Credit Stimulus, Executive Ownership, and Firm Leverage*

Rajdeep Chakraborti†, Sandeep Dahiya‡, Lei Ge§, and Pedro Gete¶

This Draft: May 2021

Abstract

We show that executive ownership is a significant driver of the demand for credit following credit expansion policies. Our focus on credit demand is in contrast to most studies that have focused on credit supply factors such as bank-capital. Our identification exploits the large and unexpected Chinese credit expansion in 2008. This setting offers a unique advantage as in 2008 the Chinese government had almost complete control over the banking sector and it directed the banks to increase credit supply. Thus, in this setting, demand, rather than supply, largely drives the observed changes in firms' borrowing. We provide extensive robustness tests to validate our results.

Keywords: China, Credit Policies, Executive Ownership, Leverage.

JEL Classification: E44, G28, G30, G32, G34

*We appreciate the comments of Luca Anderlini, Axel Anderson, Sirio Aramonte, Jun Kyung Auh, Jennie Bai, Turan Bali, Chuqiao Bi, Mary Ann Bronson, Micheal Cichello, Behzad Diba, Dragon Yongjun Tang, Martin Evans, Douglas Gale, Garance Genicot, Limor Golan, Juan Pedro Gomez, Iftekhar Hasan, Kinda Hachem, Zhangkai Huang, Gazi Kara, David Marquez-Ibanez, Thomas Noe, Thorvardur Olafsson, Steven Ongena, Franco Peracchi, Yuliy Sannikov, Manuel Santos, Elod Takats, David Valencia, Quan Wen, Maya Waisman, Wei Xiong, Eleanor Xu, Owen Zidar and seminar participants at Georgetown, George Washington and at the 2017 Fordham-Bank of Finland conference. We thank the jury of the 2018 Eastern Finance Association conference for choosing this paper as the best paper on International Finance. Research reported in this paper was partially funded by the Spanish Ministry of Economy and Competitiveness (MCIU), State Research Agency (AEI) and European Regional Development Fund (ERDF) Grant No. PGC2018-101745-A-I00.

†IE Business School. Email: rajdeepch@student.ie.edu. Phone: (+34) 692809283. Address: Maria de Molina 12, 4th floor, 28006 Madrid, Spain.

‡Georgetown University. Email: Sandeep.Dahiya@georgetown.edu. Phone: (+1) 202-687-3808. Address: 37th and O Sts., NW. Washington DC, 20057, USA.

§Renmin University of China. Email: lei.ge@live.com. Phone: (+1) 571-2740082. Address: 59 Zhongguancun St, Haidian District, Beijing 100872, China.

¶IE Business School. Email: pedro.gete@ie.edu. Phone: (+34) 915689727. Address: Maria de Molina 12, 5th floor, 28006 Madrid, Spain.

1 Introduction

The Great Recession of 2008 triggered an extraordinarily large and rapid response by monetary authorities world-wide. A key feature of these policies was to provide banks with additional funds at a reduced cost. Agarwal et al. (2018) discuss this stimulus policy and note that "one goal was to encourage banks to expand credit to households and firms that would, in turn, increase their borrowing, spending, and investment".

Most of the literature examining the effectiveness of credit policies has focused on the "supply" side frictions that alter banks' willingness to lend. For example, Bebchuk and Goldstein (2011) develop a model in which the banks abstain from lending to firms even when the firms have good projects. Gambacorta and Shin (2018) provide a recent survey of this literature, which is usually known as the "bank lending channel". They argue that poorly capitalized banks have lower loan growth. The supply factors can also lead to an increase in unprofitable lending. Agarwal and Ben-David (2018) document that incentivizing bank loan officers to prospect for new loans results in a significant loan volume increase but the ex-post performance of these loans is worse than other loans.

Our paper takes a different approach. We study the "demand" side of credit policies, which is a relatively unexplored research area. Agarwal et al. (2018) show that consumers' propensity to borrow is key in explaining how much additional credit the economy generates. Their focus is exclusively on households' credit demand. In this paper, we focus on corporate borrowers. We provide evidence that the structure of executive compensation is an important determinant of the transmission of credit policies. In this regard, our results complement the growing literature that links compensation policies and risk-taking. Edmans and Gabaix (2016) survey this growing stream of literature.

Specifically, we examine the evolution of borrowings by Chinese public-listed firms after the announcement of a remarkably large credit stimulus by the government of China in November, 2008.

The 2008 Chinese stimulus provides an interesting natural experiment. The stimulus was exceptionally large and unanticipated (Naughton, 2009 and Deng et al. 2015).[1] Importantly, for the periods that we study (i.e. 2007-2010 as the longer sample period and 2008-2009 as the shorter sample period), the "supply" side problem of credit expansion studied in the bank lending channel literature is not a major factor in China. This is because during the pre-stimulus period, state-controlled banks originated most of the credit in the economy and these banks reacted strongly to the stimulus. As Deng et al. (2015) state bluntly: "Beijing ordered

[1] Total loan quotas, which are the lending targets that Chinese bank officials are expected to meet, were increased from RMB 4.9 trillion in 2008 to almost RMB 10 trillion in 2009 (Cong et al. 2019). At the same time, the Central Bank dramatically lowered banks' reserve requirements and expanded the money supply.

banks to lend and they lent."

The baseline approach we adopt in this study is to estimate an interaction coefficient to measure heterogeneous changes caused by an exogenous shock in the form of a large Chinese credit stimulus in 2008. We compare the pre- and post-stimulus time periods and exploit the cross-sectional differences in the executive ownership levels across firms at the time when the credit stimulus was announced. This allows us to isolate the effect of credit stimulus on leverage choices made by firms with different levels of executive ownership.

The difference between the pre- versus post-stimulus executive ownership is plausibly exogenous. The government's credit push was largely unexpected and there is no reason to believe that firms with higher managerial ownership played any role in inducing the government to launch the credit expansion. We conduct a large number of tests to ensure that.

Furthermore, there is no theoretical reason why the differences in reactions across banks to the credit stimulus could drive our results. Nevertheless, we also perform a series of tests to rule this possibility out.[2]

Our core result is that, following the 2008 credit push, firms whose executives owned a larger fraction of the firm-equity (i.e. stronger pay-for-performance incentives), increase leverage significantly more compared to firms with lower managerial ownership.[3] On average, one standard deviation increase in managerial ownership is associated with two percent higher leverage. Thus, we show that the structure of executive compensation has a significant influence on how firms react to a credit stimulus.

Over our window of analysis and given the large number of fixed effects and controls that we use in our analyses, executive ownership is expected to be unrelated to the factors driving the response to the credit stimulus. We conduct multiple tests to ensure that as well.

First, we conduct a parallel trends analysis. We find that the leverage ratios of high versus low managerial ownership firms do not follow a perfectly linear trend in the pre-stimulus period. However, a sensitivity analysis to check for the validity of parallel trends assumption reveals that we do not have sufficient evidence to reject the parallel trends assumption until a high level of nonlinearity is introduced in the model. Furthermore, in the post-stimulus period, the executives of firms with higher ownership increase their leverage ratios dramatically compared to the firms with lower executive ownership.

Second, we include industry and industry-year fixed effects in our model specification. We also use a large set of firm level controls in our models. These controls include whether the firm

[2]The literature is also unaware of any additional policies over our sample period other than the 11th five-year plan for 2006-2010. The impact of this plan was anticipated since it was announced (Purda, 2007).

[3]The fraction of total equity owned by the executives is commonly employed in studies of managerial ownership. For example, Panousi and Papanikolau (2012) use this measure with U.S. data to show that the negative effect of idiosyncratic risk on investment is stronger when risk-averse executives hold a higher fraction of a firm's equity.

is a state-owned-enterprise, return-on-assets, book-to-market ratios, firm size, concentration of the ownership structure, institutional ownership and share of fixed assets in the total assets of the firm. We estimate the parameters for the baseline model for our focal 2007-2010 sample period. Additionally, we also estimate the parameters for the baseline model for the shorter 2008-2009 period in order to capture the immediate impact of the 2008 credit shock.

We find that, after the 2008 credit shock, firms with high executive ownership levels borrow more than the firms with low levels of executive ownership for our benchmark sample period of 2007-2010 as well as for the shorter 2008-2009 sample period.

Third, we re-analyze our benchmark model using a set of nonlinear model specifications. In the first specification, we create a single dummy variable denoted as $TopQuartile_{2008}$, representing the firms in the top quartile of the executive ownership level in 2008, and include it along with its interaction term with the dummy variable representing the credit shock ($Credit\ Push_t$).

In the second specification, we drop all firms that report executive ownership level of zero. The remaining sub-sample represents almost 50% of the original sample. Within this sub-sample, we create four dummy variables representing executive ownership quartiles, where ExQuartile1 denotes the lowest 25% of executive ownership level and ExQuartile4 denotes the top 25% of executive ownership level. We re-estimate our benchmark model by including these quartile dummies and their interactions with the credit shock dummy given by $Credit\ Push_t$. Even with this model specification, our main results remain robust.

Fourth, we use a dynamic regression model to check the reaction pattern across firms over time to the credit stimulus. In this dynamic specification, we interact the executive ownership level across firms over time with respective year dummies. The results of this dynamic regression model indicate that the parallel trends assumption may not hold true. To overcome this issue, we undertake a sensitivity analysis by introducing nonlinearity in the parallel trends assumption. The relatively large value (with reference to zero that represents the absence of nonlinearity) of the nonlinearity parameter suggest that our main findings hold true even in the presence of nonlinearity in the dynamic model specification.

Fifth, to ensure that any prior bank-borrower relationship is not driving our results, we estimate a model controlling for such relationships. Even with this specification, we observe that high managerial ownership firms opt for higher leverage relative to the low executive ownership firms for both sample periods.

Sixth, we employ a propensity score matching (PSM) methodology. We designate the firms in top quartile of managerial ownership as "treated" group. We match each of these treated firms with another firm that is predicted to have a similar level of managerial ownership but in fact does not have so. This matched set of firms is classified as "control" group. Again, we

find that holding all else constant at the sample means, the top quartile firms increase their leverage significantly more.

Additionally, we conduct a host of robustness tests including: a) using time fixed effects; b) a placebo test in which we randomly designate 2011 as the year of credit shock; c) using firm fixed effects; d) testing if our results are driven by a disproportionately large impact of the credit stimulus (i.e. the credit shock) on the state owned enterprises (SOEs); e) measuring if the impact of the credit stimulus on infrastructure firms is driving our results; f) measuring credit demand using an alternate variable (log of debts); g) measuring changes in leverage based on pre-credit push compensation structure, and h) using ratio of value of equity owned by the executives to the cash salary of the top three executives as an alternate measure of managerial pay-for-performance sensitivity.

Taken together, consistent findings across all these tests across both 2007-2010 and 2008-2009 sample periods strongly suggest that the structure of managerial compensation plays a significant role to influence a firm's reaction to a credit expansion.

Our paper links two strands of prior research. First, there is a growing literature that examines the interplay between a firm's pay-for-performance sensitivity of its top executives and its financial policy. Some recent examples include Cheng et al. (2015); Gopalan et al. (2014); Milidonis and Stathopoulos (2014); Panousi and Papanikolau (2012), Gete and Gomez (2015, 2018) and Shue and Townsend (2017).

Second, there is a large literature that studies credit and monetary policies mostly focusing on the credit suppliers (see Ioannidou et al. 2015; Dell'Ariccia et al. 2017 or Gambacorta and Marques-Ibanez, 2011).

To our knowledge, we are the first to study how different corporate borrowers react to a credit stimulus and to show that executive ownership plays a significant role in the post-expansion leverage choice of firms.

In addition, we also contribute to the growing literature on the Chinese corporate sector. The previous studies have focused either on the drivers of executive compensation (Firth et al. 2006; Chen et al. 2012; and Conyon and He, 2011) or on the drivers of the capital structure (Li et al. 2009, and Firth et al. 2008) separately. Although Jiang and Kim (2020) have surveyed the horizontal agency conflict arising from concentrated ownership structure in China; to the best of our knowledge, ours is the first paper to jointly study the compensation structure and firm leverage of Chinese corporations.

Agarwal et al. (2019) and Cong et al. (2019) have also studied the effect of 2008 Chinese credit shock. While Agarwal et al. (2019) focus on examining the impact of a large cut in the benchmark home mortgage rate on the household spending; Cong et al. (2019) focus on credit supply towards state-owned firms. In contrast, we focus on the role of compensation structure

as a key factor of shaping the credit demand.

The paper proceeds as follows. Section 2 discusses the theoretical motivations that underpin our empirical tests and the main variables used in the study. Section 3 describes the 2008 Chinese credit push and credit supply in China. Section 4 presents the main empirical analysis. Section 5 discusses the propensity score matching that validates the key results. Section 6 summarizes many other robustness tests. Section 7 concludes. The Appendix describes the variables. An Online Appendix contains supplementary tables and results.

2 Theory and Main Variables

2.1 Theory

Dahiya et al. (2018) show the underlying mechanism for a positive relationship between executive incentives and firm leverage. They argue that this positive relationship is due to the fact that equity is a residual claim, while debt is a fixed claim.

Equity payments are used to encourage an executive to take actions realigning her own incentives with the incentives of the firm. A larger variable component implies that the executive compensation has a higher pay-for-performance sensitivity. After accepting the contract, the executive chooses her effort level as well as how much debt to take on. Larger debt expands the scope of the firm and can potentially lead to a larger cash flow.

Dahiya et al. (2018) argue that both leverage and compensation are endogenous. For a shareholder, the firm's leverage and the executive's effort are complements. That is, greater effort makes higher future cash flow more likely, and this allows the firm to sustain a higher level of leverage. This implies that the shareholders of firms desiring a higher level of debt will include a larger variable component in the executive compensation contract to encourage the executive to exert more effort. Thus, the optimal action of shareholders can generate a positive cross-sectional relationship between the level of leverage and the degree of pay-for-performance sensitivity (i.e. variable component) of executive compensation.

Since the government credit subsidy increases the value of the borrowing firm, its executive will borrow more if she is promised a larger share of the firm. In addition, after the credit stimulus, variable compensation increases as shareholders want to encourage their executives to borrow. Such an action on behalf of the shareholders will allow executives with equity stakes reap the benefits of increase in firm value from subsidized funding by leveraging more following a credit stimulus (Dahiya et al. 2018).

2.2 Main variables

We utilize two main sets of data: the China Stock Market & Accounting Research (CSMAR) dataset and the Wind Financial database. CSMAR is the leading database for accounting and market information about Chinese corporations. It has been used in a number of recent research studies such as Conyon and He (2011), Giannetti et al. (2015), Jiang and Kim (2015), Liao et al. (2014), and Piotroski and Zhang (2014). Wind is the other major data source for Chinese firms and has been used by Li et al. (2011) and Chen et al. (2012).

Following the capital structure literature, we exclude financial firms given their significant differences in leverage and regulation relative to the other industries.[4] We also restrict our sampling universe to those firms which were publicly-listed before 2008 and had a book value of equity greater than zero.

For the executive ownership of the firm, we create a continuous measure similar to the insider-holding variable used for U.S. based studies like Panousi and Papanikolau (2012). This measure takes the total number of shares owned by the firm's executives and divides it by the number of shares outstanding, we denote it as *ExecutiveOwnership*.

Our other main variable of interest is the firm's leverage level. Following the commonly used methodology outlined in Berger et al. (1997), we measure the level of leverage at the end of the fiscal year using two continuous variables:

$$BookLeverage = \frac{TotalDebt(BookValue)}{TotalAsset(BookValue)} \tag{1}$$

and

$$MarketLeverage = \frac{TotalDebt(BookValue)}{TotalDebt(BookValue) + Equity(MarketValue)} \tag{2}$$

We include detailed definitions of all these variables in the Appendix.

There is one specific firm characteristic that is unique to our sample which merits more discussion. Unlike most developed economies, a large fraction of publicly listed firms in China are state-owned enterprises (SOEs) that undertook the share issue privatization process. Many empirical studies focusing on China explicitly acknowledge this by including a control for SOEs (see for example Piotroski and Zhang, 2014). We follow their approach and in all our regression tests we include a dummy variable that equals one if the firm is a SOE and zero otherwise. In our robustness tests, we re-estimate our empirical models on a sub-sample that excludes the SOEs.

Table 1 summarizes the key variables in our main sample which is a four year (2007-2010)

[4] See, for example, Garvey and Hanka (1999), Malmendier et al. (2011) or Lemmon et al. (2008).

panel of publicly-listed Chinese firms. We have data on 1,547 firms. We start by reporting the leverage and compensation proxies which are at the center of our empirical analysis. The average book leverage is 0.50, implying that roughly half the book value of total assets is accounted for by debt. For comparison, Giannetti et al. (2015) also report an average leverage ratio of 0.50 for their sample of Chinese firms over the 1999-2009 sample period. Piotroski and Zhang (2014) report a similar level (0.52) for the sample period 2005-2007.

The average market leverage ratio for our sample is 0.26, which is much lower than the book leverage. While book leverage and market leverage of a firm tend to follow each other closely under normal circumstances (Ferris et al. 2018), they dramatically diverge under large fluctuations of stock prices (Welch, 2004). During our sample period, we observe such a large fluctuation in the Shanghai Stock Exchange Composite Index, which closed at 5,272 at the start of 2008. However, by end of the year in December 2008, the index had dropped to 1,821 implying a loss of nearly two-third of the market value. The following year saw an equally dramatic bounce back with the index climbing to 3,277 implying an increase in valuation of almost 77%. These large fluctuations in market valuations account for the observed large differences in book and market leverages in our focal sample period of 2007-2010.

The average executive ownership in our sample is approximately 2% which is similar to the middle quintile insider holding of 1.01% that Panousi and Papanikolau (2012) report for their sample of U.S. firms.

Panel B of Table 1 reports the descriptive statistics of the control variables that we use in our regressions. These are broadly consistent with existing studies of Chinese corporations (see Chen et al. 2012 and Liao et al. 2014). SOEs makeup roughly half of our firm-year observations.

Insert Table 1 about here

3 The 2008 Stimulus and Credit Supply in China

Given the size of the recession caused by the 2008 financial crisis, the Chinese State Council announced a massive fiscal and monetary stimulus package on November 9, 2008. The monetary stimulus was aimed primarily at enhancing bank lending by increasing the lending quotas for banks, reducing the reserve ratio and cutting the base lending rate (Deng et al. 2015; Ouyang and Peng 2015 and Cong et al. 2019). It was an unexpected and remarkably large shock to the credit supply that we illustrate in Figure 1, in which we plot the ratio of credit to GDP for several years before and after the 2008 stimulus (dashed line). As can be seen in the figure, this ratio is quite stable at around 150% up to December of 2008. However, in 2009 the ratio shot

up to almost 182% and remains in the same level in 2010. This represents an increase of over 20% in a single year from a fairly stable baseline. The solid line plots the ratio of bank loans to GDP over the same period and shows that bulk of the growth in credit was driven largely by growth in bank loans. This ratio grows from 100% in 2008 to 122% in 2009.

