bank lending in terms of the link between leverage and investment. This is particularly important in light of the post-crisis surge in credit intermediation by non-financial firms in a market that has been traditionally dominated by state banks. Throughout the analysis, we also account for firms' political connection.

No prior study has compared the formal banking and shadow banking systems in terms of leverage-investment link. Such comparison is warranted in the context of China due to some unique features of its shadow banking activities and the potential efficiency-enhancing effects. Specifically, Chinese shadow banking can be divided into loans made to affiliated parties and non-affiliated parties; each type of loans carries very different operation mechanism (Allen et al., 2015). For non-affiliated loans, instead of using the capital markets

¹ This is reported by Reuters in "China Shadow banking assets grew 30 percent in 2015: Moody's" on July 27, 2016.

as platform of risk assessment and transactions as in developed countries, lenders in China rely on banks as middlemen. The banks, however, in general do not assume the default risk for these credit-intermediation activities. Hence, the lending parties either suffer from severe asymmetric information owing to the lack of information infrastructure, or risk misperception from wrongly believing that the banks implicitly guarantee their loans (Dang et al., 2014). Information asymmetry under non-affiliated CI is thus very different from that in the formal lending market, and it may affect the role of leverage in disciplining investment of low-performance firms.

Unlike non-affiliated CI, affiliated CI faces much lower information asymmetry and better lender-borrower interest alignment. It is therefore reasonable to expect the debt overhang problem and disciplinary effect of leverage are different between these two types of credit intermediation. In addition, state ownership and/or personal political connection grant firms easier access to affiliation networks and, consequently, to financial credits allocated within these networks. We examine under this particular aspect of shadow banking, whether and how these political assets matter to firms in their investment decision and in the leverage-investment link.

We use data of China's listed firms from 2009 to 2015 to compare the relationship among leverage, investment, and political connection in the industries where there is active credit intermediation among non-financial firms to that under industries where credit intermediation is dominated by state banks. Owing to the shadow nature of this activity, publicly disclosed information by firms may not sufficiently reveal the actual extent of credit intermediation in which they engage. We thus follow Shin and Zhao (2013) and identify this activity by estimating the elasticity of financial assets to financial liabilities of firms. As non-financial firms in China tend to provide loans to other firms within the same industry (Allen et al., 2015), we group the firms according to the industries where there is evidence of active credit intermediation.

Our empirical analysis yields the following findings. First, the negative association between leverage and investment is weaker in the "CI-active" industries, particularly when the CI is performed by SOE, than in the "CI-inactive" industries. Since the potential affiliation network of SOE is generally greater than that of private firms, this finding is interpreted as evidence of better lender-borrower interest alignment under credit intermediation among affiliated firms. Second, personal political connection (PC) appears to mitigate debt overhang problem. This indicates political connection may improve lender-borrower interest alignment in the state bank dominated financing environment in China. We found this mitigating effect of PC is smaller in "CI-active" industries, which indicates PC may bring less lender-borrower interest alignment in CI loans than in bank loans. Lastly, in the sample of private firms, the disciplining effect of leverage on poorly performing firms is stronger in industries with active CI. But such increase in disciplining effect is robust only for active CI conducted by SOEs, but not by private firms. It suggests the inadequate risk assessment of private firms in this particular shadow banking activity in China. In the sample of SOEs, we found only bailout effect but not disciplining effect of debt, regardless of activeness of CI. It implies that although emergence of CI is commonly perceived as a sign of marketization, CI may not help disciplining SOEs as formal banks may still serve as a last resort of bailout.

Our research provides the following contributions. First, although shadow banking has drawn considerable

attention from policy makers after 2008 financial crisis, related studies on emerging markets are rare. This paper would be among the first round of studies that examine the implications of shadow banking on corporate financial behaviour in emerging economies. Second, by better understanding of shadow banking in China, our research provides policy insights towards allocating financial resources for optimal investment under credit intermediation. Third, it contributes to the literature of political economy and corporate governance by evaluating the role and influence of firms' political connection and ownership in a shadow banking system.

The rest of the paper is organised as follows. Section 2 provides a brief review of literature and hypothesis development. Section 3 provides the details of research methodology. Section 4 presents empirical results and Section 5 concludes.

2. Literature Review and Hypothesis Development

Our study is built on several literature streams. The first stream investigates the link between leverage and investment. In principles, leverage can (i) lead to debt overhang problem and (ii) discipline investment of low-performance firms. Empirical evidence in developed countries confirms both effects of leverage. For example, Aivazian et al. (2005) show that leverage exerts negative and significant impact on investment in a sample of Canadian firms, and the negative relation is stronger among firms with low growth (as measured by Tobin's Q). In the case of China, Firth et al. (2008), however, find that in the credit market dominated by state banks, firms with state ownership tend to encounter less restriction on investment when they have poor performance. As the data sample in Firth et al. (2008) covers the period of 1991-2004, we extend their study by exploring whether the rise of CI after the 2008 crisis changes the leverage-investment link in China.

The second stream of literature is related to a growing body of literature on the shadow banking system. Most of the existing literature on shadow banking focus on advanced economies. These studies investigate mechanism design of financial intermediation by nonbank financial entities, with focus on securitization market. In contrast to that in advanced economies, shadow banking in China involves much more CI among non-financial entities. A few studies have discussed the characteristics of CI in China. Allen et al. (2015) note that CI loans in China can be categorized into affiliated loans and non-affiliated loans according to the relationship between lenders and borrowers. These salient features suggest the nature of information asymmetry and borrower-lender interest alignment in CI of China is likely to be different from that in securitization market of advanced economies. Notwithstanding the potential impact of shadow banking on both Chinese and global economy, studies on Chinese shadow banking are very limited.

Finally, our study is related to the role of network in financing activities and corporate governance. Previous studies suggest social network help to facilitate financing activities. In the context of microfinance, Allen and Babus (2008) note that social network makes the financing model work through the embedded peer pressure and self-monitoring. Karlan et al. (2009) propose a theoretical model where personal relationship serves as social collateral in lending. Previous researches also point out the importance of network attributes.

