Credit Stimulus, Executive Ownership, and Firm Leverage*

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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

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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.

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. It was exceptionally

large and unanticipated (Naughton, 2009 and Deng et al. 2015).[1] Importantly, for the period that we study (i.e. 2008-2009), 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 banks to lend and they lent."

The baseline approach we adopt in this study is an interaction coefficient to measure heterogeneous changes caused by an exogenous shock. We compare the pre- versus post-stimulus time periods exploiting cross-sectional differences in the executive ownership level across firms at the time when the credit stimulus is announced.

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 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 own 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 three percent higher leverage. Thus, we show that the structure of executive compensation has a significant influence on how

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

[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 as it was disclosed in 2006 (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.

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 show that the leverage ratios of high as well as low managerial ownership firms follow a similar trend in the pre-stimulus period. However, in the post-stimulus period, the executives of firms with higher ownership increase their leverage ratios dramatically.

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 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 both for 2008-2009 period and for 2007-2010 period. We find that, similar to our prediction, firms with higher executive ownership levels borrow more than the firms with low levels of executive ownership.

Third, we redo the analysis using a set of non-linear 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. In the second specification, we re-estimate our benchmark model by including quartile dummies for the executive ownership variable in those firms reporting non-zero ownership values. 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. Our main findings still hold true.

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.

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.

Finally, we did more robustness tests including: a) using time fixed effects; b) a placebo test in which we randomly designate 2011 as the year of credit stimulus; c) using firm fixed effects; d) testing if our results are driven by a disproportionately large impact of the credit stimulus 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 as an alternate measure of managerial pay-for-performance sensitivity.

Taken together, consistent findings across all these tests 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 studies. 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 (2014); Panousi and Papanikolau (2012) 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, this 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 credit demand.

The paper proceeds as follows. Section 2 discusses the theoretical motivations that underpin our empirical tests and the main variables that we use. 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 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 (e.g. 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 SOEs.

Table 1 summarizes the key variables in our main sample which is a two-year (2008 and 2009) panel of publicly-listed Chinese firms. We have data on 1,530 firms. We start by reporting the leverage and compensation proxies which are at the center of our empirical analysis. The

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

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 0.5 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 0.30, 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 observed 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 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 sample period.

The average executive ownership in our sample is 1.85% 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.[5]

Insert Table 1 about here

[5] A more detailed comparison of the firms in the database is reported in Section A of the Online Appendix.

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, 2018. 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%. 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 most of our empirical tests, we restrict our sample period to two years: 2008, which captures the baseline leverage and compensation structure before the credit push, and 2009, which incorporates the change in these variables subsequent to 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 end of 2008 to the end of 2009 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 public-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.[6]

Insert Figure 3 about here

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. 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 2008. 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 2009. The gray dots represent the relationship between leverage and borrowing cost in 2009. For each of the 20 leverage ratios, the gray dots

[6]Section B of the Online Appendix provides a formal test of this figure.

(i.e. 2009) lie below the black dots (2008). The fitted dotted line for 2009 is also below the solid line (2008) 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 2007 to 2010. Again the figure shows that pre-stimulus period had consistently higher borrowing costs compared to 2010 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 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 were 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 baseline analyses using several extensions.

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 requires that leverage ratio of high as well as low managerial ownership firms follow a similar trend in the pre-stimulus period. Below we discuss why we believe that the parallel trends assumption is valid for our sample.

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 8-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.

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 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 or market) 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.[7] 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 the 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 2008 to 2009 for firms with varying levels of executive ownership.

Insert Table 2 about here

[7] This definition was also used by Panousi and Papanikolaou (2012) who use the 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 while Panel B presents the estimation results based on market leverage. 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 0.206 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 0.014 in the absolute level of book leverage (0.206×0.07). Since the sample average of book leverage is 0.5, this is an economically significant increase of almost three percent. This increase in book leverage is in addition to the predicted increase of 0.061 in book leverage for all firms after the credit expansion (based on the coefficient of 0.061 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 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 and Song (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 the results in column 1 are after controlling for 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 of Panel A, 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. 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 the size and significance remains essentially unchanged when we introduce industry or industry-year fixed effects (columns 2 and 3).