Insert Figure 1 about here

Given this sharp discontinuity in 2008, for all of our empirical tests, we provide results for our main four year sample period (2007-2010) along with the shorter sample period of 2008-2009. The shorter sample period captures the baseline leverage and compensation structure in 2008 just before the credit push, and 2009, which incorporates the change in these variables in the immediate aftermath of the large credit expansion. We also examined if the composition of financing sources changed significantly after the credit supply announcement. In 2008, banks account for 73% of all new loans. This ratio also remains essentially unchanged at 75.6% in 2009. Thus, at least over this two year period, there is no significant change in the structure of corporate bank loan market.

Figure 2 shows that all banks followed the mandate of the state government to try to lend more. It plots the ratio of bank loans to GDP for two types of banks in China. The solid line represents that total bank loans to GDP for all banks that are directly under state control. The dashed line plots the same ratio for 16 of the largest banks that are indirectly controlled by the government. Together, these two groups account for most of the bank lending in China. Comparing this ratio from the end of 2008 (when the credit shock occurred) to the end of 2010 shows that both groups increased their lending sharply and in a remarkably similar fashion. The stock of bank-loans-to-GDP ratio for the directly controlled banks grows by 20% and this number for the top 16 indirectly controlled banks grows by 25%. Thus, heterogeneity across banks is unlikely to be a major driver of variation in corporate borrowing.

Insert Figure 2 about here

Figure 3 plots the policy rate in China and the average borrowing cost for the firms in our sample of publicly-listed Chinese firms. The borrowing cost for an individual firm is the ratio of reported interest expenses to the total reported debt for the year. The figure shows that both the policy rate and the average borrowing costs decreased sharply after the 2008 credit push.[5]

Insert Figure 3 about here

[5]Section C of the online appendix provides a formal test of this figure.

The top graph of Figure 4 provides visual evidence that the 2008 credit stimulus led to a significant drop in borrowing costs for Chinese firms regardless of their level of leverage from 2007 to 2010. This graph illustrates the cost of borrowing for the period before and after the credit push. It is a binned scatterplot. We rank all firms according to their book leverage as reported at the end of 2008 and divide them into 20 bins of roughly 70 firms each. Thus, each bin can be viewed as an equally-weighted portfolio of firms that have similar book leverage levels. We construct a scatterplot of the average borrowing costs for each bin (y-axis) and the average book leverage (the x-axis). The solid black dots represent our calculations for 2007. The solid black line is the fitted regression for these 20 bins.

Insert Figure 4 about here

As expected, the upward sloping regression line implies that the borrowing costs are increasing in leverage. We repeat this exercise for 2010. The gray diamonds represent the relationship between leverage and borrowing cost in 2009. For each of the 20 leverage ratios, the gray diamonds (i.e. 2010) lie below the black dots (2007). The fitted dotted line for 2010 is also below the solid line (2007) and the difference is almost one percentage point in borrowing costs across the entire leverage spectrum.

The bottom graph of Figure 4 shows the same analysis but compares 2008 to 2009. Again the figure shows that the firms had consistently higher borrowing costs in 2008 compared to 2009 at every leverage level.

To sum up, the results depicted in these figures show that China's 2008 credit push was large and had a significant and wide-ranging impact on the firms' leverage ratios as it was followed by a large increase in borrowing and a sharp decrease in borrowing costs. Furthermore, there is little evidence to suggest that these changes are driven by heterogeneity across banks as the corporate loan market shows little change in composition and almost all the increase in loans appears to be due to increase in lending by banks.

4 Heterogeneous Responses to a Credit Shock

This is our baseline empirical section. We analyze heterogenous responses to the Chinese credit stimulus across firms having different levels of executive ownership. First we check that our identifying parallel trends assumption holds. Then we conduct several analyses to test the robustness of our findings for our baseline sample period (2007-2010) and also for the shorter 2008-2009 sample period.

4.1 Parallel Trends

Our empirical strategy examines the post-2008 change in leverage for firms with different levels of executive ownership. We employ an approach to capture the heterogeneous responses to a credit supply shock (i.e. Chinese credit stimulus) across our two sub-groups (high versus low executive ownership firms).

A key identifying assumption for us is that in the absence of the credit stimulus, the observed difference in changes in leverage ratios across firms would be zero. This assumption is frequently referred to as "parallel trends assumption". In our setting, the parallel trends assumption implies that leverage ratios of high as well as low executive ownership follow a similar trend in the pre-stimulus period. This identifying assumption allows us to isolate the impact of credit stimulus on leverage choices made by the Chinese firms.

Our results show that firms with high executive ownership increased their leverage significantly more compared to firms with low executive ownership in response to the credit stimulus. Figure 5 examines this issue by plotting the leverage ratios for these two groups for several years before and after the 2008 stimulus. First, we first rank all firms based on level of executive ownership as estimated at the end of 2008. We denote all firms in which the executives own less than the median level of executive ownership as "Low Ownership" firms, while all firms above the median are denoted as "High Ownership". Next, we calculate the average book leverage for both these groups annually for the period 2005 to 2012. Finally, in Figure 5 we plot the evolution of the leverage ratio for these two groups over this eight-year period. The solid black line represents the leverage ratio for the low ownership group while the dashed line represents the leverage ratio of the high ownership group.

Insert Figure 5 about here

Figure 5 shows that for the four-year period leading up to 2008, the leverage ratios for both groups appear to be following a similar trend. The leverage of low executive ownership firms is always larger than that of the high executive ownership firms. However, immediately after the 2008 credit stimulus, the leverage ratio of the high ownership group increases sharply and within two years it becomes larger than that of the low ownership group. This sharp break in the leverage ratio pattern for high executive ownership firms in 2008 motivates the empirical strategy employed in this study.

For additional robustness test of the parallel trends assumption, we undertook a dynamic regression model analysis. We provide a detailed discussion about the same in Section 4.4.

4.2 Baseline Results

We estimate how the change in a firm's leverage after the credit expansion is related to the ownership by its executives. Our empirical strategy consists of estimating panel regression models where the dependent variable (i.e. leverage ratio) is either book leverage or market leverage as defined in equations (1) and (2) respectively. The benchmark model that we estimate is:

$$\begin{aligned} Leverage\,Ratio_{it} = \beta_0 + \beta_1 ExecutiveOwnership_{it} + \beta_2 Credit\,Push_t + \\ + \beta_3 ExecutiveOwnership_{it} \times Credit\,Push_t + \\ + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{3}$$

where i indexes firms, t indexes years, and j indexes industry. $Leverage\,Ratio_{it}$ is the leverage ratio (book leverage or market leverage) of the firm i at the end of year t; $ExecutiveOwnership_{it}$ is the fraction of total shares owned by the top executives of firm i at the end of year t and $Credit\,Push_t$ is a dummy variable that equals one if the observation occurs after 2008 and zero otherwise.[6] Controls are characteristics of firm i at time t. We control for several variables commonly employed in the literature to explain leverage and compensation structure such as firm's operating performance (return-on-assets), growth opportunities (book-to-market ratio), firm's size (natural log of sales), concentration of the ownership structure, institutional ownership and asset composition (ratio of fixed assets to total assets). We also include a dummy variable that equals one for firms in which the government is the largest shareholder and zero otherwise. α_{jt} is a set of industry j and year t fixed effects. We also adjust the standard errors by clustering at the individual firm level.

The main variable of interest is the interaction term ($ExecutiveOwnership_{it} \times Credit\,Push_t$) as it allows us to estimate how the effect of the credit push translates into leverage choices across firms with varying level of executive ownership. Specifically, we are interested in the size and significance of coefficient β_3 which captures the average change in leverage from 2007 to 2010 in the long term and from 2008 to 2009 in the short term for firms with varying levels of executive ownership.

Insert Table 2 about here

[6] This definition is also used by Panousi and Papanikolaou (2012) who use executive ownership as the proxy for the pay-performance sensitivity.

Table 2 describes the results of our baseline regression. Panel A reports the estimates based on book leverage as the dependent variable for the longer sample period (2007-2010) while Panel B presents the estimation results based on the shorter sample period (2008-2009). The estimates based on market leverage as the dependent variable for both sample periods are given in Table A6 of the Online Appendix.[7]

In column 1 of Panel A we present the results of our simplest specification where we control for the firm characteristics but do not include any fixed effects. The coefficient for $ExecutiveOwnership_{it} \times Credit\,Push_t$ (β_3) is 0.160 and is significant at one percent level. This implies that higher ownership by the executives is significantly more likely to be associated with a larger increase in debt following a government-initiated credit expansion. Thus, a one standard deviation increase in executive ownership corresponds to an increase of 0.011 in the absolute level of book leverage (0.160×0.07). Since the sample average of book leverage is 0.5, this is an economically significant increase of almost two percent. This increase in book leverage is in addition to the predicted increase of 0.01 in book leverage for all firms after the credit expansion (based on the coefficient of 0.01 for $Credit\ Push_t$).

The coefficient for $ExecutiveOwnership_{it}$ (β_1) is negative and significant at the one percent level. This result is consistent with the argument that the risk-averse executives with a higher level of stock-holding will tend to choose lower levels of debt as their compensation is more exposed to the default of the firm. Huang et al. (2006) also report similar findings using data on Chinese firms from 1994 to 2003. This negative relation is also consistent with the results from other studies using U.S. data (for example, Carlson and Lazrak, 2010; Morellec et al. 2012; and Glover and Levine, 2015).

Thus, holding all else equal, higher ownership by a firm's executives is associated with lower book leverage.

While column 1 reports the results after controlling for the observable firm characteristics, there may be unobservable industry characteristics (both time-invariant and time-variant) that can bias the coefficient estimates. In columns 2 through 3, we re-estimate our benchmark regression specification by introducing an increasingly restrictive set of fixed effects.

In column 2, we include industry fixed effects to control for any time-invariant unobserved differences across different industries. In column 3 we replace the industry fixed effects by industry-time fixed effects. This specification allows us to control for time-varying industry level unobserved heterogeneity.

[7] To conserve space, we only report the results using book leverage as the dependent variable (for both the 2007-2010 and 2008-2009 sample periods). The results using market leverage as the dependent variable are reported in the Online Appendix of the paper. We also provide the results of our benchmark model for a seven year sample period (2006-2012) in Table A28 of the Online Appendix. Although weaker, the results using this longer sample period still provides support to our original findings.

These specifications provide a strong control for any omitted variables bias in our estimations. Examining the coefficients for $ExecutiveOwnership_{it} \times CreditPush_t$ shows that both size and significance remains essentially unchanged when we introduce industry or industry-year fixed effects (columns 2 and 3).

We report the results of same specification using a shorter sample period of 2008-2009 in Panel B. The shorter sample period offers two advantages. First, the assumption of leverage being a good proxy for stimulus-induced debt growth is more likely to hold in the short-term rather than in the longer period. This is due to the fact that over an extended period, a firm may issue additional equity as well as additional debt which may influence the leverage ratio. Second, both leverage and executive ownership are endogenous in the long term. These issues are less problematic for a shorter sample period and may allow a sharper identification of the effects of an exogenous shock such as the credit stimulus that we study in our paper. Panel B shows that the coefficient estimates are stronger for the shorter period and provides additional support for the findings reported in Panel A.

We repeat the analysis outlined above using market leverage instead of book leverage as the dependent variable in equation 3. The results are described in Table A6 of the Online Appendix and these results closely mirror the results reported in Table 2.[8]

The coefficients of the interaction term $ExecutiveOwnership_{it} \times CreditPush_t$ (β_3) are significantly positive for both book leverage ratio and for market leverage for our focal sample period of 2007-2010 as well as for the shorter 2008-2009 period. Thus, an increase in executive ownership (and the resulting increase in pay-for-performance sensitivity of compensation) for a risk-averse CEO will induce her to reduce leverage, while an increase in subsidized credit via a monetary stimulus will induce her to increase leverage.

Taken together, the results reported in Panel A (for 2007-2010) and Panel B (for 2008-2009) of Table 2 and of Table A6 provide strong evidence that high ownership by executives is associated with lower debt levels. However, a government-sponsored credit stimulus creates significantly more incentive for managers with larger ownership to take on greater debt.

4.3 Non-Linear Specifications

Next, we revisit our baseline results but with two non-linear model specifications. First, we create a single dummy variable denoted as $TopQuartile_{2008}$, representing firms in the top quartile

[8] The coefficient for $CreditPush_t$ is negative when using market leverage as the dependent variable, implying a decrease in market leverage from 2007 to 2010. This finding is driven largely by the remarkable recovery of the stock prices by the end of 2009 from the extremely low levels at the end of 2008 (see Section 2.2 for a detailed discussion). Since our market leverage ratio is calculated at the end of 2007 till the end of 2010, the increase in stock prices in 2009 increases the denominator in equation 2 leading to a mechanically lower level of market leverage following the credit push.

of the executive ownership level during 2008 and estimate the following specification:

$$\begin{aligned} Leverage\,Ratio_{it} = \beta_0 + \beta_1 Credit\,Push_t + \beta_2 Top\,Quartile_{\,2008} + \\ + \beta_3 Top\,Quartile_{\,2008} \times Credit\,Push_t + \\ + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{4}$$

The results for book leverage, reported in Table 3 show that the interaction term is positive and significant for both the longer sample period (Panel A) and for the shorter sample period (Panel B). Repeating this analysis using market leverage as the dependent variable period produces similar results (see Table A7 of the Online Appendix).

The results show that the firms with high levels of executive ownership (i.e. in the top quartile of executive ownership level) are likely to increase their leverage more in the post credit stimulus period relative to the other firms. This result is consistent with our findings from Section 4.2.

Insert Table 3 about here

In the second non-linear specification, we drop all firms that report executive ownership level of zero. The remaining sub-sample represents almost 50% of the original sample. Within this sub-sample, we create four dummy variables representing executive ownership quartiles, where $ExQuartile_1$ denotes the lowest 25% and $ExQuartile_4$ denotes the top 25% executive ownership level. We use $ExQuartile_4$ as the reference group and estimate:

$$\begin{aligned} Leverage\,Ratio_{it} = \beta_0 + \sum_{n=1}^{3} \beta_n (ExQuartile_n)_{2008} + \beta_4 Credit\,Push_t + \\ + \beta_5 (ExQuartile_3)_{2008} \times Credit\,Push_t + \\ + \beta_6 (ExQuartile_2)_{\,2008} \times Credit\,Push_t + \\ + \beta_7 (ExQuartile_1)_{2008} \times Credit\,Push_t + \\ + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{5}$$

The results for book leverage are reported in Table 4, Panel A for 2007-2010 and Panel B for 2008-2009. Figures A1 to A4 report the coefficients for both book and market leverage. The results basically show a monotonic relationship that supports the benchmark results.[9]

[9] Using market leverage as the dependent variable also provides similar results (see Table A8 of the Online Appendix).

Insert Table 4 about here

4.4 Dynamic Regression

We also estimate a dynamic regression model by replacing the interaction term $Executive\,Ownership_{it} \times Credit\,Push_t$ with the set of interaction terms i.e. $Executive\,Ownership_{im} \times Year_m$ for the period 2006-2012 with 2008 as the omitted year. Specifically we estimate the following model:

$$\begin{aligned} Leverage\,Ratio_{it} = \beta_0 + \beta_1 Executive\,Ownership_{it} + \sum_{m=2006}^{2012} \beta_m Year_m + \\ + \sum_{m=2006}^{2012} \beta_{interact,m} Executive\,Ownership_{im} \times Year_m + \\ + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{6}$$

The coefficients for individual interaction terms will allow us to see for how long the impact of 2008 credit push lasts. We report the results in Table 5 (for book leverage) and in Table A9 of the Online Appendix (for market leverage) and find that the interaction coefficient is positive and significant for 2009 and 2010 at one percent level for both book leverage and for market leverage. Thus, compared to 2008 (our omitted year), a larger executive ownership leads to greater leverage levels in the post credit push period for up to two years. However, this effect becomes statistically insignificant after 2010.

Insert Table 5 about here

In some of the specifications reported in Table 5, the coefficient of the interaction term $Executive\,Ownership_{i,2007} \times Year_{2007}$ is significant. This suggests that parallel trends assumption of a traditional Difference in Difference (DiD) setting may not hold. While our empirical approach is not a classic DiD, we address this issue by following the sensitivity analysis approach suggested by Rambhachan and Roth (2019). We describe the results of this sensitivity analysis in Section 6.8. Broadly, the sensitivity analysis suggests that our results are robust to the presence of nonlinearity in the pre-stimulus period.

4.5 Demand Side Interpretation of the Results

To confirm that our results capture the effects of structure of executive ownership on credit demand, we did two other tests. First, we showed that there are no meaningful differences in types of loans taken by low and high executive ownership firms. We use four loan characteristics that are reported for all loans in the CSMAR-BLCLC dataset, namely: the frequency

of borrowing, the size of the loan, the collateral status, and the lender identity to make this comparison. We find that the loan characteristics are largely similar for high and low executive ownership firms. Section B of the Online Appendix contains the details of the same.

Second, to rule out any bank specific supply bias, we looked at bank-borrower relationship as discussed below.

We estimate the following modified version of our baseline specification:

$$\begin{aligned} Leverage\,Ratio_{it} = \beta_0 + \beta_1 ExecutiveOwnership_{it} + \beta_2 Credit\,Push_t + \\ + \beta_3 ExecutiveOwnership_{\,it} \times Credit\,Push_t + \\ + \sum_b \beta_b Bank_{ib} + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{7}$$

The key modification is the inclusion of a number of dummy variables for the past bank-borrower relationship. Specifically we employ a separate CSMAR dataset called the CSMAR–Bank Loans of Chinese Listed Companies (CSMAR-BLCLC) dataset, which includes the details of the new bank-firm loan data.

Each observation in this data is a unique bank-firm loan transaction. We merge the data on all new loans originated during the 2006-2008 period with our original sample. We only retain a firm from our original sample if we can identify it in the CSMAR-BLCLC dataset. This reduces our sample of observations from almost 6,000 to 2,473 for the long sample period and from almost 3,000 to 1,256 for the shorter sample period. However, these reduced samples allow us to control for pre-existing banking relationships. Specifically, this allows us to create a dummy variable $Bank_{ib}$ which equals one if firm i had borrowed at least once from bank b in the pre-credit push period (2006-2008) and zero otherwise. Cong et al. (2019) state that 95% of new loans to Chinese firms are originated by banks with which the borrower has a pre-existing credit relationship. Thus, by including a dummy variable that captures existing lending relationships, we are able to control for any bank-specific heterogeneity.