Concepts like “strong” and “weak” ties, which are determined in terms of social or geographical distance, are regarded as useful elements in gauging the link between network and lending (Ganovetter, 1973; Fafchamps and Gubert, 2007). This paper enriches the literature on network study in finance as CI lending and state bank lending in China covers different types of network with varying relation attributes and strength. Specifically, we compare how the different lender-borrower relations involved in affiliated CI loans, non-affiliated CI loans and state-bank loans affect leverage-investment link.

Motivated by these literature streams, we propose several hypotheses on the investment-leverage link under the rise of CI in financing environment in China. First, we posit debt overhang problem is affected by the lender-borrower relations which varies among industries with active affiliated CI, active non-affiliated CI and bank-dominated financing environment.² The basic idea is that relationship that strengthens interest alignment between borrower and lender would make the negative relationship between investment and leverage less salient.

Under affiliated CI, as loans are made to support affiliated borrowers, lending firms also benefit from equity return of their subsidiaries and/or from maintaining a stable coalition in the network. A prevalent practice of affiliated CI is cash pooling arrangement, where affiliated firms pool cash for re-lending among themselves with banks acting as the conduit (Lu, 2013; He, 2014). Affiliated firms liaise among themselves to allocate financial resources to priority investment projects. There is thus a higher degree of lender-borrower interest alignment and hence lower information risk. In contrast, firms under active non-affiliated CI environment or bank-dominated financing environment would regard interest payment as sharing investment return to “outsiders”. Due to the preferential status and considerable shares of SOEs in Chinese economy, state ownership may grant firms easier access to a greater affiliation network with other SOEs and private firms³. Hence, more affiliated loans and lower information asymmetry are expected for industries with CI conducted by SOEs.⁴ Accordingly, our first hypothesis is formalized as follows.

Hypothesis 1a: The debt overhang problem (negative relation between debt and leverage) is less severe in industries with active CI conducted by SOEs than in “CI-*inactive*” industries.

Hypothesis 1b: The debt overhang problem is less pronounced in industries with active CI conducted by SOEs than in industries where there is active CI conducted by private firms.

² We take reference to Allen et al. (2015) find that in the case of entrusted loans, which is an important component of CI activities in China, most of the loans are provided to borrowers within the same industry.

³ Private firms in China would pursue to form relationship with SOEs, so as to establish legitimacy for conducting business (Ahlstrom et al., 2008).

⁴ Allen et al. (2015) find that in the case of entrusted loans, majority of lenders of affiliated loans are SOE.

Secondly, in transition economies like China, firms with politically-connected senior executives (PC) are more likely to share similar political (and economic) goal with government in running the business. As state bank is one of the important government tools to achieve political and economic goal, higher degree of interest alignment and lower information asymmetry are expected for loans provided by state banks to politically-connected firms. We thus expect PC would make the negative relationship between investment and leverage less resilient. Since interest alignment of PC is politics-driven instead of profit-driven, shadow banking activities including CI may alleviate the impact of PC because profit and firm survival are the main driving engine of CI activities. This muting effect of CI on the impact of PC is also applicable for CI conducted by SOEs. In the continual process of marketization, SOEs need to bear an increasing degree of responsibilities for business sustainability and profitability. It is reasonable to expect CI among SOEs increases the weight of interest alignment in profit context relative to that in politics context. Thus, our second hypothesis is stated as follows.

Hypothesis 2a: Political connection mitigates the debt overhang problem.

Hypothesis 2b: The mitigating effect of political connection on the debt overhang problem is smaller in CI-active industries

Finally, we argue that debt disciplining effect on poorly-performing firms varies across bank loans and CI under different types of lender-borrower relation. After 2008 financial crisis, supporting poorly-performing firms with state bank loans is one of the channels for the government to bailout the economy. Accordingly, we expect a more positive association between leverage and investment for poor-performing firms in bank loan dominating (i.e. “*CI-inactive*”) industries. Since CI are relatively free from the government concern of bailing out the economy, one may surmise that CI could strengthen disciplining effect on poorly-performing firms. Yet, such disciplining effect is at least subject to two conditions. First, the lenders do not have the intention to bailout borrowers. Second, the lenders have sufficient information and capacity to conduct performance assessment.

Regarding the first condition, affiliated CI works like a “pseudo internal capital market”. As noted by Stein (2003), there are both bright and dark sides of internal capital markets in terms of investment. On the one hand, affiliated firms can liaise to allocate financial resources to those with better investment opportunities, leading to so called “smarter-money” effect (Alchian, 1969; Stein, 1997). On the other hand, management may adopt a more “socialist” approach and cross-subsidize weaker business units under lobbying pressure from rent-seeking agents (Rajan, Servaes and Zingales, 2000; Wulf, 2009). It is worth-noting that the relative weight of “smarter-money” effect and “socialist cross-subsidizing” effect may vary across different lender-borrower relations involved in affiliated loans.

For example, for SOE-SOE affiliation, the needs to bailout other affiliated SOEs may make the “smarter-money” effect derived from information advantage not outweighing the “socialist” incentives in disciplining low-performance firms. For SOEs-private firms affiliation, the relative strength of “smarter-money” effect over

“socialist cross-subsidizing” effect may be different. As noted in the literature, private firms in emerging economies encounter the need to establish “legitimacy” (i.e. the rationale for their existence) (Suchman, 1995), so that their ability to conduct business would not be significantly hampered by the government or other entities (Ahlstrom & Bruton, 2001; Stillman, 1974). Some private firms in China may establish legitimacy through forming relationship with SOEs (Ahlstrom et al., 2008). Against this background, SOEs may have lower incentive to cross-subsidize the affiliated private firms.

Regarding the second condition, SOEs are more likely to enjoy better information access in China. Poorer information infrastructure and lower risk assessment capacity is generally observed among private firms, which may limit the disciplining effect of CI conducted by private firms. In addition, CI conducted by private firms are less likely to enjoy “smarter-money” effect due to the lower proportion of affiliated CI. Considering the two conditions together, disciplining effect would be a function of the ownership types of firms conducting CI, and the relations between lenders and borrowers. Thus, our third hypothesis is stated as follows.

Hypothesis 3: The disciplining effect of active CI varies with firm ownership and types of relations involved in the CI.