To keep the number of indicator variables tractable we focus on the 20 largest commercial banks and the three policy banks in China.[10] All the other remaining banks are grouped in a single category. We estimate the specification outlined in equation 7 and report the results in Table 6 (for book leverage) and in Table A10 of the Online Appendix (for market leverage). The coefficients for the interaction term $ExecutiveOwnership_{it} \times CreditPush_t$ for book leverage are positive and significant at five percent (for the 2007-2010 sample period) and at one percent

[10]The three policy banks are Agricultural Development Bank of China (ADBC), China Development Bank (CDB) and the Export-Import Bank of China (Chexim).

level (for the 2008-2009 sample period). However, when using market leverage, the coefficient of the interaction term becomes insignificant for the 2007-2010 period while remaining significant at 1% level for the 2008-2009 period. Therefore, the estimated coefficients, after controlling for prior banking relationship, have quite similar tendencies to those estimated for the baseline specification reported in Table 2.

Insert Table 6 about here

Additionally, to explore if the characterization of bank-firm relationship has changed over time, we compare the bank-firm relationships between the pre-credit push period (2006 to 2008) and the post-credit push period (2009 to 2011). We compare the relationship between two sets of firms: a) zero and non-zero executive ownership firms and b) top-quartile executive ownership firms and others. In both cases, the bank-firm relationships remain stable. We provide a detailed discussion on this in Section D of the Online Appendix.

5 Propensity Score Matching

Our results so far have examined a firm's willingness to borrow based on different levels of managerial ownership. In this section we use an alternative approach that addresses concerns that firms with high managerial ownership may differ systematically from firms with low managerial ownership. We compare the leverage choices made by high managerial ownership firms (the treatment group) to the borrowing decisions of a propensity-score-matched sample of low managerial ownership firms (the control group).

The key idea underlying the propensity score matching (PSM) methodology is to create a control group of firms who are similar to the treated firms when compared on several pre-treatment observable characteristics. For our setting, the treated firms are those with high levels of executive ownership. Ideally we would like to compare the response to credit stimulus of this group to the response of an ex-ante similar control group that did not have high managerial ownership level. For the creation of this control group, we employ the nearest neighbor matching of propensity scores, developed by Rosenbaum and Rubin (1983). A number of recent papers, like Michaely and Roberts (2011), Dahiya et al. (2017) and D'Acunto and Rossi (2017), have used this PSM methodology.

We start the matching process by creating the treatment group based on executive ownership at the end of 2008. All firms with ownership levels in the top quartile in 2008 are assigned to the high ownership (treated) group. Specifically, we create a dummy variable $Top\,Quartile$

which equals one if the firm ranks in the top 25% firms based on the executive ownership in 2008 and zero otherwise.

In the second step, we estimate a probit regression model using the $TopQuartile$ as the dependent variable and a large set of observable firm characteristics which include all firm-level control variables from the benchmark regression model (equation 3) and additional controls: CEO turnover, whether the CEO and the Chairman of the board is the same person, whether the firm has a compensation committee, the size of the board and the proportion of independent directors in the board. The choice of these additional control variables for the executive ownership is motivated by their use in prior studies of the determinant of incentive pay for the managers (Bettis et al. 2010; Dittmann et al. 2010; Kato et al. 2005; and Bertrand and Mullainathan, 2001).

The probit model is estimated over the entire cross-section of firms in our sample. This estimation allows us to calculate the predicted probability of being a top quartile executive ownership firm in 2008. We hope to find a matching firm for each top-quartile executive ownership firm based on predicted probability (propensity score). This matched firm will be statistically indistinguishable from the treatment firm based on observable characteristics but will not have a high executive ownership. We employ a one-to-one matching process as outlined by D'Acunto and Rossi (2017).

In the next step, we use the predicted probabilities (i.e. propensity scores) to match each of the high managerial ownership firms to the nearest neighbor from the control group. We employ a one-to-one match without replacement procedure. After the matching process, each firm in the treatment group (top 25% executive ownership) is paired with a firm from the control group that has the closest propensity score. To ensure that our matching procedure creates similar firms in each pair, we follow the process outlined by D'Acunto and Rossi (2017).

We calculate the difference in the propensity score for each matched pair. If the propensity score difference between the matched firms is larger than one quarter of the standard deviation of the executive ownership in our sample, we exclude that pair from our analysis. We also exclude all matched pairs that are not in the common support (whose propensity score is higher than the maximum or less than the minimum propensity score of the controls of our sample).

After applying these exclusions we are left with a final sample of 303 treated and 303 control firms for our PSM tests. The t-test for difference in observable firm characteristics is insignificant for all sixteen attributes (Table A11 of the Online Appendix). These results provide strong evidence that our matching process yields firm pairs that are statistically indistinguishable across the two groups.

We use the propensity score matched sample to estimate the following regression:

$$Leverage\,Ratio_{it} = \beta_0 + \beta_1 Top\,Quartile_{\,2008} + \beta_2 Credit\,Push_t + \\ + \beta_3 Top\,Quartile_{\,2008} \times Credit\,Push_t + \\ + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \quad (8)$$

The model described above is similar to equation 4 with one modification. We use the propensity score matched sample instead of the total sample. Again the main coefficient of interest is β_3 which is roughly the average change in leverage from pre-credit push year (2008) to the post credit push year(s) (2009 for the short sample and 2009-2010 for the long sample) for the treatment group (top quartile ownership) minus the same change in leverage for the control group.

The results from estimating equation 8 are presented in Table 7 for book leverage and in Table A12 of the Online Appendix for market leverage. Panel A of Table 7 provides the results from the longer sample period. The first column is the baseline specification that includes the firm characteristics as control variables but does not include fixed effects. The coefficient β_3 for the interaction term is 0.021 and is significant at the five percent level. It implies that if the firm is in the top quartile of executive ownership in 2008, on average, it increases book leverage by 0.021 more compared to a similar firm (based on observable characteristics) that was not in the top quartile of managerial ownership. It is equivalent to the around 4.2% (0.021 divided by the sample mean book leverage of 0.50) increase in book leverage for firms with top-quartile executive ownership. In columns 2 and 3 of Panel A, we add the industry fixed effect and industry-by-year fixed effects respectively. Both the size and the significance of the coefficient β_3 remains essentially unchanged. This result is quite similar to the result for the shorter sample period (see Panel B of Table 8). For the shorter sample period of 2008-2009, a top quartile executive ownership firm increased its book leverage by 4.6% (0.023 divided by the sample mean book leverage of 0.50) on average compared to a similar firm (based on observable characteristics) that was not in the top quartile of managerial ownership.

Insert Table 7 about here

In Panel A of Table A12 of the Online Appendix, we present the results using the market leverage as the dependent variable in equation 8 for the longer sample period. Column 1 (firm controls included but no fixed effects) shows that the coefficient β_3 of the interaction term $Top\,Quartile_{\,2008} \times Credit\,Push_t$ is 0.017 and significant at one percent level. This is equivalent to around 6.5% (0.017 divided by the sample mean market leverage of 0.26) increase

in market leverage after the credit stimulus for top quartile managerial ownership firms. This result is robust to adding the industry fixed effect (column 2) and the industry-by-year fixed effect (column 3). Furthermore, this result is quite similar to that of the shorter sample period (see Panel B of Table A12) where the market leverage after the credit stimulus for top quartile managerial ownership firms grew by 6.2% (0.019 divided by the sample mean market leverage of 0.30) relative to the firms that were not in the top quartile of managerial ownership.

We provide additional discussion about the Propensity Score Matching approach in Section E of the Online Appendix.

6 Robustness Tests

In this section we discuss a number of robustness tests to validate our findings.

6.1 Time Fixed Effects

We also estimate our baseline specification using our focal sample period (2007-2010) by including the full set of time fixed effects with 2008 being the omitted year. The new specification is:

$$\begin{aligned} Leverage\,Ratio_{it} = \beta_0 + \beta_1 Executive\,Ownership_{it} + \sum_{m=2007}^{2010} \beta_m Year_m + \\ + \beta_3 Executive\,Ownership_{it} \times Credit\,Push_t + \\ + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{9}$$

We report the estimation results of the above specification in Table A13. The main variable of interest is β_3, the coefficient for the interaction term $Executive\,Ownership_{it} \times Credit\,Push_t$. In Table A13, we use book leverage as the dependent variable and coefficient for the interaction term is 0.152 in the least restrictive specification (column 1) and 0.139 in the specification with industry (column 2) and industry-year fixed effects (column 3). The coefficient is significant at one percent level in all three specifications. Table A14 reports the results for market leverage and again we find that the coefficients for the interaction term are positive and significant across all specifications.

6.2 Placebo Test

A possible concern about our findings is the validity of our natural experiment capturing the impact of the 2008 Chinese credit stimulus on credit supply. Figure 5 shows a clear discontinuity in firms' leverages (especially for the firms with high executive ownership) around 2008, when the credit stimulus was introduced. To establish a stronger claim of the causal effect of the credit stimulus on firms' leverage, we design a falsification test in which we designate 2012 (for the shorter sample period) and 2012-2014 (for the longer sample period) as placebo "post-credit push" year(s) by assigning a fake credit push at the end of 2011. We rerun all our tests on the 2011-2014 panel data to simulate a four year sample period (to replicate the longer 2007-2010 sample period) around the fake credit stimulus. We also replicate the falsification test on the 2011 and 2012 panel data to simulate a two year sample period (to replicate the shorter 2008-2009 sample period) around the fake credit stimulus. The results of this placebo test for book leverage and for market leverage are presented in Table A15 and in Table A16 of the Online Appendix.

Since there was no policy shift in the placebo period, we expected to see the placebo credit push period of 2012 (*Post2012*) to have no explanatory power. This is indeed what we find. For both book leverage and market leverage, the coefficient for $ExecutiveOwnership_{it} \times Post2012$ remains statistically insignificant for both sample periods.[11]

6.3 Firm-Fixed Effects

Our benchmark model specification in Table 2 had industry and industry-year fixed effects. However, there may be unobservable firm characteristics (e.g. corporate culture) which may introduce omitted variable bias in our estimated coefficients. Thus, we add firm fixed effects into our benchmark regression model (equation 3). By adding firm fixed effects, we control for all time-invariant firm-specific characteristics, yielding coefficient estimates that are less likely to be contaminated by omitted variable bias.

Table A17 of the Online Appendix reports the results of our panel regression for book leverage that include firm fixed effects. As in the previous table, Panel A describes our estimation results for the 2007-2010 sample period. Column 1 reports the estimation results in which we only include firm-fixed effects (no other firm level controls). This specification assumes that any change in leverage from 2007 to 2010 for a specific firm is entirely due to managerial ownership, the credit push and the interaction of these two factors. The coefficient $ExecutiveOwnership_{it} \times CreditPush_t$ (i.e. β_3) is insignificant for the longer sample period of

[11] The coefficient of the $ExecutiveOwnership_{it}$, however, is still negative for the placebo test. This is consistent with the theoretical predictions of negative relation between executive ownership and leverage during normal times.

2007-2010 (see Panel A). However, the coefficient (β_3) becomes positive and significant at 5% level for book leverage for the shorter sample period (see Panel B). Thus, even for the same firm, an increase in executive-ownership implies a significantly larger increase in leverage following the credit push in the immediate short term but the credit shock loses its effectiveness over time.

In column 2 we include firm controls that we used for estimation of equation 3 in addition to firm fixed effects. Column 3 reports estimation of a model which also includes industry-year fixed effects. Both the size and the significance of the coefficient for $ExecutiveOwnership_{it} \times CreditPush_t$ (β_3) for both sample periods remains largely unchanged to that of column 1.

The results reported in Table A18 of the Online Appendix employ market leverage as the dependent variable. The results are even stronger than the results for book leverage (see Table A17). Although the results in column 1 follows the similar trend as the results given in Table A17, these results change for the longer sample period in columns 2 and 3. In fact, the coefficient for $ExecutiveOwnership_{it} \times CreditPush_t$ (β_3) becomes significant at one percent level for the longer sample period when firm controls (in column 2) and industry-year fixed effects (in column 3) are added (see Panel A). The estimated values of the β_3 are increasing from 2% to almost 11% from column 1 to column 3 for the longer sample period. For the results using the shorter sample period, the estimated values of the β_3 remain consistently above 0.20 in all specifications (columns 1 to 3) (see Panel B).

6.4 Excluding State Owned Enterprises

Almost half of our sample consists of State Owned Enterprises (SOE). Deng et al. (2015) argue that a significant fraction of the credit push was aimed at pushing state owned banks to lend to state owned enterprises. We control for this issue by following the approach of Piotroski and Zhang (2014). We include an indicator variable for SOEs in all the estimations discussed in Section 4. We classify a firm to be a SOE if the government is the largest shareholder. To classify as SOEs, we follow the approach taken by Chen et al. (2012) and Liao et al. (2014). We checked that alternative definitions do not alter the results.

To ensure that our results are not sensitive to the inclusion of SOEs, we re-estimate our benchmark panel regression for sub-samples in which we exclude all SOEs. The results are described in Table A19 and Table A20 of the Online Appendix.

The coefficient for $ExecutiveOwnership_{it} \times CreditPush_t$ continues to be positive and significant for both measures of leverage across both sample periods. The other variables of interest continue to have coefficients that are of same sign and significance as reported in our main results (see Table 2). Thus, our main result that heterogeneity in managerial compensation structure is systematically related to changes in firm's leverage, continues to hold for the

sample that excludes the SOEs.

6.5 Role of Infrastructure Firms

The Chinese stimulus package was especially targeted to increase investment in infrastructure (Naughton, 2009). We conduct a robustness test to see if our main findings are being driven by borrowing of the infrastructure related firms. We use the granular industry sector classification of CSMAR database to identify industrial sectors that are likely to be infrastructure focused. Specifically, we classify all firms in the following sectors as infrastructure firms: a) air transport, b) civil engineering, c) construction, d) electricity production and distribution, e) road transport, f) water transport, and g) telecommmunications, radio and transmission services.

We identify 159 firms in our sample that operate in an infrastructure related sector. We exclude these firms from our sample and re-estimate our base line specification for both book leverage (Table A21 of the Online Appendix) as well as for market leverage (see Table A22 of the Online Appendix). The interaction coefficient remains positive and significant for both book leverage and for market leverage across the two sample periods.

Taken together, our findings suggest that even after excluding firms that are likely to experience a higher impact of the credit shock from our sample, our main findings do not change.

6.6 Debt Instead of Leverage Ratio

It is possible that the observed change in leverage measures (book leverage and market leverage) occurred due to a change in the denominator of leverage (level of assets). To ensure that our results are not influenced by such changes in level of assets of a firm, we substituted the leverage ratios by log of total debt as a measure of credit demand in our model specifications. We implement this approach and estimate the following specification:

$$\begin{aligned} Ln(Debt)_{it} = \beta_0 &+ \beta_1 Executive\,Ownership_{\,it} + \beta_2 Credit\,Push_t + \\ &+ \beta_3 Executive\,Ownership_{\,it} \times Credit\,Push_t + \\ &+ \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{10}$$

The coefficient for the interaction term in column 1 of Panel A of Table A23 of the Online Appendix is 0.703. As the model estimated is a log-linear specification (equation 10), the coefficients are best interpreted as the impact of one standard deviation increase in executive ownership on increase in debt following the credit stimulus. The standard deviation of executive

ownership in our sample is 0.07 (Table 1). Thus, a one standard deviation increase in executive ownership, holding all else constant, implies an increase of approximately 5% in total debt.[12]

The results for the shorter sample period (2008-2009) are quite similar with the interaction coefficient of 1.017 (as reported in Panel B, Table A23 of the Online Appendix). This implies an increase of almost 7% increase in total debt for one standard deviation increase in executive ownership. Thus, our results show that higher executive ownership is associated with significantly greater increase in total debt in the post-credit push period.

6.7 Pre-Credit Push Compensation

A possible concern is that the firms can react rapidly by adjusting the compensation of their executives in response to the credit stimulus. This concern is unlikely to be a critical one because it pushes our tests towards not finding any significant effects. Nevertheless, we re-estimate our baseline specification in which we fix the compensation structure proxies at their 2008 values. Since these contracts were in place before the announcement of the stimulus package, it is reasonable to argue that they were unaffected by the policy shift announced in November of 2008. The results reported in Table A24 and Table A25 of the Online Appendix show that our original findings remain robust to this alternative specification.

These findings provide additional support to our argument that the effect of the credit shock is more profound for the firms in the top-quartile of executive ownership level.

6.8 Sensitivity Analysis of Dynamic Regression Model Parameters

We implemented the Rambachan and Roth (2019) approach to study the robustness to non-parallel trends of the key estimate of our analysis, that is, the interaction term between executive ownership level and the 2009 year dummy in the regression on firm leverage. We computed optimal fixed length confidence intervals (FLCI-s) of the coefficient in question (that is, the interaction term for 2009 in the dynamic regression model) across a range of nonlinearity parameters (denoted by M). The larger is the value of the nonlinearity parameter (M), the more the estimation allows for failure of the parallel trends assumption.

We focused on book leverage as the dependent variable. Figure A5 of the Online Appendix has the results. The vertical blue line in Figure A5 is the confidence interval for the interaction term for $M = 0$, that is, the case when the parallel trends assumption perfectly holds.[13] The confidence interval for the interaction term on book leverage is positive and significant. Figure

[12] Obtained by substituting the estimated coefficient value and the value for standard deviation, $exp(0.703 * 0.07) - 1$.

[13] Both FLCI and CI are using 95% confidence level.

A5 of the Online Appendix shows that as we gradually increase the extent of nonlinearity, that is, as M grows, the estimated interaction term remains significantly positive. In other words, the key estimated coefficient of interest of the paper is positive even as we relax the parallel trends assumption (i.e. when, $M > 0$). Thus, the methodology of Rambachan and Roth (2019) provides strong support for our core results as these results are robust to the failures of the parallel trends assumption.

Our empirical approach is not a classical difference-in-difference (DiD). Instead, our empirical tests examine how Chinese firms reacted to a large credit stimulus shock. We find that firms with high executive ownership increase their leverage significantly more compared to firms with low executive ownership in the post-stimulus period. However, unlike a conventional DiD approach, we do not make strong claims of causality. Therefore, the interpretation of our results is less sensitive to failures of the parallel trends assumption that is central to a traditional DiD approach.

6.9 Alternate Pay-Performance Sensitivity Measure

We use equity-to-salary ratio as a substitute for executive ownership level to measure the executive pay-performance sensitivity and ran our benchmark model. We provide a detailed discussion about the same in Section F of the Online Appendix.

7 Conclusions

How the private sector reacts to a government-initiated credit stimulus is an important topic for economists as well as for the policy makers. After all, the ultimate goal for expansionary credit policies is to induce greater borrowing by households and corporations. However, when faced with an increased credit supply, not all firms will respond in a similar manner. This paper focuses on one important source of heterogeneous response to positive credit shocks across firms, namely: the compensation structure of the top executives.

We study the 2008 Chinese government's exceptionally large and unanticipated credit expansion. The Chinese setting offers a unique advantage as the Chinese government has almost complete control over the banking sector. This implies that banks had little discretion in not increasing the credit supply. Thus, demand, rather than supply, largely drives the observed changes in firms' borrowing in this study.

When a large, government-subsidized credit expansion is in place, the executives with higher ownership (i.e. higher pay-for-performance sensitivity) will take on more debt. We provided many tests to validate our results.

Nevertheless, this paper can motivate future research on how credit policies may produce different responses across countries, as well as across different industries within a country. For example, it is possible that the credit policies in Japan, and to a certain extent in Europe, may not lead to significantly more borrowing by the corporate sector because executives did not have enough ownership. In this regard, Gorry et al. (2017) show that the structure of executive compensation is sensitive to taxation. Our results indicate that tax incentives to encourage greater managerial equity ownership can create conditions in which firms will be more willing to increase leverage in response to a credit stimulus.

References

Agarwal, S. & Ben-David, I. (2018), 'Loan prospecting and the loss of soft information', *Journal of Financial Economics* **129**(3), 608–628.

Agarwal, S., Chomsisengphet, S., Mahoney, N. & Stroebel, J. (2018), 'Do banks pass through credit expansions to consumers who want to borrow?', *The Quarterly Journal of Economics* **133**(1), 129–190.

Agarwal, S., Deng, Y., Gu, Q., He, J., Qian, W. & Ren, Y. (2019), 'Mortgage debt, hand-to-mouth households, and monetary policy transmission', *Hand-to-Mouth Households, and Monetary Policy Transmission (January 29, 2019)* .

Bebchuk, L. A. & Goldstein, I. (2011), 'Self-fulfilling credit market freezes', *The Review of Financial Studies* **24**(11), 3519–3555.

Berger, P. G., Ofek, E. & Yermack, D. L. (1997), 'Managerial entrenchment and capital structure decisions', *The Journal of Finance* **52**(4), 1411–1438.

Bertrand, M. & Mullainathan, S. (2001), 'Are CEOs rewarded for luck? The ones without principals are', *The Quarterly Journal of Economics* **116**(3), 901–932.

Bettis, C., Bizjak, J., Coles, J. & Kalpathy, S. (2010), 'Stock and option grants with performance-based vesting provisions', *The Review of Financial Studies* **23**(10), 3849–3888.

Carlson, M. & Lazrak, A. (2010), 'Leverage choice and credit spreads when managers risk shift', *The Journal of Finance* **65**(6), 2323–2362.

Chen, Q., Chen, X., Schipper, K., Xu, Y. & Xue, J. (2012), 'The sensitivity of corporate cash holdings to corporate governance', *Review of Financial Studies* **25**(12), 3610–3644.

Cheng, I.-H., Hong, H. & Scheinkman, J. A. (2015), 'Yesterday's heroes: Compensation and risk at financial firms', *The Journal of Finance* **70**(2), 839–879.

Cong, L. W., Gao, H., Ponticelli, J. & Yang, X. (2019), 'Credit allocation under economic stimulus: Evidence from China', *The Review of Financial Studies* **32**(9), 3412–3460.

Conyon, M. J. & He, L. (2011), 'Executive compensation and corporate governance in China', *Journal of Corporate Finance* **17**(4), 1158–1175.

Conyon, M. J. & He, L. (2016), 'Executive compensation and corporate fraud in China', *Journal of Business Ethics* **134**(4), 669–691.

D'Acunto, F. & Rossi, A. (2017), 'Regressive mortgage credit redistribution in the post-crisis era'.

Dahiya, S., Ge, L. & Gete, P. (2018), 'A model of managerial compensation, firm leverage and credit stimulus'.

Dahiya, S., Iannotta, G. & Navone, M. (2017), 'Firm opacity lies in the eye of the beholder', *Financial Management* **46**(3), 553–592.

Dell'Ariccia, G., Laeven, L. & Suarez, G. A. (2017), 'Bank leverage and monetary policy's risk-taking channel: Evidence from the United States', *The Journal of Finance* **72**(2), 613–654.

Deng, Y., Morck, R., Wu, J. & Yeung, B. (2015), 'China's pseudo-monetary policy', *Review of Finance* **19**(1), 55–93.

Dittmann, I., Maug, E. & Spalt, O. (2010), 'Sticks or carrots? Optimal CEO compensation when managers are loss averse', *The Journal of Finance* **65**(6), 2015–2050.

Edmans, A. & Gabaix, X. (2016), 'Executive compensation: A modern primer', *Journal of Economic Literature* **54**(4), 1232–87.

Ferris, S. P., Hanousek, J., Shamshur, A. & Tresl, J. (2018), 'Asymmetries in the firm's use of debt to changing market values', *Journal of Corporate Finance* **48**, 542–555.

Firth, M., Fung, P. M. & Rui, O. M. (2006), 'Corporate performance and CEO compensation in China', *Journal of Corporate Finance* **12**(4), 693–714.

Firth, M., Lin, C. & Wong, S. M. (2008), 'Leverage and investment under a state-owned bank lending environment: Evidence from China', *Journal of Corporate Finance* **14**(5), 642–653.

Gambacorta, L. & Marques-Ibanez, D. (2011), 'The bank lending channel: Lessons from the crisis', *Economic Policy* **26**(66), 135–182.

Garvey, G. T. & Hanka, G. (1999), 'Capital structure and corporate control: The effect of antitakeover statutes on firm leverage', *The Journal of Finance* **54**(2), 519–546.

Gete, P. & Gómez, J.-P. (2015), 'Compensation contracts and fire sales', *Journal of Financial Stability* **18**, 154–171.

Gete, P. & Gómez, J.-P. (2018), 'Dealing with overleverage: Restricting leverage vs. restricting variable compensation', *Quarterly Journal of Finance* **8**(01), 1850001.

Giannetti, M., Liao, G. & Yu, X. (2015), 'The brain gain of corporate boards: Evidence from China', *The Journal of Finance* **70**(4), 1629–1682.

Glover, B. & Levine, O. (2015), 'Uncertainty, investment, and managerial incentives', *Journal of Monetary Economics* **69**, 121–137.

Gopalan, R., Milbourn, T., Song, F. & Thakor, A. V. (2014), 'Duration of executive compensation', *The Journal of Finance* **69**(6), 2777–2817.

Gorry, A., Hassett, K. A., Hubbard, R. G. & Mathur, A. (2017), 'The response of deferred executive compensation to changes in tax rates', *Journal of Public Economics* **151**, 28–40.

Huang, G. et al. (2006), 'The determinants of capital structure: Evidence from China', *China Economic Review* **17**(1), 14–36.

Ioannidou, V., Ongena, S. & Peydró, J.-L. (2015), 'Monetary policy, risk-taking, and pricing: Evidence from a quasi-natural experiment', *Review of Finance* **19**(1), 95–144.

Jiang, F. & Kim, K. A. (2015), 'Corporate governance in China: A modern perspective'.

Kato, H. K., Lemmon, M., Luo, M. & Schallheim, J. (2005), 'An empirical examination of the costs and benefits of executive stock options: Evidence from Japan', *Journal of Financial Economics* **78**(2), 435–461.

Lemmon, M. L., Roberts, M. R. & Zender, J. F. (2008), 'Back to the beginning: Persistence and the cross-section of corporate capital structure', *The Journal of Finance* **63**(4), 1575–1608.

Li, K., Yue, H. & Zhao, L. (2009), 'Ownership, institutions, and capital structure: Evidence from China', *Journal of Comparative Economics* **37**(3), 471–490.

Liao, L., Liu, B. & Wang, H. (2014), 'China's secondary privatization: Perspectives from the split-share structure reform', *Journal of Financial Economics* **113**(3), 500–518.

Malmendier, U., Tate, G. & Yan, J. (2011), 'Overconfidence and early-life experiences: The effect of managerial traits on corporate financial policies', *The Journal of Finance* **66**(5), 1687–1733.

Michaely, R. & Roberts, M. R. (2012), 'Corporate dividend policies: Lessons from private firms', *The Review of Financial Studies* **25**(3), 711–746.

Milidonis, A. & Stathopoulos, K. (2014), 'Managerial incentives, risk aversion, and debt', *Journal of Financial and Quantitative Analysis* pp. 453–481.

Morellec, E., Nikolov, B. & Schürhoff, N. (2012), 'Corporate governance and capital structure dynamics', *The Journal of Finance* **67**(3), 803–848.

Naughton, B. (2009), 'Understanding the Chinese stimulus package', *China Leadership Monitor* **28**(2), 1–12.

Ouyang, M. & Peng, Y. (2015), 'The treatment-effect estimation: A case study of the 2008 economic stimulus package of China', *Journal of Econometrics* **188**(2), 545–557.

Panousi, V. & Papanikolaou, D. (2012), 'Investment, idiosyncratic risk, and ownership', *The Journal of Finance* **67**(3), 1113–1148.

Piotroski, J. D. & Zhang, T. (2014), 'Politicians and the IPO decision: The impact of impending political promotions on IPO activity in China', *Journal of Financial Economics* **111**(1), 111–136.

Pittman, J. A. & Fortin, S. (2004), 'Auditor choice and the cost of debt capital for newly public firms', *Journal of Accounting and Economics* **37**(1), 113–136.

Purda, L. D. (2007), 'Stock market reaction to anticipated versus surprise rating changes', *Journal of Financial Research* **30**(2), 301–320.

Rambachan, A. & Roth, J. (2019), 'An honest approach to parallel trends'.

Rosenbaum, P. R. & Rubin, D. B. (1983), 'The central role of the propensity score in observational studies for causal effects', *Biometrika* **70**(1), 41–55.

Shue, K. & Townsend, R. R. (2017), 'How do quasi-random option grants affect CEO risk-taking?', *The Journal of Finance* **72**(6), 2551–2588.

Welch, I. (2004), 'Capital structure and stock returns', *Journal of Political Economy* **112**(1), 106–131.

Appendix: Variable Definitions

Here we describe the main variables that we use in the paper. We utilize two main datasets: the China Stock Market & Accounting Research (CSMAR) dataset, and the Wind Financial database. All continuous variables are winsorized at the 1% and 99% level.

1. Main variables:

Book value leverage (Book Leverage) is the ratio of total debt to total assets of the firm.

Market value leverage (Market Leverage) is the ratio of total debt to the sum of market value of the firm's equity and total debt.

Percentage of executive stock-holding (Executive Ownership) is the ratio of the shares held by the executives to the total shares of the firm. The executives are the senior executives disclosed in the annual report, including the CEO, the general manager and other senior managers.

Executive equity to cash salary ratio in 2008 (*Equity to Salary*$_{i,2008}$**)** is the ratio of the market value of shares held by the executives in 2008 to the annual cash compensation for the top three executives in 2008.

Credit Push is a dummy variable equal to one if year $\geq$2009 and zero otherwise.

Post 2012 is an indicator for the placebo test, denoting one if year $\geq$2012 and zero otherwise.

Interest Expense (%) is the firm's ratio of the interest expense to the total debt.

Year$_t$ represents year dummies

ExQuartile$_i$ represents the i-th quartile of executive ownership with ExQuartile$_1$ being the lowest quartile and ExQuartile$_4$ being the highest quartile.

Ln(Debt) represents the log of total debts.

2. Control Variables:

Return-on-assets (ROA) is the ratio of operating income of the firm before taxation and interest expense to the total asset of the firm.

Market-to-book ratio (Market Book) is the ratio of the stock market value of the firm to the book value of the firm's total assets.

Asset tangibility of the firm (Asset Tangibility) is the ratio of the fixed assets to the total assets of the firm.

Positive Net Profit is an indicator to show whether the firm's annual net profit after tax and interest expense is positive.

Dividend is a dummy variable equal to one if the firm paid a dividend in that year and zero otherwise.

State-Owned-Enterprises (SOE) is a dummy variable that equals to one if the firm is directly controlled by the government and zero otherwise.

Size of the firm (Size) is the logarithm of the total sales of the firm.

Concentration of the share structure (Stock Holding Concentration) is the sum of squares of the percent of shares of the five largest shareholders.

Institutional percentage of share (Institution Share) is the ratio of shares held by the institutional investors to the total shares of the firm.

Holding by banks (Bank Holding) is an indicator to show whether the stock of the firm is held by Chinese commercial banks.

Holding by foreign investors (Foreign Holding) is an indicator to show whether the stock of the firm is held by foreign investors.

CEO Turnover indicator (CEO Turnover) is an indicator to show whether the firm has CEO turnover during the fiscal year.

CEO Chairman is a dummy variable that equals one if the CEO is also the chairman of the board. It is zero otherwise.

Compensation Committee is a dummy variable that equals one if the firm has a compensation committee. It is zero otherwise.

Board Size is the number of directors on the board of the firm.

Board Independence is the ratio of outside directors to the total number of directors in the board.

Tables

Table 1. Summary Statistics

Variable	# Obs.	# Firms	Mean	Median	SD	Min	Max
A. Main Variables							
Book Leverage	5898	1547	0.50	0.51	0.19	0.01	1.00
Market Leverage	5898	1547	0.26	0.22	0.18	0.00	0.97
Executive Ownership	5898	1547	0.02	0.00	0.07	0.00	0.63
Equity-to-Salary	5833	1519	34.30	0.00	130.01	0.00	795.09
Interest Expense (%)	4283	1465	2.70	2.61	1.67	0.00	8.18
B. Control Variables							
ROA (net)	5898	1547	0.06	0.06	0.07	-0.42	0.55
Firm Size	5898	1547	21.09	21.03	1.48	13.40	28.28
Market Book	5898	1547	2.24	1.70	1.85	0.14	15.69
Asset Tangibility	5898	1547	0.28	0.24	0.19	0.00	0.96
Dividend	5898	1547	0.53	1.00	0.50	0.00	1.00
Positive Net Profit	5898	1547	0.90	1.00	0.30	0.00	1.00
SOE	5898	1547	0.52	1.00	0.50	0.00	1.00
Stock Holding Concentration	5898	1547	0.17	0.15	0.12	0.00	0.76
Institution Ownership	5898	1547	0.07	0.03	0.10	0.00	0.74
Bank Holding	5898	1547	0.03	0.00	0.17	0.00	1.00
Foreign Holding	5898	1547	0.06	0.00	0.24	0.00	1.00
CEO Turnover	5898	1547	0.20	0.00	0.40	0.00	1.00
CEO Chairman	5716	1541	0.85	1.00	0.36	0.00	1.00
Compensation Committee	5898	1547	0.83	1.00	0.38	0.00	1.00
Board Size	5803	1546	9.22	9.00	1.91	3.00	18.00
Board Independence	5803	1546	0.36	0.33	0.05	0.09	0.71

Note: This table reports the summary statistics of the 1,547 publicly-listed Chinese firms over 2007-2010. The unit of observation is firm-year. The variables are defined in the Appendix.

Table 2. Executive Ownership and Book Leverage

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.160***	0.145***	0.139***
	(0.000)	(0.001)	(0.001)
Executive Ownership$_{it}$	-0.253***	-0.207***	-0.183***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	0.010***	0.009***	0.052
	(0.002)	(0.003)	(0.271)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.310	0.348	0.364

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.206***	0.185***	0.188***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{it}$	-0.222***	-0.179***	-0.180***
	(0.000)	(0.001)	(0.001)
Credit Push$_t$	0.061***	0.055***	0.121***
	(0.000)	(0.000)	(0.003)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.354	0.391	0.393

Note: The sample covers 2007-2010 in Panel A and 2008-2009 in Panel B and estimates equation 3 with Book Leverage as the dependent variable. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. Controls are: ROA, firm size, market-to-book ratio, assets tangibility, dividend, positive net profit, SOE, ownership concentration, institutional ownership, bank holding and foreign holding. We include industry and industry-year FE. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table 3. Top Quartile Executive Ownership and Book Leverage

Panel A: 2007-2010

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Credit Push}_t$	0.028***	0.022***	0.022***
	(0.001)	(0.005)	(0.008)
$\text{TopQuartile}_{2008}$	-0.047***	-0.040***	-0.034***
	(0.000)	(0.000)	(0.001)
Credit Push_t	0.009***	0.008***	0.049
	(0.008)	(0.009)	(0.305)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.309	0.348	0.364

Panel B: 2008-2009

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Credit Push}_t$	0.042***	0.036***	0.037***
	(0.000)	(0.000)	(0.000)
$\text{TopQuartile}_{2008}$	-0.047***	-0.040***	-0.041***
	(0.000)	(0.000)	(0.000)
Credit Push_t	0.058***	0.052***	0.120***
	(0.000)	(0.000)	(0.003)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.354	0.392	0.393

Note: The sample covers 2007-2010 in Panel A and 2008-2009 in Panel B and estimates equation 4 with Book Leverage as the dependent variable. Credit Push_t denotes whether $t \geq 2009$. $\text{TopQuartile}_{2008}$ represents a dummy for the firms belonging to the top quartile of the executive ownership level in 2008. The controls are same as in Table 2. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table 4. Executive Ownership Quartiles and Book Leverage.

Panel A: 2007-2010

	(1)	(2)	(3)
$ExQuartile3_{2008} \times$ Credit $Push_t$	-0.029**	-0.026*	-0.024*
	(0.046)	(0.060)	(0.078)
$ExQuartile2_{2008} \times$ Credit $Push_t$	-0.028**	-0.024*	-0.023*
	(0.040)	(0.067)	(0.077)
$ExQuartile1_{2008} \times$ Credit $Push_t$	-0.032**	-0.027**	-0.028**
	(0.024)	(0.049)	(0.046)
Credit $Push_t$	0.038***	0.032***	0.104
	(0.001)	(0.003)	(0.212)
Firm's Controls	Yes	Yes	Yes
Ownership Quartile Control	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2933	2933	2933
R^2	0.372	0.428	0.444

Panel B: 2008-2009

	(1)	(2)	(3)
$ExQuartile3_{2008} \times$ Credit $Push_t$	-0.044***	-0.041***	-0.037***
	(0.002)	(0.002)	(0.007)
$ExQuartile2_{2008} \times$ Credit $Push_t$	-0.056***	-0.049***	-0.047***
	(0.000)	(0.000)	(0.001)
$ExQuartile1_{2008} \times$ Credit $Push_t$	-0.060***	-0.054***	-0.051***
	(0.000)	(0.000)	(0.000)
Credit $Push_t$	0.113***	0.099***	0.208***
	(0.000)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes
Ownership Quartile Control	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	1501	1501	1501
R^2	0.416	0.466	0.468

Note: This table estimates equation 5. The sample covers only non-zero executive ownership firms for the 2007-2010 sample period (Panel A) and for the 2008-2009 sample period (in Panel B) with Book Leverage as the dependent variable. Credit $Push_t$ denotes whether $t \geq 2009$. ExQuartile variables are dummies representing the non-zero executive ownership firms belonging to the four quartiles of executive ownership levels in 2008. ExQuartile4 is used as the reference category. The controls are same as in Table 2. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table 5. Executive Ownership and Book Leverage, 2006-2012.