3. Empirical framework

3.1 Identification of credit intermediation (CI)

As discussed in Section 1, publicly disclosed firm-level data on CI is limited and may not sufficiently reflect the extent of CI.⁵ Following Shin and Zhao (2013), we investigate the co-movement in liquid financial assets and financial liabilities of the firms to identify CI. Specifically, positive association in the changes in liquid financial asset and changes in financial liability suggests active credit intermediation. In principles, such positive correlation is only expected among financial institutions as they borrow in order to lend. For non-financial firms, pecking order theory predicts that firms turn to external financing only when internal funds are not sufficient to cover investment. Such behaviour implies negative association between financial assets and liabilities because firms would raise external funds (financial liabilities) when internal funds (liquid financial assets) are drawn down.

We run fixed-effect panel regressions to estimate the elasticity of liquid financial assets to financial liabilities for China’s listed firms during 2009-2015 based on the following specification:

⁵ Allen et al. (2015) manually collect loan information for Chinese public firms disclosed from their annual report. Their sample, covering the period of 2004-2013, consists of around 111 firms and 300 loans per year on average. Although their study provides useful insights, the sample size is relatively small in comparison with the large size of CI estimated in many industry publications.

$$\ln(\text{finasset} / \text{sales})_{it} = \beta_0 + \beta_1 \ln(\text{finliab} / \text{sales})_{it} + \beta_2 \ln \text{sales}_{it} + \beta_3 \text{leverage}_{it} + \mu_{it}, \quad (1)$$

where $\ln(\text{finasset} / \text{sales})$ is the log of ratio of liquid financial assets (including cash, transactional financial assets, bill receivable, dividend receivable, and interest receivable) to sales. $\ln(\text{finliab} / \text{sales})$ is the log of the ratio of financial liabilities (including long term debt, payable bond, short term debt, transaction financial debt, bill payable, and interest payable) to sales. Leverage, measured as the ratio of financial liabilities to total assets, and the log of sales are included as control variables. Since non-financial firms in China tend to provide loans to firms within the same industry (Allen et al., 2015), and SOEs and private firms may have different ability and incentive to engage in CI, we identify the extent of CI for each type of firm ownerships in each industry separately. To this end, firms are separate into private firms and SOE; then for each ownership type, the firms are further grouped into nine industries. The regression model (1) is applied to firms in each of these 18 combinations of industry and ownership. A positive and significant coefficient β_1 would suggest that CI is active among a particular type of firm ownership in that industry. It is noted that CI activities may respond to change in formal credit availability, which is subject to continual adjustment of state-guided credit preference towards different industries. The media also observed that CI activities have been rapidly spread from real estate sectors to other industries within a few years. To capture CI activeness across industries more accurately, we break down the whole sample into two sub-periods, covering 2009-2012 and 2013-2015 respectively, and run regressions separately.

3.2 Relationship between leverage and investment

Having identified the extent of credit intermediation, we analyse the differences in debt overhang problem and debt disciplining effect in (i) “CI-inactive” industries, (ii) “CI-active by SOE” industries, and (iii) “CI-active by private firms” industries. The analysis is first conducted on the following baseline regression specification:

$$\begin{aligned} \text{invest}_{it} = & \gamma_0 + \gamma_1 \text{leverage}_{it-1} + \gamma_2 \text{leverage}_{it-1} * \text{SOECI}_{it} + \gamma_3 \text{leverage}_{it-1} * \text{PrivateCI}_{it} + \gamma_4 \text{leverage}_{it-1} * \text{PC}_{it} \\ & + \gamma_5 \text{leverage}_{it-1} * \text{SOECI}_{it} * \text{PC}_{it} + \gamma_6 \text{leverage}_{it-1} * \text{PrivateCI}_{it} * \text{PC}_{it} + \gamma_7 \text{PoorPerform}_{it} * \text{leverage}_{it-1} \\ & + \gamma_8 \text{PoorPerform}_{it} * \text{leverage}_{it-1} * \text{SOECI}_{it} + \gamma_9 \text{PoorPerform}_{it} * \text{leverage}_{it-1} * \text{PrivateCI}_{it} \\ & + \gamma_{10} \text{PoorPerform}_{it} * \text{leverage}_{it-1} * \text{PC}_{it} + \gamma_{11} \text{PoorPerform}_{it} * \text{leverage}_{it-1} * \text{SOECI}_{it} * \text{PC}_{it} \\ & + \gamma_{12} \text{PoorPerform}_{it} * \text{leverage}_{it-1} * \text{PrivateCI}_{it} * \text{PC}_{it} + \gamma_{13} X_{it-1} + \varepsilon_{it} \end{aligned} \quad (2)$$

where *invest* is the firm’s investment as measured by the ratio of net capital expenditure to total assets, *leverage* is the ratio of total liabilities to total assets, and *PC* is a dummy variable indicating whether the CEO and/or chairman of the firm possesses political connection. *SOECI* and *PrivateCI* are dummy variables indicating whether the firm is in “CI-active by SOE” industries and in “CI-active by private firms” industries respectively. *PoorPerform* is binary indicator of firm performance in business potential that equals to one if the proxy for firm’s performance is less than one standard-deviation below the industry mean in that year and is equal to zero

otherwise. We use three proxies for firm's performance, including Tobin's Q, sales growth and cashflow⁶, and run regressions on each proxy separately. A negative coefficient of interaction term between the performance indicators and leverage is consistent to the notion that leverage restricts investment in low-performance firms, whereas a positive coefficient signals that leverage serves to bailout or cross-subsidize these firms through fewer investment restrictions.

Following Chen et al. (2011), Lang et al. (1996), and Richardson (2006), we introduce several control variables in vector x : Tobin's Q, measured as the ratio of market value of tradable shares, book value of non-tradable shares, and liabilities to total asset; cash flow measured by firm's net operating cash flow over net fixed assets; secondary equity offerings (*seo*) measured in cash proceeds from seasoned equity offerings scaled by total assets; firm size measured by the log of total assets; and, lastly, number of years the firm has been listed (*age*). It is noted that leverage may be endogenously determined because anticipation of future investment may affect the firm's debt-financing decision. To address this potential problem of endogeneity, we follow Firth et al. (2008) and Aivazian et al. (2005) and adopt a fixed effect instrumental variable approach. The rationale and execution details of this methodology will be provided in Section 4.