	(1)	(2)	(3)
Executive Ownership$_{i,2006}$ × Year$_{2006}$	0.082	0.104	0.075
	(0.480)	(0.354)	(0.511)
Executive Ownership$_{i,2007}$ × Year$_{2007}$	0.096**	0.079*	0.073
	(0.046)	(0.097)	(0.135)
Executive Ownership$_{i,2009}$ × Year$_{2009}$	0.189***	0.170***	0.175***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{i,2010}$ × Year$_{2010}$	0.205***	0.179***	0.167***
	(0.000)	(0.002)	(0.005)
Executive Ownership$_{i,2011}$ × Year$_{2011}$	0.066	0.045	0.056
	(0.343)	(0.503)	(0.394)
Executive Ownership$_{i,2012}$ × Year$_{2012}$	0.073	0.058	0.082
	(0.230)	(0.317)	(0.167)
Executive Ownership$_{it}$	-0.252***	-0.203***	-0.203***
	(0.000)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	10221	10221	10221
R^2	0.319	0.356	0.361

Note: This table estimates equation 6 with Book Leverage as the dependent variable. The sample covers 2006-2012. Variables are defined in the Appendix. The controls and significance levels are same as in Table 2. P-values are in parentheses. Standard errors are clustered at the firm level.

Table 6. Executive Ownership and Book Leverage: Controlling Bank-Firm Relations

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.173**	0.167**	0.148**
	(0.015)	(0.017)	(0.037)
Executive Ownership$_{it}$	-0.152**	-0.124**	-0.101*
	(0.009)	(0.041)	(0.095)
Credit Push$_t$	0.006	0.006	0.034
	(0.137)	(0.171)	(0.429)
Prior Bank-Borrower Relationship	Yes	Yes	Yes
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2473	2473	2473
R^2	0.368	0.408	0.422

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.227***	0.219***	0.214***
	(0.003)	(0.004)	(0.006)
Executive Ownership$_{it}$	-0.136**	-0.115*	-0.111*
	(0.027)	(0.064)	(0.077)
Credit Push$_t$	0.048***	0.042***	0.094*
	(0.000)	(0.000)	(0.066)
Prior Bank-Borrower Relationship	Yes	Yes	Yes
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	1256	1256	1256
R^2	0.398	0.429	0.430

Note: This table estimates equation 7 with Book Leverage as the dependent variable and reports the estimation of the benchmark model controlling for the prior bank-borrower relationship for the 2007-2010 (in Panel A) and 2008-2009 (in Panel B) periods. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. The prior-bank-borrower relationship is an indicator variable that equals to one if firm i has borrowed from bank b at least once during the 2006-2008 period (i.e. pre-credit push period). We create this variable for the top 20 commercial banks, the 3 policy banks and a single "Other" category for all the remaining banks using the CSMAR-Bank Loans of Chinese Listed Companies (CSMAR-BLCLC) dataset. The controls are same as in Table 2. p-values are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level. Standard errors are clustered at the firm level. The variables are defined in the Appendix.

Table 7. Executive Ownership and Book Leverage: Propensity Score Matching

Panel A: 2007-2010

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Credit Push}_t$	0.021**	0.020**	0.021**
	(0.010)	(0.018)	(0.011)
$\text{TopQuartile}_{2008}$	-0.031***	-0.034***	-0.034***
	(0.008)	(0.003)	(0.003)
Credit Push_t	-0.005	-0.005	0.009
	(0.436)	(0.382)	(0.816)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2407	2407	2407
R^2	0.341	0.388	0.406

Panel B: 2008-2009

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Credit Push}_t$	0.023***	0.022***	0.023***
	(0.006)	(0.007)	(0.005)
$\text{TopQuartile}_{2008}$	-0.030**	-0.031**	-0.032**
	(0.017)	(0.011)	(0.010)
Credit Push_t	0.050***	0.043***	0.071***
	(0.000)	(0.000)	(0.002)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	1204	1204	1204
R^2	0.371	0.410	0.412

Note: This table estimates equation 8 with Book Leverage as the dependent variable for 2007-2010 in Panel A and 2008-2009 in Panel B using the 303 firm pairs created on the basis of propensity scores on the 2008 values of the control variables using the nearest neighbor approach. Variables are defined in the Appendix. All 16 firm characteristic variables used as controls in Table 2 have been used to calculate the propensity scores. p-values are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level. Standard errors are clustered at the firm level.

Figures

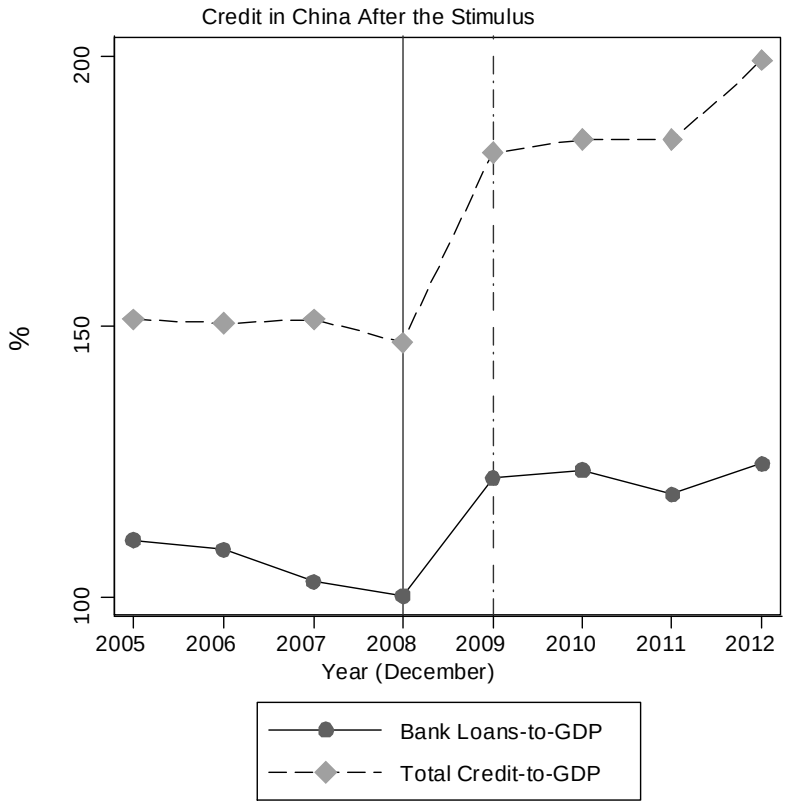

Figure 1. The credit-to-GDP ratio vs. the bank loans-to-GDP ratio. The Credit-to-GDP is the ratio of the credit to GDP for the non-financial sector. The Bank Loans-to-GDP is the ratio of the aggregate bank loans to GDP. The vertical solid line is end of 2008, which is when the credit stimulus was announced by the Chinese government. The vertical dashed-line is the end of 2009, one year after the credit push.

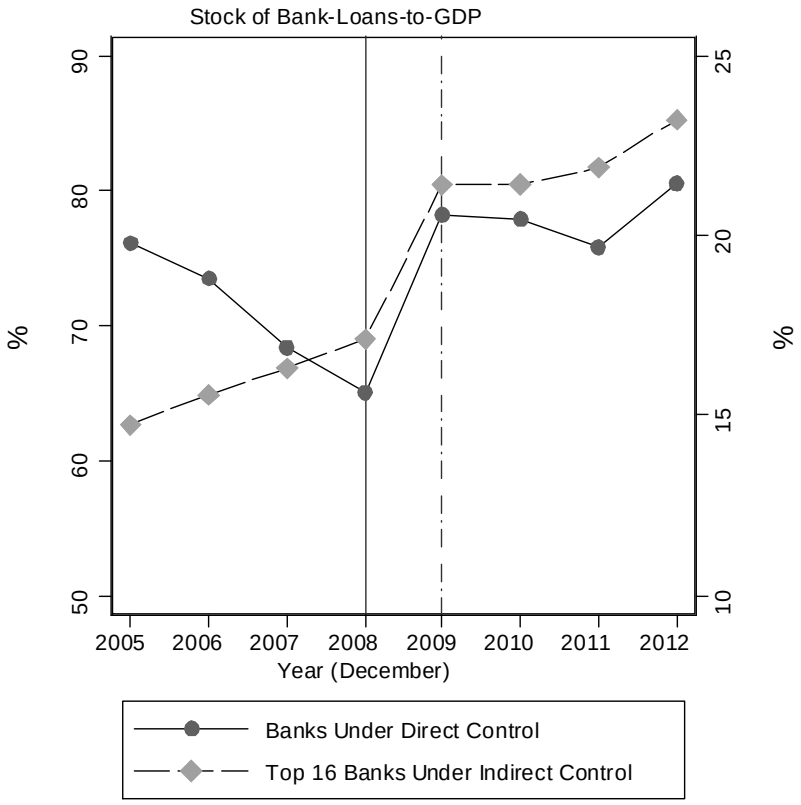

Figure 2. Bank-loans-to-GDP ratio in China for different types of banks. The vertical line is end of 2008, which is when the credit stimulus was announced by the Chinese government. The vertical dashed-line is end of 2009, one year after the credit push. 2008-09 is the sample we study in the empirical work. Banks under direct control of the government are: Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, China Construction Bank, Bank of Communications, China Postal Savings Bank, Agricultural Development Bank of China, China Development Bank, and the Export-Import Bank of China. Banks under indirect control are the top 16 large commercial banks indirectly controlled by the government.

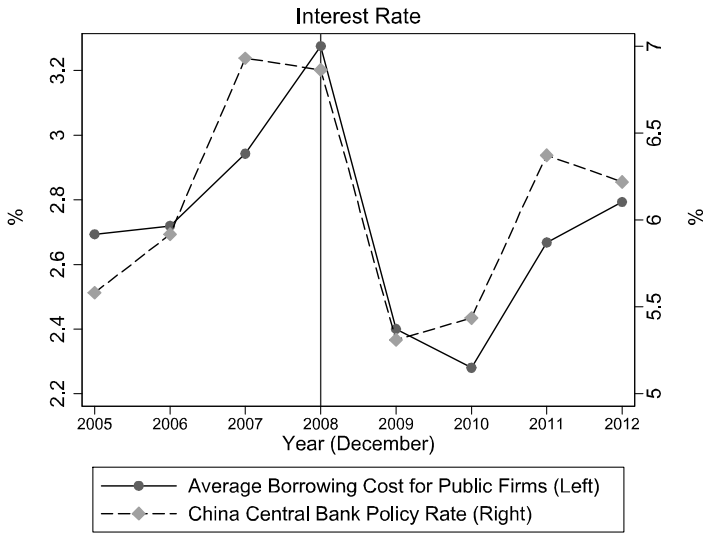

Figure 3. Cost of borrowing in China. This figure plots the policy rate of China's Central Bank (dashed line) and the average cost of debt for the Chinese public firms (solid line). The vertical line is end of 2008, which is when the credit stimulus was announced by the Chinese government.

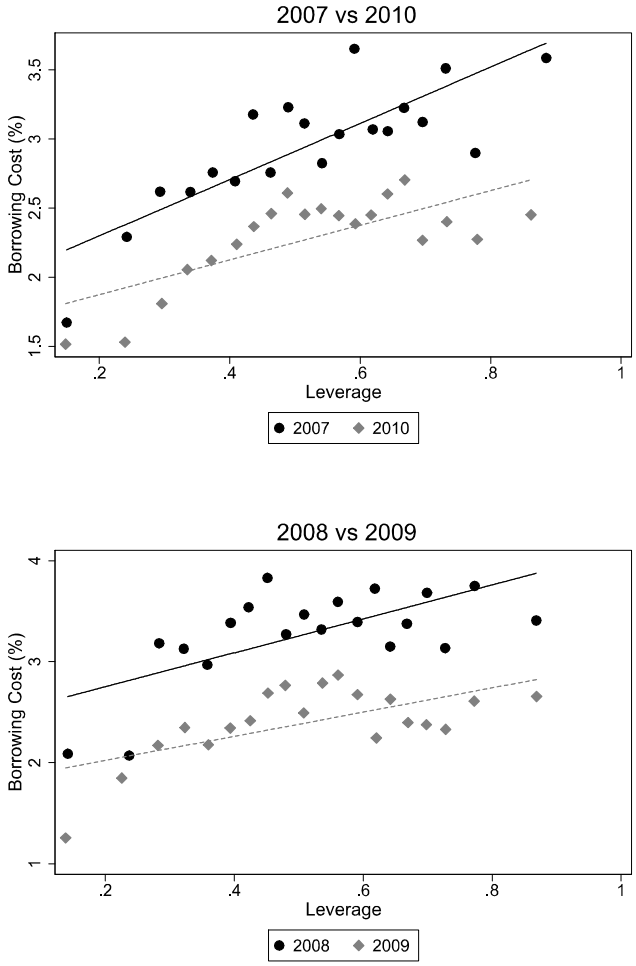

Figure 4. Borrowing cost versus leverage for public non-financial firms in China before and after the 2008 credit push. The figure in the upper panel compares 2007 vs. 2010. The figure in the bottom panel compares 2008 vs. 2009. For ease of appearance, the points are grouped into 20 bins of around 70 observations each. The lines are the fitted regressions for each year.

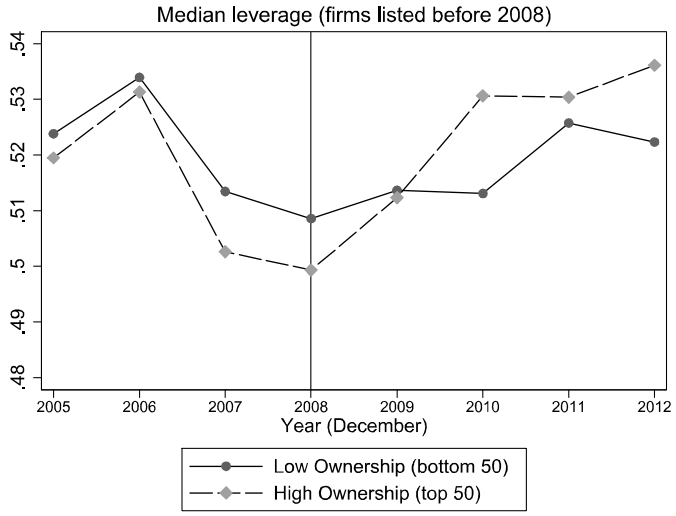

Figure 5. The median book leverage ratio for the non-financial public firms. The vertical line is end of 2008, which is when the credit stimulus was announced by the Chinese government. The solid line is the median leverage for the group of firms with top 50 percentile executive ownership in 2008, the dashed line is the median leverage for the group of firms with bottom 50 percentile executive ownership in 2008.

NOT FOR PUBLICATION
ONLINE APPENDIX

A. In-Depth Sample Description

For our focal sample period of 2007-2010, we have 5,898 firm-year observations, of which, 2,914 observations are related to 769 firms with zero executive ownership and 2,984 observations are related to 778 firms with non-zero executive ownership.[14]

First, we provide sector wise descriptions of the firms given in Table A1.

Insert Table A1 about here

Next, we compare zero executive ownership firms with non-zero executive ownership firms across sixteen firm-characteristics including profitability, size, and market to book ratio. The results given in Table A2 show that these two groups of firms differ significantly on a number of these firm characteristics. For example, the non-zero executive ownership firms are significantly larger and more profitable. We include all the variables from Panel B of Table 1 for this comparison purpose.

In addition, we focus on the subset of firms that report non-zero executive ownership and conduct a similar comparison between the top quartile executive ownership firms and all other firms within this subset. We have 2,984 non-zero executive ownership firm-year observations, of which, 764 are by top-quartile executive ownership firms and the 2,220 observations are by non top quartile (but positive) executive ownership firms (Table A3). Again, we find that, on average, top quartile firms differ significantly compared to the non top quartile firms across multiple firm characteristics. For example, high executive ownership firms are more profitable (both higher ROA as well as fraction of firms that report a positive net income) and have a higher market to book ratio.

Insert Table A2 and Table A3 about here

B. Comparison of Loan Characteristics Across Firms with Different Levels of Executive Ownership

To explore if there are meaningful differences in types of loans taken by low and high executive ownership firms, we focus on four loan characteristics that are reported for all loans in the CSMAR-BLCLC dataset: the frequency of borrowing, size of the loan, collateral status, and the lender identity. We were able to match 631 firms in our original sample to the CSMAR-BLCLC database for the 2006-2008 period. We first divide the 631 matched firms in two groups.

[14] This classification between the firms is done based on the 2008 executive ownership level.

One group consists of firms that report zero executive ownership (as of the end of 2008). The other group comprises of firms that report a positive level of executive ownership.

There are 302 firms with zero executive ownership and 329 firms that have some level of executive ownership. The non-zero executive ownership firms borrow more frequently during the pre-shock period of 2006-2008 compared to the zero executive ownership firms (3.61 versus 3.07), however this difference is statistically not significant. Similarly, the difference in the average loan size of non-zero (RMB 657 million) and zero executive ownership firm (RMB 510 million) is statistically insignificant. Almost all loans are secured by collateral and the fraction of unsecured loans is quite low for both zero-executive ownership firms (1%) and non-zero executive ownership firms (2%) and this difference is marginally significant.

Finally, we examine the identity of the lending bank. Nearly one third of loans are provided by banks that are classified as government-controlled banks.[15] The fractions of total loans issued by these central government-controlled banks to the zero (0.34) and non-zero executive ownership firms are very similar (0.36) and their difference is not statistically significant.

We repeated this analysis by comparing the firms in the top quartile executive ownership level to the remaining firms. Thus, the 631 matched firms are now assigned to two groups: 171 firms in the top-quartile executive ownership level (top-quartile) and 460 firms that belong to the other three quartiles of executive ownership level (others).

The comparison of the loan characteristics again shows that the two groups (top quartile firms and other firms) are similar in frequency of borrowing, average loan amount and fraction borrowed from banks controlled by the central government. The only characteristic on which these two groups differ significantly is the fraction of loans that are unsecured (3% for the top-quartile versus 1% for the others).

Taken together, these two analyses suggest that the bank-borrower relationships were largely similar for the high and low executive ownership firms in the period immediately before the credit stimulus.

C. Estimation of Borrowing Cost: Pre and Post and Credit Push

One firm characteristic that deserves a special mention is the Interest Expense Ratio, which captures the borrowing costs of a firm. We estimate this variable following Pittman and Fortin (2004) as the ratio of interest expenses to total debt:

$$\text{Borrowing Cost} = \text{Interest Expense Ratio} = \frac{InterestExpense}{ShortTermDebt+LongTermDebt} \quad \text{(A1)}$$

While the visual evidence provided in Figure 4 points to a significant downward shift in

[15] This group consists of 9 banks: 1) Bank of China; 2) Agricultural Bank of China; 3) Construction Bank; 4) Industrial and Commercial Bank of China; 5) Bank of Communications; 6) China Development Bank; 7) Export Import Bank; 8) Agricultural Development Bank, and 9) Postal Savings Bank of China.

borrowing costs, we test this more formally by estimating a regression model of the following form:

$$\begin{aligned} Borrowing\ Cost = {} & \beta_0 + \beta_1 LeverageRatio_{it} + \beta_2 Credit\ Push_t + \\ & + \beta_3 LeverageRatio_{\,it} \times Credit\ Push_t + \\ & + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{A2}$$

where the Borrowing Cost is the interest expense ratio as defined in (A1), $Book\ Leverage_{it}$ is as defined in equation 1 in the paper, $CreditPush_t$ is a dummy variable that equals one for post-stimulus period and zero for pre-stimulus period, and α_j is the industry fixed effect. The controls $\sum_k \beta_k Controls_{itk}$ are return to assets, size of the firm, market-to-book ratio and bank holding.

We report the results in Table A4. The key coefficients of interest are $CreditPush_t$ and its interaction with $BookLeverage_{it}$. In column 1 of Panel A we present the results where we control for the firm characteristics and include any fixed effects. We obtain a coefficient of -0.35 for $CreditPush_t$. The coefficient for $BookLeverage_{it} \times Credit\ Push_t$ is -0.75, and it is significant at one percent level. Thus, while the credit push lowers the cost of borrowing across all firms, it is especially powerful in reducing the borrowing costs for firms that choose high leverage.

In other columns from 2 through 4, we re-estimate our benchmark regression specification by introducing industry fixed effects and using the market leverage as alternative specifications. Our results hold for these alternative specifications as well.

Insert Table A4 about here

We also re-estimate equation A2 for the shorter sample period of 2008-2009. Our findings, reported in Table A5, show identical results.

D. Bank Firm Relationship: Pre and Post Credit Shock

We have been able to match 631 firms with 2116 loans related to these firms from our original sample to the CSMAR-BLCLC database over the 2006-2008 period. We classify all firms into two groups based on their executive ownership levels as of 2008. We rank the firms based on this variable. The first group consists of firms that are in the top quartile and the second group consists of the remaining firms. As before, we focus on the four loan characteristics that are

reported for all loans and compare these for pre and post credit push periods. For the top quartile firms, the average loan size goes up from RMB 454 million to RMB 458 million.

Although this suggests that the average size of loans taken by the top quartile firms increases by almost RMB 4 million on average, this difference is not statistically significant. In contrast, the average loan size for other firms (not top-quartile) decreases from RMB 645 million to RMB 642 million. This drop is also statistically not significant.

The changes in other bank-loan characteristics such as frequency, collateral status and the lender identity for both top-quartile firms and other firms were found to be insignificant. This suggests that over time, bank-firm relationships remained stable and any observable increase in the leverages is caused by the credit shock.

E. Description of Propensity Score Matching Procedure

We start the matching process by creating the treatment group based on executive ownership at the end of 2008. All firms with ownership levels in the top quartile in 2008 are assigned to the high ownership (treated) group. Specifically, we create a dummy variable $TopQuartile$ which equals one if the firm ranks in the top 25% firms based on the executive ownership in 2008 and zero otherwise.

In the second step, we estimate a probit regression model using the $TopQuartile$ as the dependent variable and a large set of observable firm characteristics which include all firm-level control variables from the benchmark regression model (equation 3) and additional controls: CEO turnover, whether the CEO and the chairman of the board is the same person, whether the firm has a compensation committee, the size of the board and the proportion of independent directors in the board. The choice of these additional control variables for the executive ownership is motivated by their use in prior studies of the determinant of incentive pay for the managers (Bettis et al. 2010; Dittmann et al. 2010; Kato et al. 2005; and Bertrand and Mullainathan, 2001).

The probit model is estimated over the entire cross-section of firms in our sample. This estimation allows us to calculate the predicted probability of being a top quartile executive ownership firm in 2008. We hope to find a matching firm for each top quartile executive ownership firm based on predicted probability (propensity score). This matched firm will be statistically indistinguishable from the treatment firm based on observable characteristics but will not have a high executive ownership. We employ a one-to-one matching process as outlined by D'Acunto and Rossi (2017).

The validity of the matching process is illustrated in Table A11 of the Online Appendix. The first three columns under the heading "Pre-Matching" report the sample average of various firm characteristics of top-quartile executive ownership firms, of all the remaining firms (before we created matched pairs) and the t-statistics of the differences between the treatment (i.e.

top-quartile firms) and the control (i.e. remaining firms) groups.

The last three columns reported under the heading "Post-Matching" repeat the same analysis but compare the top-quartile executive ownership firms to the propensity score matched firms (we were able to find matches for 303 out of 375 top quartile firms). The t-test for difference in observable firm characteristics is insignificant for all sixteen attributes.

These results provide strong evidence that our matching process yields firm pairs that are statistically indistinguishable based on observable firm characteristics.

F. Using Equity-to-Salary Ratio

Our primary measure of managerial incentives in this paper is the fraction of firm's equity owned by its executives. This measure captures the accumulated stock holding of a firm's managers. An alternative approach to measure the executive pay-performance sensitivity is to use the ratio of the value of the stock ownership to the annual fixed cash compensation. We re-estimate our baseline specification using this alternative pay-performance sensitivity measure, denoted as equity-to-salary-ratio. We denote this new measure as $Equity\,to\,Salary_{i,2008}$. This ratio is defined as:

$$Equity\,to\,Salary_{i,2008} = \frac{Market\,Value\,of\,the\,Equity_{i,2008} \times Executive\,Ownership_{i,2008}}{Cash\,Salary\,of\,the\,Executives_{i,2008}} \tag{A3}$$

Where $Market\,Value\,of\,the\,Equity_{i,2008}$ is the market value of the firm at the end of 2008 and $Executive\,Ownership_{i,2008}$ is the executive ownership level of the firm at the end of 2008. The $Cash\,Salary\,of\,the\,Executives_{i,2008}$ is the average cash salary of the top three executives of the firms at the end of 2008.[16] We modify the baseline specification of equation 3 above by replacing $Executive\,Ownership_{it}$ by $Equity\,to\,Salary_{i,2008}$. The new model specification is given by:

$$\begin{aligned} Leverage\,Ratio_{it} = {} & \beta_0 + \beta_1 EquitytoSalary_{i,2008} + \beta_2 Credit\,Push_t + \\ & + \beta_3 EquitytoSalary_{\,i,2008} \times Credit\,Push_t + \\ & + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{A4}$$

[16] Due to data limitations, the $CashSalaryoftheExecutives_{i,2008}$ variable only includes the cash salaries of the top three executives from each firm. In addition, the Equity to Salary ratio changes over the 4 years of our research period due to the change in stock price. So, we fix this ratio at year 2008.

The results of this alternative measure of executive pay-performance sensitivity for book leverage are reported in Table A26 and for market leverage are reported in Table A27. Again the results are consistent with our original findings.

Thus, our core findings are robust to this alternative definition of pay for performance sensitivity of executives both in the immediate aftermath of the credit shock and over a longer, four year period. However, for the longer sample period, the effect of the credit shock becomes weaker for book leverage. This diminishing impact of the credit shock on book leverage in the longer sample period is caused by other factors that existed in the market at that time.

NOT FOR PUBLICATION
ONLINE APPENDIX TABLES

Table A1. Decomposition Per Sector

			Mean			
Industry	# Obs	% Obs	Int. Cost	Book Lev.	Market Lev.	Ex. Own.
Agriculture	97	1.64	3.12	0.42	0.17	2.14
Mining	222	3.76	2.45	0.45	0.18	0.14
Manufacturing	3393	57.53	2.83	0.48	0.24	2.43
Energy	310	5.26	3.81	0.59	0.38	0.02
Building	154	2.61	1.79	0.67	0.43	1.80
Wholesale & Retail	484	8.21	2.37	0.56	0.29	0.10
Transportation	247	4.19	2.72	0.45	0.28	0.01
Hotel and Catering	36	0.61	2.64	0.34	0.13	0.15
Information	162	2.75	2.01	0.38	0.16	5.87
Real Estate	493	8.36	1.97	0.57	0.33	0.42
Leasing & Business	63	1.07	2.33	0.47	0.25	3.72
Science & Technology	16	0.27	0.82	0.53	0.17	0.19
Environment	58	0.98	3.11	0.48	0.21	0.03
Education	4	0.07	4.09	0.55	0.29	0.04
Health & Social Welfare	8	0.14	0.91	0.17	0.05	0.00
Culture $ Sports	60	1.02	2.25	0.46	0.18	0.28
Comprehensive	91	1.54	2.83	0.52	0.29	0.01
Total	5898	100	2.70	0.50	0.26	1.73

Note: This table reports sector specific sample statistics of firms present in the database and contains the interest cost, book leverage, market leverage and executive ownership in percentage levels for comparison purposes. The variables are defined in the Appendix. The sample covers 2007-2010 and uses 2008 executive ownership level for classification purposes. Source: CSMAR.

Table A2. Comparison Between Zero and Non-Zero Executive Ownership Firms

Variable	# Obs.		Non-Zero	Zero		
	Non-zero	Zero	Mean	Mean	t-stat	p-values
ROA (net)	2984	2914	0.07	0.06	-5.64	0.00
Firm Size	2984	2914	21.22	20.96	-6.52	0.00
Market Book	2984	2914	2.24	2.24	0.07	0.95
Stock Holding Concentration	2984	2914	0.15	0.20	15.78	0.00
Institution Ownership	2984	2914	0.07	0.06	-3.53	0.00
SOE	2984	2914	0.49	0.55	4.70	0.00
Positive Net Profit	2984	2914	0.92	0.89	-4.20	0.00
Foreign Holding	2984	2914	0.05	0.07	4.34	0.00
Dividend	2984	2914	0.59	0.47	-9.16	0.00
Bank Holding	2984	2914	0.03	0.03	-0.53	0.60
Asset Tangibility	2984	2914	0.27	0.28	2.36	0.02
CEO Turnover	2984	2914	0.17	0.22	5.28	0.00
CEO Chairman	2886	2830	0.82	0.88	5.95	0.00
Compensation Committee	2984	2914	0.83	0.83	0.24	0.80
Board Size	2938	2865	9.26	9.19	-1.42	0.16
Board Independence	2938	2865	0.36	0.36	2.46	0.01

Note: This table compares between the zero and non-zero executive ownership firms across the sixteen firm characteristic variables for the sample period 2007-2010 and uses 2008 executive ownership level for classification purposes. The variables are defined in the Appendix.

Table A3. Comparison Between Top Quartile Executive Ownership Firms and Other Firms

Variable	# Obs.		Top Quartile	Others		
	Top Quartile	Others	Mean	Mean	t-stat	p-values
ROA (net)	764	2220	0.08	0.06	-8.68	0.00
Firm Size	764	2220	20.66	21.41	13.60	0.00
Market Book	764	2220	3.15	1.93	-16.42	0.00
Stock Holding Concentration	764	2220	0.15	0.15	-0.08	0.93
Institution Ownership	764	2220	0.06	0.08	4.61	0.00
SOE	764	2220	0.13	0.61	24.92	0.00
Positive Net Profit	764	2220	0.95	0.91	-4.25	0.00
Foreign Shareholding	764	2220	0.06	0.04	-1.42	0.16
Dividend	764	2220	0.67	0.57	-4.98	0.00
Bank Holding	764	2220	0.01	0.04	4.52	0.00
Asset Tangibility	764	2220	0.23	0.28	6.99	0.00
CEO Turnover	764	2220	0.14	0.18	2.66	0.01
CEO Chairman	740	2146	0.67	0.87	12.53	0.00
Compensation Committee	764	2220	0.75	0.85	6.68	0.00
Board Size	753	2138	8.85	9.40	7.00	0.00
Board Independence	753	2185	0.36	0.36	-2.01	0.04

Note: This table compares between the top quartile executive ownership firms and other firms (only based on non-zero ownership firms) across the sixteen firm characteristics variables based on the 2008 executive ownership level. The variables are defined in the Appendix.

Table A4. Cost of Leverage Before and After the Credit Push, 2007-2010

	Interest Expense			
	(1)	(2)	(3)	(4)
Book Leverage$_{it}$ × Credit Push$_t$	-0.750***	-0.714***		
	(0.003)	(0.004)		
Book Leverage$_{it}$	1.813***	2.184***		
	(0.000)	(0.000)		
Market Leverage$_{it}$ × Credit Push$_t$			-0.699***	-0.418*
			(0.002)	(0.063)
Book Leverage$_{it}$			1.849***	2.149***
			(0.000)	(0.000)
CreditPush$_t$	-0.345**	-0.349**	-0.492***	-0.539***
	(0.013)	(0.011)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Observations	4283	4283	4283	4283
R^2	0.123	0.205	0.117	0.194

Note: The sample covers 2007-2010. The controls are return to assets, size of the firm, market-to-book ratio, bank holding. p-values are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level. Standard errors are clustered at the firm level.

Table A5. Cost of Leverage Before and After the Credit Push, 2008-2009

	Interest Expense			
	(1)	(2)	(3)	(4)
Book Leverage$_{it}$ × Credit Push$_t$	-0.845***	-0.903***		
	(0.009)	(0.004)		
Book Leverage$_{it}$	1.732***	2.201***		
	(0.000)	(0.000)		
Market Leverage$_{it}$ × Credit Push$_t$			-0.861**	-0.744**
			(0.021)	(0.039)
Book Leverage$_{it}$			2.025***	2.382***
			(0.000)	(0.000)
CreditPush$_t$	-0.301	-0.256	-0.318**	-0.292**
	(0.125)	(0.184)	(0.032)	(0.044)
Firm's Controls	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Observations	1956	1956	1956	1956
R^2	0.117	0.205	0.118	0.203

Note: The sample covers 2008-2009. The controls are return to assets, size of the firm, market-to-book ratio, bank holding. p-values are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level. Standard errors are clustered at the firm level.

Table A6. Executive Ownership and Market Leverage

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.134***	0.125***	0.137***
	(0.000)	(0.001)	(0.001)
Executive Ownership$_{it}$	-0.115***	-0.090**	-0.116***
	(0.006)	(0.022)	(0.003)
Credit Push$_t$	-0.022***	-0.024***	-0.054*
	(0.000)	(0.000)	(0.091)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.584	0.613	0.642

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.361***	0.343***	0.327***
	(0.000)	(0.001)	(0.001)
Executive Ownership$_{it}$	-0.255***	-0.229**	-0.220***
	(0.000)	(0.00)	(0.000)
Credit Push$_t$	-0.051***	-0.058***	-0.038*
	(0.000)	(0.000)	(0.094)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.604	0.636	0.640

Note: The sample covers both the 2007-2010 (in Panel A) and 2008-2009 (in Panel B) periods and estimates equation 3 with Market Leverage as the dependent variable. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. Controls are: ROA, firm size, market-to-book ratio, assets tangibility, dividend, positive net profit, SOE, ownership concentration, institutional ownership, bank holding and foreign holding. We include industry and industry-year FE. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A7. Top Quartile Executive Ownership and Market Leverage

Panel A: 2007-2010

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Credit Push}_t$	0.027***	0.023**	0.027***
	(0.000)	(0.000)	(0.000)
$\text{TopQuartile}_{2008}$	-0.028***	-0.023***	-0.021***
	(0.000)	(0.000)	(0.000)
Credit Push_t	-0.024***	-0.025***	0.050
	(0.000)	(0.000)	(0.115)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.584	0.613	0.642

Panel B: 2008-2009

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Credit Push}_t$	0.075***	0.070***	0.068***
	(0.000)	(0.000)	(0.000)
$\text{TopQuartile}_{2008}$	-0.062***	-0.058***	-0.056***
	(0.000)	(0.000)	(0.000)
Credit Push_t	0.057***	0.063***	0.037
	(0.000)	(0.000)	(0.107)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.606	0.638	0.641

Note: The sample covers both the 2007-2010 (in Panel A) and 2008-2009 (in Panel B) periods and estimates equation 4 with Market Leverage as the dependent variable. Credit Push_t denotes whether $t \geq 2009$. $\text{TopQuartile}_{2008}$ represents a dummy for the firms belonging to the top quartile of the executive ownership level in 2008. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A8. Executive Ownership Quartiles and Market Leverage

Panel A: 2007-2010

	(1)	(2)	(3)
$ExQuartile3_{2008} \times Credit\ Push_t$	-0.023**	-0.024**	-0.026**
	(0.038)	(0.025)	(0.011)
$ExQuartile2_{2008} \times Credit\ Push_t$	-0.022**	-0.021**	-0.027***
	(0.030)	(0.037)	(0.006)
$ExQuartile1_{2008} \times Credit\ Push_t$	-0.035***	-0.032***	-0.037***
	(0.001)	(0.002)	(0.000)
$Credit\ Push_t$	0.004	0.000	0.084
	(0.675)	(0.982)	(0.163)
Firm's Controls	Yes	Yes	Yes
Ownership Quartile Control	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2933	2933	2933
R^2	0.595	0.637	0.674

Panel B: 2008-2009

	(1)	(2)	(3)
$ExQuartile3_{2008} \times Credit\ Push_t$	-0.060***	-0.060***	-0.054***
	(0.000)	(0.000)	(0.000)
$ExQuartile2_{2008} \times Credit\ Push_t$	-0.096***	-0.092***	-0.083***
	(0.000)	(0.000)	(0.000)
$ExQuartile1_{2008} \times Credit\ Push_t$	-0.112***	-0.108***	-0.102***
	(0.000)	(0.000)	(0.000)
$Credit\ Push_t$	0.035**	0.022	0.135***
	(0.013)	(0.100)	(0.000)
Firm's Controls	Yes	Yes	Yes
Ownership Quartile Control	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	1501	1501	1501
R^2	0.631	0.676	0.679

Note: This table estimates equation 5 with Market Leverage as the dependent variable. The sample covers only non-zero executive ownership firms for the sample periods 2007-2010 in Panel A and 2008-2009 in Panel B. $Credit\ Push_t$ denotes whether $t \geq 2009$. ExQuartile variables are dummies representing the non-zero executive ownership firms belonging to the four quartiles of executive ownership levels in 2008. ExQuartile4 is used as the reference category. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A9. Executive Ownership and Market Leverage, 2006-2012.