3.3 Data

Our sample is drawn from listed A-share non-financial firms in China from 2009 to 2013. Financial data and ownership information are collected from China Securities Markets and Accounting Research (CSMAR) database. A firm is considered a state-owned enterprise if its ultimate controlling shareholder is a government entity or another state-owned enterprise.

To identify personal political connection, we manually examine the background information of the CEO and chairman, which is also available in CSMAR, of each firm in each year. A firm is considered politically connected if the chairman or/and the CEO was a government official, was a military officer, is a member of the National People's Congress (NPC), is a member of the Chinese People's Political Consultative Conference (CPPCC), or is a government party secretary.

Table 1 presents the distribution of firms in the sample. The number of state-own enterprises (SOE) is quite stable, numbering 953 in 2009 to 984 in 2015. The number of private firms, on the other hand, more than doubles from 755 in 2009 to 1779 in 2015. The percentage of politically connected firms is not very different

⁶ As "efficient investment" implies that firms with better expected profitability would engage in more investment, these three performance measures are chosen because they reflect the firm's performance in terms of expected profitability. Although Tobin's Q is a common proxy for expected profitability, in markets with potential bubbles (or in the case of China, potential government support to the share price of privileged firms), Tobin's Q may not accurately reflect expected profitability. Cashflow may then provide additional information about expected profitability (Bond et al., 2004). For robustness purpose, we include sales growth as another performance proxy of expected profitability.

between the two types of ownership: both are between 20% and 30%. The average percentage of politically connected firms for SOE is around 22 percent, a little bit lower than that for private firms (which is around 28 percent). The sample consists of 12748 observations, including 6275 observations on SOEs and 6473 observations on private firms.

4. Empirical Results

4.1 Identifying credit intermediation

Table 2 reports the elasticity of liquid financial assets to financial liabilities, coefficient β_1 in Equation (1), for firms grouped under eight industries and two ownership types. A positive and significant elasticity signals that there is active credit intermediation in that particular group of firms. The more a non-financial firm engages in this activity, the larger is the value of elasticity. As shown in the table, our estimates of elasticity are positive across most industries, although not all of them are statistically significant. These values are consistent with the finding in Shin and Zhao (2013) of a positive and statistically significant elasticity of around 0.2 based on a sample of non-financial Chinese firms across various industries. Shin and Zhao (2013) also find that the elasticity for non-financial firms in US was -0.04 to 0.02 in the past few decades; our results therefore indicate CI is quite prevalent among Chinese non-financial firms.

One may presume that shadow banking activities (including CI) generally exist across most industries in China owing to its repressive credit market. As shown in Table 2, however, the pervasiveness and intensity of CI vary across industries and ownerships. For some combination of industries and ownerships, the elasticities are insignificant at 10% level, some carry even negative coefficient. For those with elasticities that are significant at 5% level, they all carry a value much higher than the benchmark elasticity of non-financial firms in US (i.e. 0.02). Some of them even got elasticities higher than 0.3.

We use the statistical significance at 5% level on the estimated elasticity to group the industries. Accordingly, in the first sub-period (2009-2012), there is strong evidence of CI in *Real Estates* and *Utilities* among private firms. In the second sub-period (2013-2015), active CI conducted by private firms are found in *Materials*, *Industrials*, *Consumer Staples*, *Real Estates*, *IT and Telecom Services*, and *Utilities*. We will refer to these industries in the following regression analysis as “Active CI by private firms” industries for the corresponding years (having a value equals 1 in the dummy variable $PrivateCI_{it}$). For SOEs, strong evidence of CI is found in *Industrials*, *Consumer Staples*, *Health Care* and *Utilities* in the first sub-period, and in *Materials*, *Industrials*, *IT and Telecom Services* and *Utilities* in the second sub-period. We will refer to these industries in the following regression analysis as “Active CI by SOEs” industries for the corresponding years (having a value equals 1 in the dummy variable $SOECI_{it}$). Industries with both $PrivateCI_{it}$ and $SOECI_{it}$ equal 0 would be regarded as industries relying more on banks for financing activities in that year. Overall, it is observed that CI activities have been intensifying as

times go by, especially among private firms. The spread of CI conducted by private firms is more prominent in terms of both number of industries involved and the degree of activeness as revealed in the higher elasticity.

In Table 3, we report the mean and standard deviation of key variables in the regression analysis. The firms are divided into three groups according to the extent of credit intermediation as discussed above; in each group, we consider SOE and private firms separately. Generally speaking, leverage is higher in “Active CI by SOE” industries and “Active CI by private firms” industries, than in “CI-inactive” industries, showing that active CI improves credit availability for firms in the same industry. As the business prospect of private firms appear to be better than that of SOEs as measured in Tobin’s Q, cashflow and sales growth, one may expect active CI may narrow the credit access gap between SOEs and private firms. Yet, private firms appear to have lower leverage than SOEs in all three groups. The leverage gap between private firms and SOEs is even a bit larger in “Active CI by SOE” industries and “Active CI by private firms” industries. These statistics provide preliminary hints that the larger affiliation network of SOEs provide SOEs with better access to CI credit, outweighing the downside impact of poorer business potential. With network playing an important role in CI, these statistics imply potential differences in the effects of CI in the investment-leverage link under different strength of network involved.

Table 4 reports the correlations among the variables. The absolute value of all the correlation coefficients are not high, which suggests that multicollinearity is not a serious problem in the sample. Leverage is negatively and significantly related to investment, providing some signs of debt-overhang problem. Although Investment is positively related to Sales Growth, Cashflow and Tobin’s Q, Leverage is negatively related to these three performance-related variables. More comprehensive econometric analysis is needed to test if “disciplining” effect or “socialist cross-subsidizing” effect exist.

4.2 Leverage-Investment link

We now explore the relationship between debt and investment as specified in Equation (2). To account for potential endogeneity of debt, measured by leverage, we adopt an instrumental variable approach with fixed effect introduced. Following Aivazian et al. (2005), Grullon et al. (2006), and Firth et al. (2008), we consider several instruments candidates including Tangibility as measured by the ratio of tangible assets to total assets (*Tangibility*), non-debt tax shield as measured by depreciation and amortization scaled by total assets (*NDTS*), Asset Maturity as measured by ratio of net fixed assets to annual depreciation expenses (*Maturity*), average tax rate of the firm (*Average Tax Rate*), and average industry leverage (*Average Industry Leverage*) in that year. As all these instruments are financial variables, one may question the exogeneity of these instruments.⁷ Since firms with

⁷ A potential alternative to fixed effect IV model is dynamic GMM estimation. Some prior studies on investment have considered this method (e.g. Guariglia, 2008; Firth et al., 2012). In the use of GMM estimates on our data, we shared similar problem with Firth et al. (2012), who studied the link between investment and financing channels for China’s listed

different ownership in different industries may encounter different financing constraints or privileges, instruments exogenous to one type of firms may not be exogenous to the others. To avoid weak instruments and address endogeneity better, we perform Cragg-Donald test and Sargan test on different combinations of instruments to pick the best combination of instruments for each regression.

4.2.1 The impact of CI on debt-overhang problem

Table 5 reports the regression results for private firms, as specified in Equation (2). Regressions are run separately for three poor-performance measures, “Sales Growth”, “Cashflow”, and “Tobin’s Q”, with results reported under column (1) to column (3) respectively. Under all three columns, the coefficient of *leverage* is negative and statistically significant at 1 percent. It indicates that private firms face the debt overhang problem: the amount of debt does affect the investment decision of private firms.

Regarding the impact of CI in debt overhang problem, the coefficients of *leverage*SOECI* in all three columns are positive and significant, suggesting that industries with active CI conducted by SOEs would make the negative link of private firms between leverage and investment less prominent. This result provides support to Hypothesis 1a. As the coefficients of *leverage*PrivateCI* are also positive, the results suggest the interest alignment between CI loan provider and private firms are stronger than that between formal banks and private firms. Overall, the findings support the argument that the embedded relation in CI activities has improved lender-borrower interest alignment and thereby mitigate debt-overhang problem.

To compare the impact of CI conducted by SOEs and that conducted by private firms, we perform a joint test on *leverage*SOECI* and *leverage*PrivateCI*. The test shows that the alleviation impact of CI conducted by SOEs is significantly higher than CI conducted by private firms. It is consistent with the notions that SOEs are more likely to provide affiliated CI loans due to their greater affiliated network covering both SOEs and private firms. The closer relationship between CI loan provider and private firms in “Active CI by SOE” industries provide greater interest alignment and alleviation on debt-overhang problem.

Table 6 reports the regression results for SOEs. Again, under all three columns, the coefficient of *leverage* is negative and statistically significant at 1 percent. It indicates that SOEs face the debt overhang problem also. Regarding the impact of CI in debt overhang problem, we found results similar with that on private firms. Both the coefficients of *leverage*SOECI* and *leverage*PrivateCI* are positive and significant. It is also interesting to note that the coefficients of *leverage*SOECI* is higher under Table 6 than under Table 5. It implies that when SOEs

companies. Firth et al. (2012) found that the instruments in the dynamic model GMM estimates are too weak and the dependent variables is not influenced by prior realization. Following the related econometrics literature (Roodman, 2006), dynamic GMM model is not superior to fixed effect model under this scenario. Whilst Firth et al. (2012) stick to the fixed effect approach, we adopt fixed effect IV approach as this method avoids weak instrument and passes also the over-identification test in our data.

provide CI loans to other SOEs, there is greatest improvement in interest alignment between borrowers and lenders. The joint test on $leverage*SOECI$ and $leverage*PrivateCI$ also shows that the debt overhang alleviation impact of CI conducted by SOEs is significantly higher than that of CI conducted by private firms. The empirical results support Hypothesis 1b in both the samples of SOEs and private firms that “the debt overhang problem is less pronounced in industries with active CI conducted by SOEs than in industries where there is active CI conducted by private firms”.

4.2.2 The role of PC in debt-overhang problem under different CI environment

To gauge the role of PC in debt-overhang problem under different CI environment, we look at the coefficients of $leverage*PC$, $leverage*SOECI*PC$ and $leverage*PrivateCI*PC$. All the coefficients of $leverage*PC$ in Table 5 are positive and significant, implying that political connection of firms’ executive would enhance interest alignment between formal banks and private firms, and thereby reduces debt overhang problem. It is in line with the expectation that formal banks and executives with personal political connection shares common goals in attaining state-guided economic agenda. For SOEs, similar results are found in Table 6 on the coefficients of $leverage*PC$. The regression results support Hypothesis 2(a) in both the samples of SOEs and private firms.

The coefficients of $leverage*SOECI*PC$ and $leverage*PrivateCI*PC$ capture whether active CI reduces the mitigating impact of PC on debt overhang problem. In both Table 5 and Table 6, all the coefficients of $leverage*SOECI*PC$ are negative and significant. The result is consistent with the hypothesis that active CI reduces the weight of interest alignment in terms of sharing political goals among politicians and state banks. It also suggests that CI loans may reduce the influence of state-guided finance, even though the firms conducting CI are SOEs. For the coefficients of $leverage*PrivateCI*PC$, it is negative in both Table 5 and Table 6 but significant only in Table 6. It implies active CI conducted by private firms does not change the impact of PC on private firms, but only on SOEs. A potential reason is that PC also serves to enlarge affiliation network of private firms (Li et al., 2008, Podolny and Page, 1998), and thereby increases the weight of affiliated CI loans over non-affiliated CI loans. The increase in interested alignment resulted from more affiliated CI loans may offset the decrease in interest alignment in sharing common political goals. For SOEs, the marginal impact of PC on affiliation enlargement is relatively smaller, making $leverage*PrivateCI*PC$ significant only in samples of SOEs but not of private firms. Overall, the results are consistent with Hypothesis 2(b) that active CI reduces the mitigating impact of PC on debt overhang problem, but the extent of reduction varies across firm ownership types.