	(1)	(2)	(3)
Executive Ownership$_{i,2006}$ × Year$_{2006}$	-0.022	-0.005	-0.047
	(0.739)	(0.929)	(0.454)
Executive Ownership$_{i,2007}$ × Year$_{2007}$	0.429***	0.408***	0.378***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{i,2009}$ × Year$_{2009}$	0.340***	0.322***	0.306***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{i,2010}$ × Year$_{2010}$	0.320***	0.294***	0.289***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{i,2011}$ × Year$_{2011}$	0.062	0.043	0.069
	(0.261)	(0.418)	(0.161)
Executive Ownership$_{i,2012}$ × Year$_{2012}$	0.058	0.047	0.079*
	(0.236)	(0.295)	(0.089)
Executive Ownership$_{it}$	-0.266***	-0.224***	-0.222***
	(0.000)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	10221	10221	10221
R^2	0.597	0.631	0.644

Note: This table estimates equation 6. The sample covers 2006-2012 with Market Leverage as the dependent variable. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Year$_t$ variable represents dummies for the years 2006, 2007, 2009, 2010, 2011 and 2012, with 2008 taken as the base year. The remaining controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A10. Executive Ownership and Market Leverage: Controlling Bank-Firm Relations.

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.053	0.059	0.074
	(0.304)	(0.251)	(0.130)
Executive Ownership$_{it}$	-0.073	-0.055	-0.083*
	(0.152)	(0.277)	(0.083)
Credit Push$_t$	-0.025***	-0.026***	0.020
	(0.000)	(0.000)	(0.587)
Prior Bank-Borrower Relationship	Yes	Yes	Yes
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2473	2473	2473
R^2	0.633	0.657	0.691

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.322***	0.315***	0.301***
	(0.000)	(0.001)	(0.000)
Executive Ownership$_{it}$	-0.246***	-0.227***	-0.218***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	-0.058***	-0.065***	-0.019
	(0.000)	(0.000)	(0.534)
Prior Bank-Borrower Relationship	Yes	Yes	Yes
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	1256	1256	1256
R^2	0.656	0.682	0.684

Note: This table estimates equation 7 with Market Leverage as the dependent variable and reports the estimation of the benchmark model controlling for the prior bank-borrower relationship for both the 2007-2010 (in Panel A) and 2008-2009 (in Panel B) periods. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. The prior-bank-borrower relationship is an indicator variable that equals to one if firm i has borrowed from bank b at least once during the 2006-2008 period (i.e. pre-credit push period). We create this variable for the top 20 commercial banks, the 3 policy banks and a single "Other" category for all the remaining banks using the CSMAR-Bank Loans of Chinese Listed Companies (CSMAR-BLCLC) dataset. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level. Standard errors are clustered at the firm level.

Table A11. Comparison of Top Quartile Firms and Matched Sample

	Pre Matching			Post Matching		
Variable	Treated	Control	t-stat	Treated	Control	t-stat
ROA (net)	0.04	0.07	-6.42***	0.07	0.07	0.10
Firm Size	21.06	20.88	2.03***	20.89	20.93	-0.42
Market Book	1.12	1.42	-5.05***	1.33	1.25	0.89
Stock Holding Concentration	0.19	0.14	6.50***	0.14	0.14	-0.25
Institution Ownership	0.07	0.07	-0.35	0.06	0.06	0.02
SOE	0.63	0.33	10.33***	0.41	0.37	0.92
Positive Net Profit	0.83	0.91	-3.74***	0.89	0.89	-0.26
Foreign Shareholding	0.07	0.07	0.30	0.08	0.07	0.63
Dividend	0.49	0.64	-5.33***	0.59	0.60	-0.33
Bank Holding	0.04	0.01	2.53***	0.02	0.02	0.00
Asset Tangibility	0.29	0.25	3.88***	0.25	0.25	-0.46
CEO Turnover	0.21	0.14	2.97***	0.13	0.15	-0.82
CEO Chairman	0.89	0.74	7.14***	0.77	0.80	-0.89
Compensation Committee	0.83	0.74	3.69***	0.80	0.79	0.40
Board Size	9.31	8.99	2.84***	8.86	9.02	-1.08
Board Independence	0.36	0.36	0.49	0.36	0.36	-0.34
Observations	375	1135		303	303	

Note: "Treated" represents Top Quartile firms (i.e. firms in the fourth quartile) while "Control" represents: a) remaining firms in the "Pre Credit Shock" scenario and b) the matched sample in the "Post Credit Shock" scenario. *, ** and *** indicate significance at the 10%, 5% and 1% level. The variables are defined in the Appendix.

Table A12. Executive Ownership and Market Leverage: Propensity Score Matching

Panel A: 2007-2010

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Credit Push}_t$	0.017***	0.015***	0.015***
	(0.004)	(0.008)	(0.008)
$\text{TopQuartile}_{2008}$	-0.017**	-0.020***	-0.020***
	(0.019)	(0.005)	(0.004)
Credit Push_t	-0.033***	-0.034***	-0.059***
	(0.000)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2407	2407	2407
R^2	0.614	0.642	0.675

Panel B: 2008-2009

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Credit Push}_t$	0.019**	0.018**	0.019**
	(0.031)	(0.035)	(0.023)
$\text{TopQuartile}_{2008}$	-0.020*	-0.020**	-0.020**
	(0.055)	(0.046)	(0.040)
Credit Push_t	-0.058***	-0.066***	-0.021
	(0.000)	(0.000)	(0.329)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	1204	1204	1204
R^2	0.627	0.658	0.665

Note: This table estimates equation 8 with Market Leverage as the dependent variable for both the 2007-2010 (in Panel A) and 2008-2009 (in Panel B) periods using the 303 firm pairs created on the basis of propensity scores on the 2008 values of the control variables using the nearest neighbor approach. Variables are defined in the Appendix. All 16 firm characteristic variables in Table A11 have been used as controls to calculate the propensity scores. p-values are in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% level. Standard errors are clustered at the firm level.

Table A13. Executive Ownership and Book Leverage with Year FE, 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.152***	0.139***	0.139***
	(0.000)	(0.001)	(0.001)
Executive Ownership$_{it}$	-0.224***	-0.184***	-0.183***
	(0.000)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.327	0.361	0.364

Note: This table estimates the benchmark equation with year fixed effects as given in equation 9. The sample covers the 2007-2010 period with Book Leverage as the dependent variable. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. CreditPush$_t$ is a dummy that takes the value of 1 if year $\geq$ 2009 and zero otherwise. Controls are: ROA, firm size, market-to-book ratio, assets tangibility, dividend, positive net profit, SOE, ownership concentration, institutional ownership, bank holding and foreign holding. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A14. Executive Ownership and Market Leverage with Year FE, 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.141***	0.131***	0.137***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{it}$	-0.141***	-0.115***	-0.116***
	(0.001)	(0.003)	(0.003)
Firm's Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.601	0.633	0.642

Note: This table estimates the benchmark equation with year fixed effects as given in equation 9. The sample covers the 2007-2010 period with Market Leverage as the dependent variable. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. CreditPush$_t$ is a dummy that takes the value of 1 if year $\geq$ 2009 and zero otherwise. Controls are: ROA, firm size, market-to-book ratio, assets tangibility, dividend, positive net profit, SOE, ownership concentration, institutional ownership, bank holding and foreign holding. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A15. Executive Ownership and Book Leverage: Placebo Test

Panel A: 2011-2014

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Post2012	0.058	0.061	0.060
	(0.290)	(0.243)	(0.263)
Executive Ownership$_{it}$	-0.168**	-0.125**	-0.124*
	(0.013)	(0.047)	(0.052)
Post2012	-0.006*	-0.007**	0.117**
	(0.086)	(0.027)	(0.014)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5994	5994	5994
R^2	0.311	0.368	0.369

Panel B: 2011-2012

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Post2012	0.015	0.025	0.031
	(0.766)	(0.602)	(0.527)
Executive Ownership$_{it}$	-0.156**	-0.119**	-0.122*
	(0.022)	(0.063)	(0.057)
Post2012	0.007**	0.007**	0.078
	(0.015)	(0.021)	(0.106)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3001	3001	3001
R^2	0.322	0.377	0.377

Note: The sample covers 2011-2014 in Panel A and 2011-2012 in Panel B to estimate equation 3 with Book Leverage as the dependent variable. The sample uses only the publicly listed firms that are non directly controlled by the Chinese government. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A16. Executive Ownership and Market Leverage: Placebo Test

Panel A: 2011-2014

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Post2012	0.047	0.049	0.046
	(0.299)	(0.244)	(0.284)
Executive Ownership$_{it}$	-0.145**	-0.090*	-0.090*
	(0.011)	(0.076)	(0.073)
Post2012	-0.008***	-0.010***	-0.112***
	(0.001)	(0.000)	(0.005)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5994	5994	5994
R^2	0.575	0.643	0.650

Panel B: 2011-2012

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Post2012	0.005	0.021	0.019
	(0.913)	(0.622)	(0.659)
Executive Ownership$_{it}$	-0.132**	-0.091*	-0.090*
	(0.028)	(0.087)	(0.084)
Post2012	0.000	0.000	-0.121***
	(0.804)	(0.950)	(0.000)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3001	3001	3001
R^2	0.590	0.657	0.657

Note: The sample covers 2011-2014 in Panel A and 2011-2012 in Panel B to estimate equation 3 with Market Leverage as the dependent variable. The sample uses only the publicly listed firms that are non directly controlled by the Chinese government. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A17. Executive Ownership and Book Leverage: Firm Fixed Effects

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.049	0.043	0.045
	(0.140)	(0.170)	(0.151)
Executive Ownership$_{it}$	0.022	0.042	0.033
	(0.623)	(0.353)	(0.470)
Credit Push$_t$	0.016**	0.009***	0.005
	(0.000)	(0.002)	(0.852)
Firm's Controls	No	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.018	0.123	0.146

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.063**	0.062**	0.065**
	(0.039)	(0.042)	(0.035)
Executive Ownership$_{it}$	0.026	0.052	0.052
	(0.751)	(0.476)	(0.477)
Credit Push$_t$	0.010***	0.016***	0.020
	(0.000)	(0.000)	(0.237)
Firm's Controls	No	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.021	0.149	0.156

Note: This equation estimates equation 3 with Firm Fixed Effects and Book Leverage as the dependent variable. The sample covers 2007-2010 in Panel A and 2008-2009 in Panel B. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. CreditPush$_t$ is a dummy that takes the value of 1 if year $\geq$ 2009 and zero otherwise. The remaining controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A18. Executive Ownership and Market Leverage: Firm Fixed Effects

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.019	0.094***	0.108***
	(0.371)	(0.001)	(0.000)
Executive Ownership$_{it}$	0.007	-0.003	0.005
	(0.822)	(0.945)	(0.870)
Credit Push$_t$	-0.030***	-0.027***	-0.017
	(0.000)	(0.000)	(0.101)
Firm's Controls	No	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.026	0.425	0.628

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.220***	0.210***	0.209***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{it}$	-0.130**	-0.104**	-0.096**
	(0.011)	(0.025)	(0.046)
Credit Push$_t$	-0.128***	-0.124***	-0.074***
	(0.000)	(0.000)	(0.000)
Firm's Controls	No	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.664	0.696	0.703

Note: This equation estimates equation 3 with Firm Fixed Effects and Market Leverage as the dependent variable. The sample covers 2007-2010 in Panel A and 2008-2009 in Panel B. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. CreditPush$_t$ is a dummy that takes the value of 1 if year $\geq$ 2009 and zero otherwise. The remaining controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A19. Executive Ownership and Book Leverage: Non-SOE Sample

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.176***	0.165***	0.154***
	(0.000)	(0.000)	(0.001)
Executive Ownership$_{it}$	-0.286***	-0.240***	-0.214***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	0.002	0.000	0.007
	(0.697)	(0.940)	(0.911)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2846	2846	2846
R^2	0.312	0.348	0.371

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.167***	0.158***	0.157***
	(0.000)	(0.001)	(0.002)
Executive Ownership$_{it}$	-0.224***	-0.183***	-0.182***
	(0.000)	(0.002)	(0.003)
Credit Push$_t$	0.057***	0.051***	0.095**
	(0.000)	(0.000)	(0.040)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	1469	1469	1469
R^2	0.372	0.405	0.406

Note: The sample covers 2007-2010 in Panel A and 2008-2009 in Panel B to estimate equation 3 with Book Leverage as the dependent variable. This table provides results for the estimation of equation 3 and uses only the publicly listed firms that are non directly controlled by the Chinese government. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A20. Executive Ownership and Market Leverage: Non-SOE Sample

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.124***	0.114***	0.127***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{it}$	-0.161***	-0.122**	-0.140***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	-0.025***	-0.027***	-0.031
	(0.000)	(0.000)	(0.391)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2846	2846	2846
R^2	0.579	0.609	0.638

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.283***	0.267***	0.240***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{it}$	-0.266***	-0.225***	-0.209***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	-0.049***	-0.057***	-0.036
	(0.000)	(0.000)	(0.168)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	1469	1469	1469
R^2	0.597	0.629	0.634

Note: The sample covers both the 2007-2010 (in Panel A) and 2008-2009 (in Panel B) periods to estimate equation 3 with Market Leverage as the dependent variable. This table provides results for the estimation of equation 3 and uses only the publicly listed firms that are non directly controlled by the Chinese government. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A21. Executive Ownership and Book Leverage Without Infrastructure Firms

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.172***	0.157***	0.150***
	(0.000)	(0.001)	(0.001)
Executive Ownership$_{it}$	-0.257***	-0.212***	-0.189***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	0.009**	0.008**	0.050
	(0.011)	(0.016)	(0.282)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5025	5025	5025
R^2	0.291	0.312	0.330

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.206***	0.188***	0.199***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{it}$	-0.219***	-0.177***	-0.182***
	(0.000)	(0.004)	(0.003)
Credit Push$_t$	0.063***	0.058***	0.120***
	(0.000)	(0.000)	(0.003)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2563	2563	2563
R^2	0.339	0.357	0.358

Note: This table estimates equation 3 with Book Leverage as the dependent variable but without the infrastructure firms. The sample covers both the 2007-2010 (in Panel A) and 2008-2009 (in Panel B) periods. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. CreditPush$_t$ is a dummy that takes the value of 1 if year $\geq$ 2009 and zero otherwise. The remaining controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A22. Executive Ownership and Market Leverage Without Infrastructure Firms

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.137***	0.125***	0.141***
	(0.000)	(0.001)	(0.000)
Executive Ownership$_{it}$	-0.156***	-0.127***	-0.153***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	-0.025***	-0.026***	-0.055*
	(0.000)	(0.000)	(0.085)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5025	5025	5025
R^2	0.588	0.602	0.628

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.350***	0.333***	0.337***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{it}$	-0.290***	-0.264***	-0.264***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	-0.053***	-0.058***	0.037
	(0.000)	(0.000)	(0.110)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	2563	2563	2563
R^2	0.602	0.618	0.620

Note: This table estimates equation 3 with Market Leverage as the dependent variable but without the infrastructure firms. The sample covers both the 2007-2010 (in Panel A) and 2008-2009 (in Panel B) periods. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. CreditPush$_t$ is a dummy that takes the value of 1 if year $\geq$ 2009 and zero otherwise. The remaining controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A23. Executive Ownership and Log of Debt After the Credit Push

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	0.703***	0.593***	0.570***
	(0.000)	(0.001)	(0.002)
Executive Ownership$_{it}$	-1.882***	-1.429***	-1.317***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	0.184***	0.155***	0.386**
	(0.000)	(0.000)	(0.046)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.752	0.802	0.808

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{it}$ × Credit Push$_t$	1.017***	0.876***	0.866***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{it}$	-1.864***	-1.433***	-1.426***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	0.455***	0.372***	0.663***
	(0.000)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.758	0.808	0.809

Note: This table estimates equation 10 for the periods 2007-2010 (in Panel A) and 2008-2009 (in Panel B). ExecutiveOwnership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. CreditPush$_t$ is a dummy that takes the value of 1 if year $\geq$ 2009 and zero otherwise. The remaining controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A24. Executive Ownership and Book Leverage: Ownership at 2008 level

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{i,2008}$ × Credit Push$_t$	0.139***	0.124***	0.110***
	(0.000)	(0.001)	(0.002)
Executive Ownership$_{i,2008}$	-0.285***	-0.237***	-0.206***
	(0.000)	(0.001)	(0.000)
Credit Push$_t$	0.011***	0.010***	0.050
	(0.001)	(0.002)	(0.293)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5897	5897	5897
R^2	0.311	0.349	0.365

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{i,2008}$ × Credit Push$_t$	0.159***	0.142***	0.143***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{i,2008}$	-0.233***	-0.189***	-0.189***
	(0.000)	(0.001)	(0.001)
Credit Push$_t$	0.062***	0.055***	0.120***
	(0.002)	(0.003)	(0.003)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.355	0.392	0.393

Note: The table estimates equation 3 with ownership structure fixed at 2008 level with Book Leverage as the dependent variable. The sample covers 2007-2010 in Panel A and 2008-2009 in Panel B. Executive Ownership$_{i,2008}$ is the number of shares owned by the executives divided by shares outstanding in 2008. Credit Push$_t$ denotes whether t $\geq$ 2009. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A25. Executive Ownership and Market Leverage: Ownership at 2008 level

Panel A: 2007-2010

	(1)	(2)	(3)
Executive Ownership$_{i,2008}$ × Credit Push$_t$	0.135***	0.127***	0.143***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{i,2008}$	-0.146***	-0.119**	-0.149***
	(0.000)	(0.002)	(0.000)
Credit Push$_t$	-0.022***	-0.024***	-0.052
	(0.000)	(0.000)	(0.105)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	5897	5897	5897
R^2	0.585	0.613	0.642

Panel B: 2008-2009

	(1)	(2)	(3)
Executive Ownership$_{i,2008}$ × Credit Push$_t$	0.341***	0.326***	0.310***
	(0.000)	(0.000)	(0.000)
Executive Ownership$_{i,2008}$	-0.267***	-0.240**	-0.231***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	-0.051***	-0.058***	-0.038*
	(0.000)	(0.000)	(0.099)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.604	0.636	0.639

Note: The table estimates equation 3 with ownership structure fixed at 2008 level with Market Leverage as the dependent variable. The sample covers 2007-2010 in Panel A and 2008-2009 in Panel B. Executive Ownership$_{i,2008}$ is the number of shares owned by the executives divided by shares outstanding in 2008. Credit Push$_t$ denotes whether t $\geq$ 2009. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

Table A26. Executive Ownership and Book Leverage: Equity-to-Salary Ratio in 2008

Panel A: 2007-2010

	(1)	(2)	(3)
Equity-to-Salary$_{i,2008}$× Credit Push$_t$	0.0000489**	0.0000428**	0.0000332*
	(0.012)	(0.023)	(0.078)
Equity-to-Salary$_{i,2008}$	-0.000094***	-0.0000734***	-0.000055**
	(0.000)	(0.001)	(0.011)
Credit Push$_t$	0.0104***	0.00966***	0.0513
	(0.001)	(0.002)	(0.278)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry x Year FE	No	No	Yes
Observations	5833	5833	5833
R2	0.313	0.352	0.369

Panel B: 2008-2009

	(1)	(2)	(3)
Equity-to-Salary$_{i,2008}$× Credit Push$_t$	0.0000568***	0.0000501***	0.0000489**
	(0.004)	(0.008)	(0.011)
Equity-to-Salary$_{i,2008}$	-0.0000633***	-0.0000451**	-0.0000440*
	(0.007)	(0.048)	(0.055)
Credit Push$_t$	0.0628***	0.0564***	0.0124***
	(0.000)	(0.000)	(0.002)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry x Year FE	No	No	Yes
Observations	2980	2980	2980
R2	0.355	0.393	0.394

Note: This table reports the estimation of equation A4. This model specification uses Book Leverage as the dependent variable for the 2007-2010 sample period (Panel A) and for the 2008-2009 sample period (Panel B). The variables are defined in the Appendix. The controls and significance levels are same as in Table A6. p-values are in parentheses. Standard errors are clustered at the firm level.