4.2.3 Disciplining effect of debt under active CI

The interaction terms among performance indicators, leverage and active CI indicators (i.e. $PoorPerform*leverage$, $PoorPerform*leverage*SOECI$, $PoorPerform*leverage*PrivateCI$) is another group of key variables

in this analysis. Specifically, *PoorPerform*leverage* allows us to examine how the bailout and disciplining policy of formal banks affects the leverage-investment link of firms with poor performance. *PoorPerform*leverage*SOECI* and *PoorPerform*leverage*PrivateCI* indicates whether active CI conducted by SOEs and private firms changes this link.

In the sample of private firms, all the coefficients of *PoorPerform*leverage* under column (1) to column (3) in Table 5 are positive and significant at 1% level, showing that leverage has a weaker negative linkage with investment for private firms with poor performance in terms of sales growth, cash flow and Tobin's Q. For SOEs, results in Table 6 show that the coefficients of *PoorPerform*leverage* are positive and significant at 1% level when poor performance are measured in Sales Growth and cashflow, and is positive and significant at 10% level when poor performance is measured in Tobin's Q. Overall, the result is similar to Firth et al., (2008), who find that state-owned banks impose fewer restriction on investment on poorly performing listed firms in a sample period before surge of CI.⁸

Regarding the impact of active CI on the leverage-investment link of poorly performing firms, results in Table 5 show that all the coefficients of *PoorPerform*leverage*SOECI* are negative and significant at 1% level, suggesting that CI loans provided by SOEs are less lenient in their lending to poorly performing private firms. It is consistent with the idea that SOEs have less incentive to provide socialist cross-subsidization for their affiliated private firm partners, because such affiliation may be initiated by private firms for legitimacy building purpose. The smarter-money effect and profit incentive under CI would thus bring greater disciplining effect of debt in comparison to that brought by formal banks. Along this vein, one may expect that this profit incentive would also make the disciplining effect greater for CI loans provided by private firms. But as seen in Table 5, all the coefficients of *PoorPerform*leverage*PrivateCI* are insignificant. As discussed in the previous section, there is likely a lower proportion of affiliated loans for CI conducted by private firms. Poor information infrastructure and greater information asymmetry may hinder the actual disciplining ability of CI loans provided by private firms, notwithstanding the existence of disciplining incentive.

For the sample of SOEs, we did not find robust evidence that active CI changes the leverage-investment link of poorly performing firms. In Table 6, most of the coefficients of *PoorPerform*leverage*SOECI* and *PoorPerform*leverage*PrivateCI* are insignificant. One possible reason is that formal banks may serve as last resort of bailout when poorly performing SOEs are unable to further borrow from CI loans providers. Overall, the results is consistent with Hypothesis (3) that disciplining effect of active CI varies across firms ownership and

⁸ In Firth et al., (2008), evidence that banks impose fewer restrictions on investment on poorly performing firms only when poor performance is measured in terms of sales growth but not in Tobin's Q. Our study has similar findings. The bailout effect is less robust when poor performance is measured in Tobin's Q. Although the coefficient is significant at 1% level for private firms, it is significant only at 10% level for SOEs. It is consistent with our concern that the stock price of SOEs may not fully reflect its actual performance.

type of network involved in the CI. To investigate the potential impact of PC on disciplining effect of debt, we have added $PoorPerform*leverage*PC$, $PoorPerform*leverage*SOECI*PC$, $PoorPerform*leverage*PrivateCI*PC$ in the regression, but no robust impact is found.

5. Conclusion

This study investigates the link between leverage and investment of Chinese listed firms in an environment where there has been a surge in credit intermediation among non-financial entities since 2008 financial crisis. Following Shin and Zhao (2013) we first identify the extent of credit intermediation in which the firms engage by estimating the elasticity of liquid financial assets to financial liabilities. We then compare the leverage-investment link of firms in industries where there is active CI with that in the industries where there is little CI.

One may presume that in an under-developed financial system such as that in China, shadow banking is part of market-based activities that can induce greater efficiency by suppressing the influence of state ownership or political connection. Our results show that these political capitals still matter much to firms even when there is active credit intermediation among them. First, the negative association between leverage and investment is weaker in the “CI-active” industries, particularly when the CI is performed by SOE, than in the “CI-inactive” industries. Since the potential affiliation network of SOE is generally greater than that of private firms, this finding is interpreted as evidence of better lender-borrower interest alignment under credit intermediation among affiliated firms. Second, PC appears to mitigate debt overhang problem. This indicates political connection may improve lender-borrower interest alignment in the state bank dominated financing environment in China. We found this mitigating effect of PC is smaller in “CI-active” industries, which indicates PC may bring less lender-borrower interest alignment in CI loans than in bank loans. Lastly, in the sample of private firms, the disciplining effect of leverage on poorly performing firms is stronger in industries with active CI conducted by SOEs, but not by private firms. It suggests the inadequate risk assessment of private firms in this particular shadow banking activity in China. In the sample of SOEs, we found only bailout effect but not disciplining effect of debt, regardless of activeness of CI. It implies that although emergence of CI is commonly perceived as a sign of marketization, CI may not help disciplining SOEs as formal banks may still serve as a last resort of bailout. These findings enhance our understanding of this particular aspect of shadow banking in China as well as the role of network and political connection. It also provides policy insights on improving the efficiency of the financing market under the rise of shadow banking.

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Table 1: Distribution of firms in the sample

Year	Number of SOEs		Number of private firms	
	Number	Politically-connected (%)	Number	Politically-connected (%)
2009	953	23.0	755	27.8
2010	989	22.9	1069	30.7
2011	984	22.1	1305	24.4
2012	990	23.4	1426	29.5
2013	982	22.7	1479	30.0
2014	982	21.5	1593	29.1
2015	984	21.1	1779	29.3
Total	6864	22.4	9406	28.8

Notes: The sample covers listed non-financial A-share firms in China from 2009 to 2015. State-owned enterprises (SOE) are firms in which the ultimate controlling shareholder is the government (all levels) and other government entities. Private firms are those not classified as SOE.