Table A27. Executive Ownership and Market Leverage: Equity-to-Salary Ratio in 2008

Panel A: 2007-2010

	(1)	(2)	(3)
Equity-to-Salary$_{i,2008}$× Credit Push$_t$	0.0000447***	0.0000412***	0.0000501***
	(0.003)	(0.004)	(0.000)
Equity-to-Salary$_{i,2008}$	-0.0000475**	-0.0000345*	-0.0000513***
	(0.021)	(0.075)	(0.007)
Credit Push$_t$	-0.0216***	-0.0229***	0.0520
	(0.000)	(0.000)	(0.106)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry x Year FE	No	No	Yes
Observations	5833	5833	5833
R2	0.586	0.615	0.644

Panel B: 2008-2009

	(1)	(2)	(3)
Equity-to-Salary$_{i,2008}$× Credit Push$_t$	0.000135***	0.000130***	0.000122***
	(0.000)	(0.000)	(0.000)
Equity-to-Salary$_{i,2008}$	-0.0000992***	-0.0000879***	-0.0000834***
	(0.000)	(0.000)	(0.000)
Credit Push$_t$	-0.0489***	-0.0561***	-0.0395*
	(0.000)	(0.000)	(0.082)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry x Year FE	No	No	Yes
Observations	2980	2980	2980
R2	0.604	0.637	0.640

Note: This table reports the estimation of equation A4. This model specification uses Market Leverage as the dependent variable for the 2007-2010 sample period (Panel A) and for the 2008-2009 sample period (Panel B). The variables are defined in the Appendix. The controls and significance levels are same as in Table A6. p-values are in parentheses. Standard errors are clustered at the firm level.

Table A28. Executive Ownership and Firm Leverage, 2006-2012

Panel A: Book Leverage

	(1)	(2)	(3)
Executive Ownership$_{i,t}$ × Credit Push$_t$	0.108**	0.089**	0.089**
	(0.018)	(0.043)	(0.043)
Executive Ownership$_{i,t}$	-0.235***	-0.184***	-0.168***
	(0.000)	(0.000)	(0.001)
Credit Push$_t$	-0.005	-0.004	-0.091*
	(0.156)	(0.259)	(0.065)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	10221	10221	10221
R^2	0.303	0.344	0.361

Panel B: Market Leverage

	(1)	(2)	(3)
Executive Ownership$_{i,t}$ × Credit Push$_t$	0.052	0.039	0.058*
	(0.161)	(0.264)	(0.091)
Executive Ownership$_{i,t}$	-0.097**	-0.062	-0.083**
	(0.031)	(0.147)	(0.042)
Credit Push$_t$	-0.012***	-0.012***	-0.055
	(0.000)	(0.000)	(0.144)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry × Year FE	No	No	Yes
Observations	10221	10221	10221
R^2	0.583	0.615	0.641

Note: The sample covers 2006-2012 and estimates equation 1. Executive Ownership$_{it}$ is the number of shares owned by the executives divided by shares outstanding. Credit Push$_t$ denotes whether t $\geq$ 2009. The controls are same as in Table A6. p-values are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% levels. Standard errors are clustered at the firm level.

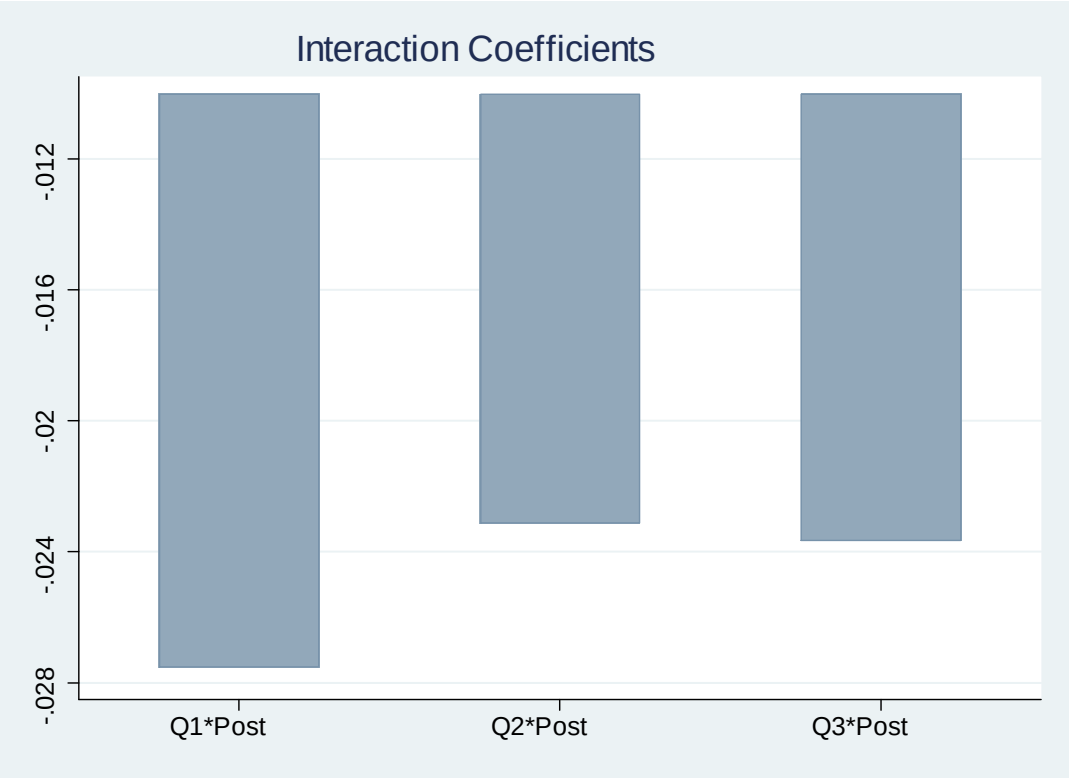

Figure A1. Interaction Between Executive Ownership Quartiles and Credit Shock with Book Leverage, 2007-2010. This figure illustrates the almost monotonous increase in the impact of the interaction term between different quartiles of executive ownership and credit shock on Book Leverage for the period 2007-2010.

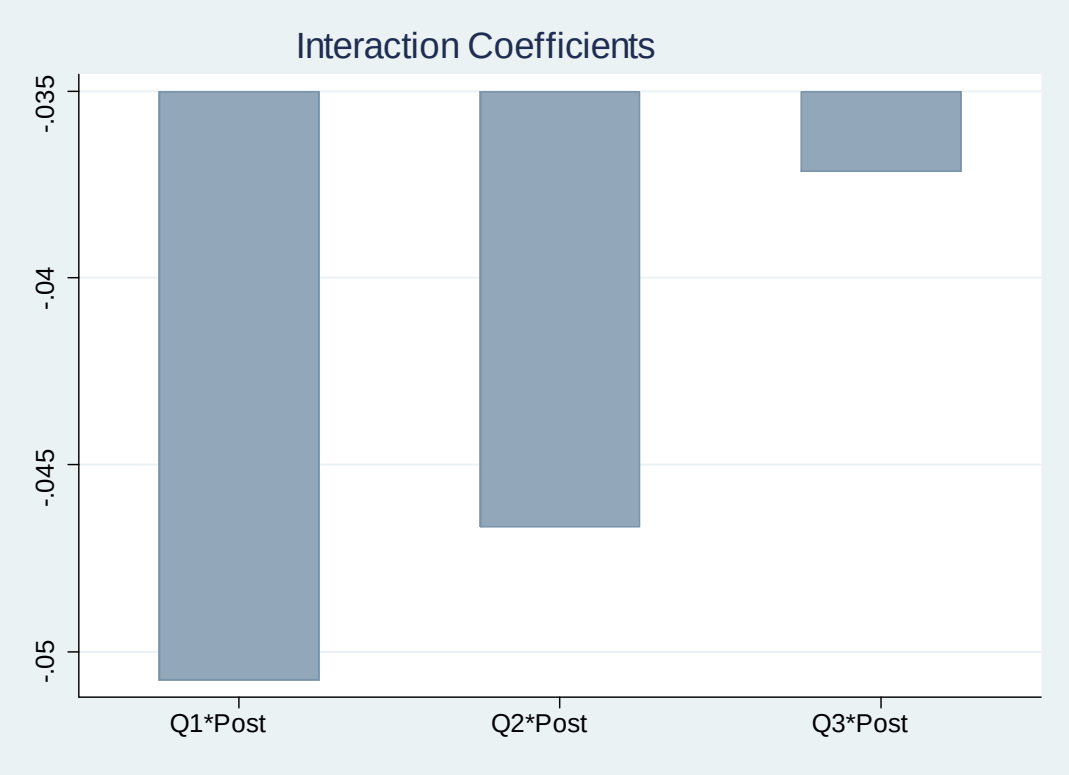

Figure A2. Interaction Between Executive Ownership Quartiles and Credit Shock with Book Leverage, 2008-2009. This figure illustrates the monotonous increase in the impact of the interaction term between different quartiles of executive ownership and credit shock on Book Leverage for the period 2008-2009.

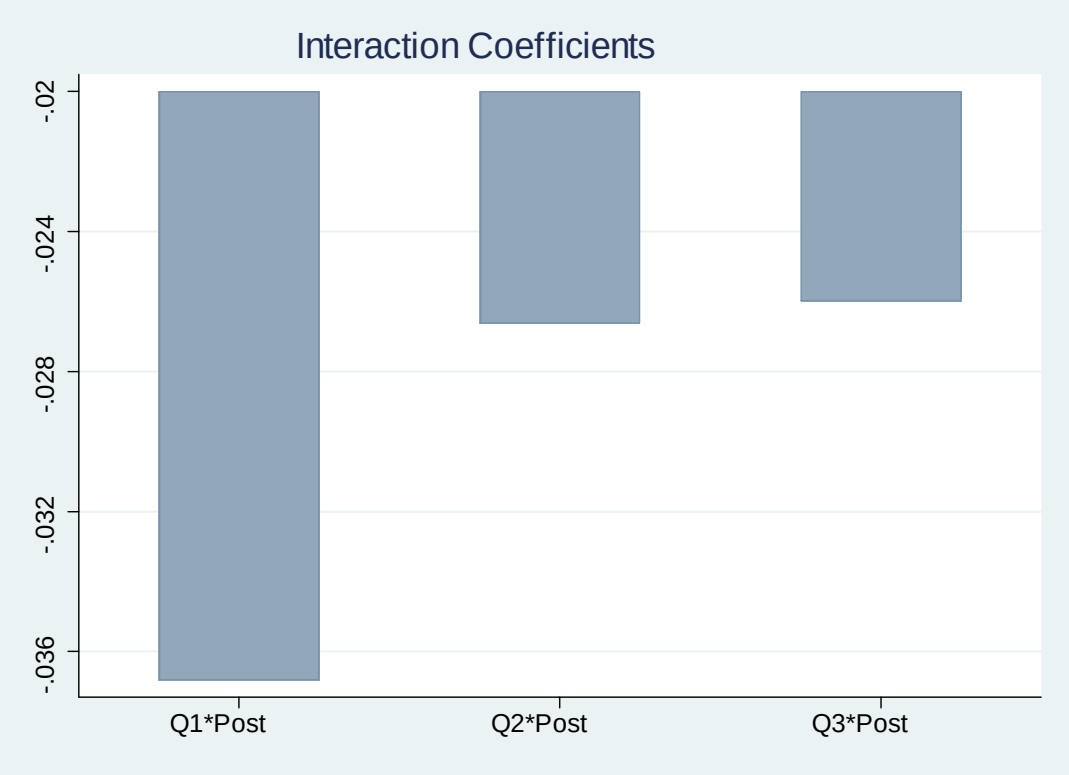

Figure A3. Interaction Between Executive Ownership Quartiles and Credit Shock with Market Leverage, 2007-2010. This figure illustrates the monotonous increase in the impact of the interaction term between different quartiles of executive ownership and credit shock on Market Leverage for the period 2007-2010.

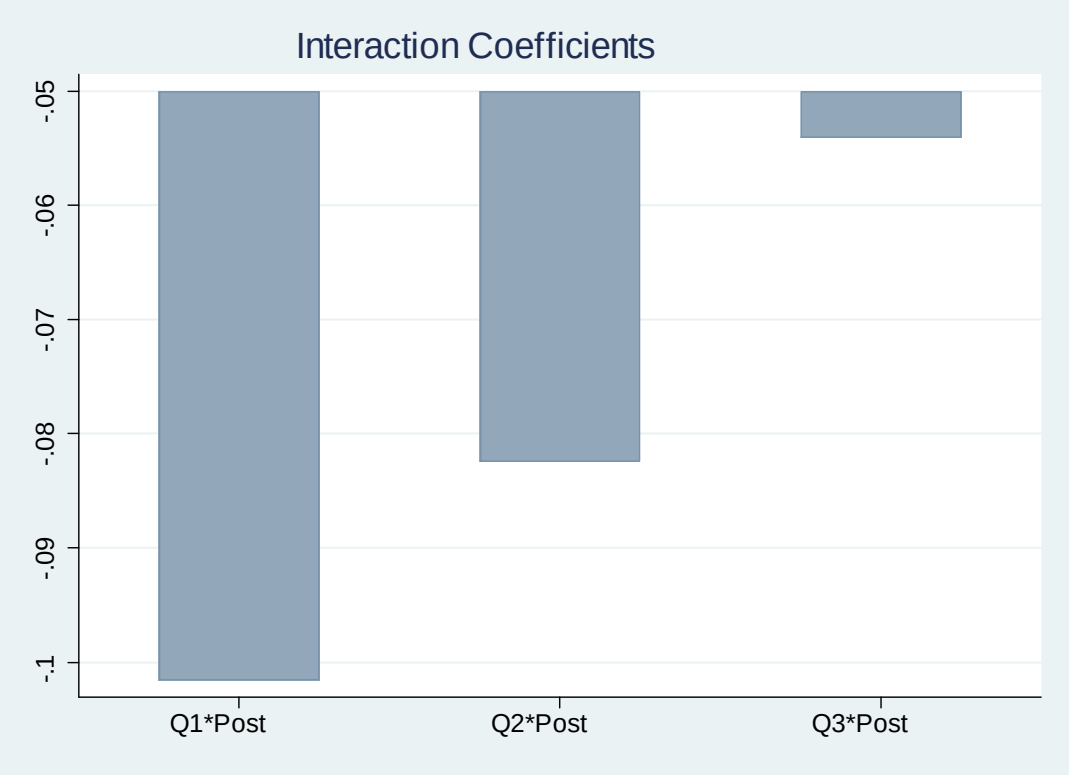

Figure A4. Interaction Between Executive Ownership Quartiles and Credit Shock with Market Leverage, 2008-2009. This figure illustrates the monotonous increase in the impact of the interaction term between different quartiles of executive ownership and credit shock on Market Leverage for the period 2008-2009.

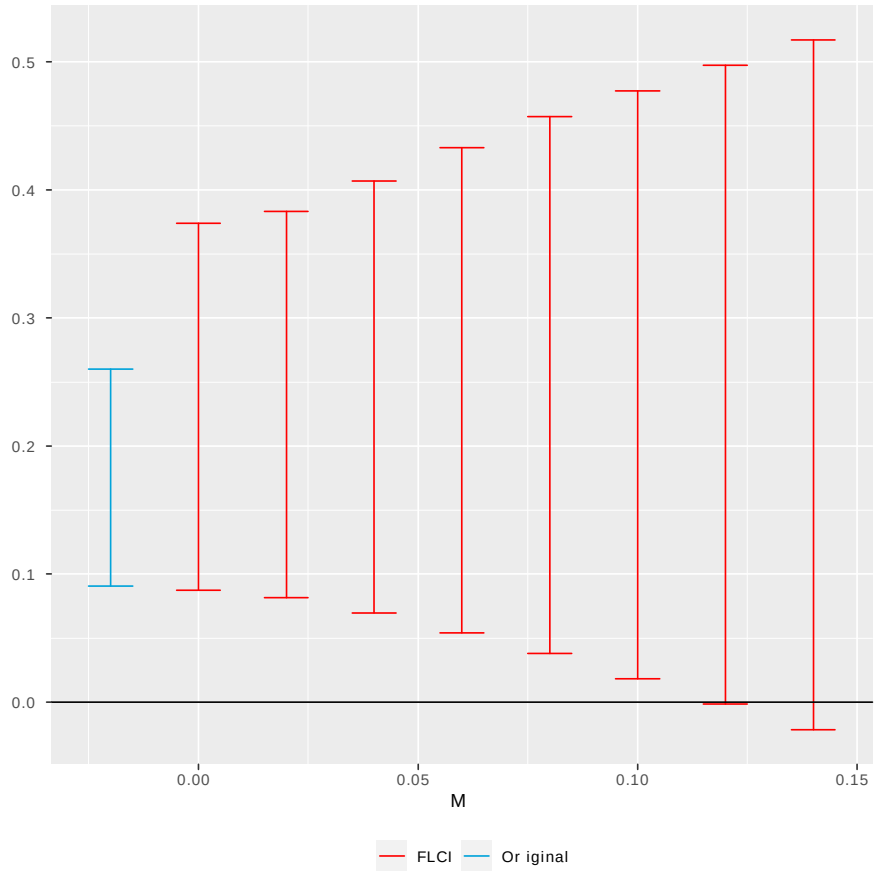

Figure A5: Sensitivity Analysis for Dynamic Regression with Book Leverage: This figure reports the sensitivity analysis to failures of the parallel lines assumption following Rambachan and Roth (2019). We check the coefficient of the interaction term between executive ownership and the 2009 year dummy with Book Leverage as the dependent variable. The sample period is 2006-2012. The x-axis is the values of the nonlinearity parameter (M) that captures the amount of deviation from parallel trends. The y-axis is the range of estimated coefficient values for the interaction coefficient. "FLCI" refers to the optimal fixed length confidence intervals for the interaction coefficient assuming $M > 0$. "Original" is the confidence interval for the interaction coefficient when $M = 0$ (i.e. the parallel trend assumption perfectly holds). Both FLCI and CI are using 95% confidence level.