Table 2: Elasticity of liquidity financial asset to financial liabilities

Industry	Year 2009 – 2012		Year 2013 - 2015	
	Private	SOE	Private	SOE
Energy	0.162 (0.51)	0.146 (1.52)	0.085 (0.37)	-0.099** (-2.65)
Materials	0.114 (1.31)	-0.024 (-0.50)	0.177** (2.08)	0.309*** (4.71)
Industrials	0.061 (1.54)	0.312*** (4.30)	0.073** (2.21)	0.277*** (3.36)
Consumer discretionary	0.060 (1.36)	0.080 (1.22)	0.065 (0.93)	0.045 (0.55)
Consumer staples	0.180 (1.05)	0.367*** (3.71)	0.226** (2.24)	0.116 (1.40)
Health care	0.104* (1.93)	0.145*** (3.04)	0.018 (0.52)	0.126 (0.76)
Real estates	0.358*** (3.14)	-0.038 (-0.34)	0.335** (2.34)	0.277 (1.35)
IT and telecom services	0.007 (0.16)	0.144 (1.63)	0.096*** (2.85)	0.306** (2.08)
Utilities	0.296*** (3.70)	0.348** (2.27)	0.510*** (4.60)	0.462*** (3.38)

Notes: These elasticities are estimated from the fixed effect model in Equation (1). t statistics are shown in the parentheses. ***, ** and * correspond to statistical significance at 1%, 5% and 10%, respectively.

Table 3: Summary statistics: mean and standard deviation

Industries →	CI-inactive		Active CI by SOE		Active CI by Private Firms	
	SOE	Private	SOE	Private	SOE	Private
<i>invest</i>	0.074 (0.196)	0.082 (0.169)	0.061 (0.182)	0.073 (0.151)	0.048 (0.102)	0.063 (0.145)
<i>Leverage</i>	0.256 (0.188)	0.187 (0.186)	0.281 (0.200)	0.178 (0.169)	0.300 (0.201)	0.195 (0.168)
<i>TobinQ</i>	1.948 (1.081)	2.207 (1.365)	1.934 (1.247)	2.365 (1.426)	1.852 (1.159)	2.441 (1.466)
<i>cashflow</i>	0.259 (0.875)	0.321 (1.298)	0.256 (0.988)	0.288 (1.287)	0.145 (1.714)	0.258 (1.583)
<i>SalesGrowth</i>	0.154 (0.516)	0.203 (0.633)	0.149 (0.578)	0.199 (0.519)	0.144 (0.641)	0.210 (0.648)
<i>SEO</i>	0.042 (0.500)	0.093 (0.486)	0.033 (0.209)	0.098 (1.112)	0.035 (0.229)	0.104 (1.222)
<i>Size</i>	22.272 (1.427)	21.260 (1.150)	22.488 (1.435)	21.386 (1.014)	22.672 (1.407)	21.624 (1.127)
<i>Age</i>	11.737 (5.405)	6.307 (6.222)	12.009 (5.390)	5.947 (5.789)	13.485 (5.344)	7.438 (6.254)

Notes: Contained in each cell is the mean, followed by standard deviation in parentheses. *leverage* is the ratio of total liabilities to total assets. *invest* is firm investment, measured by net capital expenditure to total asset. *TobinQ* is the ratio of the sum of market value of tradable shares, book value of non-tradable shares, and liabilities to total assets. *cashflow* is net operating cash flow over net fixed assets. *SalesGrowth* is growth of sales volume in the current year to the sales of volume of the previous year. *SEO* is cash proceeds from seasoned equity offerings scaled by total assets. *Size* is the log of total assets. And *Age* is the number of years the firm has been listed.

Table 4: Correlation Matrix

	$Invest_{i,t}$	$Leverage_{i,t-1}$	$TobinQ_{i,t-1}$	$Cashflow_{i,t-1}$	$SalesGrowth_{i,t}$	$SEO_{i,t-1}$	$Size_{i,t-1}$	$Age_{i,t}$
$Invest_{i,t}$	1							
$Leverage_{i,t-1}$	-0.022***	1						
$TobinQ_{i,t-1}$	0.048***	-0.232***	1					
$Cashflow_{i,t-1}$	0.017**	-0.138***	0.083***	1				
$SalesGrowth_{i,t}$	0.168***	-0.034***	0.092***	-0.021**	1			
$SEO_{i,t-1}$	0.012	-0.029***	-0.020**	0.016*	0.023***	1		
$Size_{i,t-1}$	-0.074***	0.345***	-0.418***	0.004	-0.058***	-0.001	1	
$Age_{i,t}$	-0.101***	0.253***	0.076***	-0.054***	-0.026***	-0.014	0.222***	1

Notes: This table reports the correlation coefficients of the key variables included in our analysis. *Leverage* is the ratio of total liabilities to total assets. *Invest* is firm investment, measured by net capital expenditure to total asset. *TobinQ* is the ratio of the sum of market value of tradable shares, book value of non-tradable shares, and liabilities to total assets. *cashflow* is net operating cash flow over net fixed assets. *SalesGrowth* is growth of sales volume in the current year to the sales of volume of the previous year. *SEO* is cash proceeds from seasoned equity offerings scaled by total assets. *Size* is the log of total assets. And *Age* is the number of years the firm has been listed. ***, ** and * correspond to statistical significance at 1%, 5% and 10%, respectively.

Table 5: Relationship between leverage and investment among private firms. Dependent variable: Investment (*invest*)

Poor Performance Indicators	(1) Sales Growth	(2) Cash Flow	(3) Tobin's Q
<i>Leverage</i>	-1.392*** (-9.84)	-1.230*** (-10.37)	-1.311*** (-10.07)
<i>Leverage*SOECI</i> (a)	0.267*** (7.82)	0.235*** (7.93)	0.252*** (7.92)
<i>Leverage*PrivateCI</i> (b)	0.152*** (4.98)	0.126*** (4.56)	0.139*** (4.84)
<i>Leverage*PC</i>	0.526*** (8.07)	0.471*** (8.24)	0.509*** (8.19)
<i>Leverage*SOECI*PC</i> (c)	-0.295*** (-6.36)	-0.267*** (-6.34)	-0.287*** (-6.40)
<i>Leverage*PrivateCI*PC</i> (d)	-0.016 (-0.42)	-0.013 (-0.39)	-0.019 (-0.52)
Joint-test (p-value): a = b	0.004	0.004	0.004
Joint-test (p-value): c = d	0.000	0.000	0.000
<i>PoorPerform*Leverage</i>	0.342*** (5.86)	0.184*** (4.01)	0.218** (2.22)
<i>PoorPerform*Leverage*SOECI</i>	-0.315*** (2.94)	-0.143** (-2.53)	-0.314** (-2.00)
<i>PoorPerform*Leverage*PrivateCI</i>	-0.141 (-1.32)	-0.004 (-0.06)	-0.022 (-0.14)
<i>PoorPerform*Leverage*PC</i>	0.157* (1.76)	-0.062 (-0.84)	0.108 (0.62)
<i>PoorPerform*Leverage*SOECI*PC</i>	0.186 (1.14)	0.060 (0.62)	0.283 (0.87)
<i>PoorPerform*Leverage*PrivateCI*PC</i>	-0.027 (-0.17)	0.161* (1.67)	-0.168 (-0.48)
Control Variables			
<i>TobinQ</i>	0.006** (2.54)	0.006*** (3.01)	0.006*** (2.95)
<i>Cashflow</i>	-0.004*** (-2.96)	-0.000 (-0.32)	-0.004*** (-3.03)
<i>SalesGrowth</i>	0.022*** (7.42)	0.018*** (6.75)	0.018*** (6.28)
<i>PC</i>	-0.014 (-1.57)	-0.010 (-1.20)	-0.011 (-1.35)
<i>SEO</i>	-0.016*** (-3.58)	-0.013*** (-3.21)	-0.015*** (-3.40)
<i>Size</i>	0.032*** (3.98)	0.021*** (3.05)	0.027*** (3.58)
<i>Age</i>	-0.018*** (-8.45)	-0.016*** (-8.42)	-0.017*** (-8.51)
R ²	0.512	0.512	0.514
<i>n</i>	6743	6473	6473
<i>Over-identification test (p-value)</i>	0.573	0.119	0.218

Notes: This table reports the estimates obtained from the fixed effect instrumental variable models. For each regression, instruments are chosen from *Maturity*, *Tangibility*, *Average Tax Rate*, *Average Industry Leverage* and *NDTS* (as defined in Section 4.2) with reference to Cragg-Donald Wald F statistics and Sargan test. *pc* is a dummy variable indicating whether the CEO and/or chairman of the firm possesses political connection in that year. The values of other variables are defined in Table 4. ***, ** and * correspond to statistical significance at 1%, 5% and 10%, respectively.

Table 6: Relationship between leverage and investment among SOEs. Dependent variable: Investment (*invest*)

Poor Performance Indicators	(1) Sales Growth	(2) Cash Flow	(3) Tobin'sQ
<i>Leverage</i>	-2.648*** (-5.58)	-2.335*** (-6.23)	-2.432*** (-6.05)
<i>Leverage*SOECI</i> (a)	0.429*** (4.69)	0.382*** (5.08)	0.403*** (4.96)
<i>Leverage*PrivateCI</i> (b)	0.170*** (3.47)	0.134*** (3.27)	0.144*** (3.35)
<i>Leverage*PC</i>	0.649*** (5.03)	0.572*** (5.49)	0.590*** (5.35)
<i>Leverage*SOECI*PC</i> (c)	-0.385*** (-4.02)	-0.337*** (-4.20)	-0.353*** (-4.14)
<i>Leverage*PrivateCI*PC</i> (d)	-0.143*** (-2.30)	-0.120** (-2.19)	-0.125** (-2.16)
Joint-test (p-value): a = b	0.001	0.000	0.000
Joint-test (p-value): c = d	0.034	0.031	0.030
<i>PoorPerform*Leverage</i>	0.584*** (4.71)	0.279*** (3.01)	0.141* (1.75)
<i>PoorPerform*Leverage*SOECI</i>	-0.068 (-0.58)	-0.039 (-0.41)	-0.317* (-1.84)
<i>PoorPerform*Leverage*PrivateCI</i>	-0.439*** (-3.56)	-0.094 (-0.98)	0.152 (0.91)
<i>PoorPerform*Leverage*PC</i>	-0.533** (-2.19)	-0.231 (-1.61)	-0.153 (-1.01)
<i>PoorPerform*Leverage*SOECI*PC</i>	0.436 (1.62)	0.132 (0.59)	0.513 (1.52)
<i>PoorPerform*Leverage*PrivateCI*PC</i>	0.188 (0.78)	0.034 (0.16)	-0.335 (-1.02)
<u>Control Variables</u>			
<i>TobinQ</i>	-0.006 (-1.26)	-0.005 (-1.39)	-0.006 (-1.36)
<i>Cashflow</i>	-0.014*** (-4.00)	-0.009*** (-2.83)	-0.013*** (-4.16)
<i>SalesGrowth</i>	0.043*** (6.61)	0.035*** (6.87)	0.036*** (6.73)
<i>PC</i>	-0.100*** (-4.51)	-0.089*** (-4.78)	-0.094*** (-4.71)
<i>SEO</i>	-0.200*** (-4.20)	-0.176*** (-4.47)	-0.181*** (-4.37)
<i>Size</i>	0.096*** (3.77)	0.074*** (3.82)	0.082*** (3.88)
<i>Age</i>	-0.029*** (-4.93)	-0.025*** (-5.38)	-0.026*** (-5.28)
R ²	0.434	0.430	0.430
<i>n</i>	6275	6275	6275
<i>Over-identification test (p-value)</i>	0.756	0.799	0.836

Notes: This table reports the estimates obtained from the fixed effect instrumental variable models. For each regression, instruments are chosen from *maturity*, *tangibility*, *average tax rate*, *average industry leverage* and *NDTS* (as defined in Section 4.2) with reference to Cragg-Donald Wald F statistics and Sargan test. *pc* is a dummy variable indicating whether the CEO and/or chairman of the firm possesses political connection in that year. The values of other variables are defined in Table 4. ***, ** and * correspond to statistical significance at 1%, 5% and 10%, respectively.