In Panel B of Table 2 we repeat the analysis with market leverage as the dependent variable in equation 3. The coefficient for $ExecutiveOwnership_{it} \times CreditPush_t$ (β_3) in the most restrictive specification (column 3 of Panel B of Table 2) is 0.327 and significant at one percent level. For the post-credit expansion, this implies an approximate increase of 0.025 in the market leverage for one standard deviation increase in the managerial-ownership.

Since the sample mean of $MarketLeverage_{it}$ is 0.30, this translates into an economically large increase of over 8%. As in Panel A, the coefficient for $ExecutiveOwnership_{it}$ continues to be negative and significant. The coefficient for $CreditPush_t$ is negative, implying a decrease in market leverage from 2008 to 2009. 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 detail discussion). Since our market leverage ratio is calculated at the end of 2008 and 2009, the huge 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.

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 ratio. 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 and Panel B of Table 2 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 Robustness to Longer Sample Period

The sample period of all of our tests has been the two year period 2008-2009. This choice was driven by our belief that the ceteris paribus assumption is more likely to be true over this short period. In Table 3, we re-estimate our panel regression over a longer, four year period (2007-2010). We refer to this larger sample as the "Long Event Sample" to distinguish it from our baseline sample period of 2008-2009 (denoted as "Short Event Sample").

Again, for both book leverage (Panel A) as well as for market leverage (Panel B), we find that the interaction term $ExecutiveOwnership_{it} \times CreditPush_t$ has a positive and significant (at one percent level) coefficient, similar to our main results reported in Table 2 for the 2008-2009 sample.

Insert Table 3 about here

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

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

The results reported in Table 4 show that the interaction term is positive and significant for both book leverage (Panel A) and for market leverage (Panel B). Repeating this analysis for the longer 2007-2010 period produces similar results (see Online Appendix Table A5). The results show that the firms with high levels of executive ownership (i.e. in top quartile of executive ownership level) are likely to increase their leverage more in the post credit stimulus period.

This result is consistent with our findings from sections 4.2 ad 4.3.

Insert Table 4 about here

In the second non-linear specification, we drop all firms that report executive ownership level of zero. Within this sub-sample, we create four dummy variables representing executive ownership quartiles, where *ExQuartile1* denotes the lowest 25% and *ExQuartile4* denotes the top 25% executive ownership level. We use *ExQuartile4* as the reference group and estimate:

$$\begin{aligned} Leverage\,Ratio_{it} = \beta_0 + \sum_{n=1}^{3} \beta_n (ExQuartile_n)_{2008} + \beta_4 Credit\,Push_t + \\ + \beta_5 (ExQuartile3)_{2008} \times Credit\,Push_t + \\ + \beta_6 (ExQuartile2)_{2008} \times Credit\,Push_t + \\ + \beta_7 (ExQuartile1)_{2008} \times Credit\,Push_t + \\ + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \end{aligned} \tag{5}$$

Table 5 reports the results for the specification using book leverage as the dependent variable. The coefficients for the interaction terms decrease monotonically from the highest to the lowest executive ownership quartile. We observe a similar pattern when we use market leverage. To conserve space, we do not report the results for market leverage in the paper but include them as Table A6 of the Online Appendix.

We observe a similar trend for the longer period of 2007-2010 (see Table A7 and Table A8 of the Online Appendix). These findings again support our benchmark results.

Insert Table 5 about here

We plot the interaction coefficients for both Short Term Sample and for Long Term Sample and present them as Figures A1-A4 in the Online Appendix.

4.5 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 for book leverage in Table 6 and find that the interaction coefficient is positive and significant for 2009 and 2010 at one percent level. The results for market leverage are very similar and are reported in Table A9 of the Online Appendix. Thus, compared to 2008 (our omitted year), a larger executive ownership leads to greater leverage levels in the post credit push period for upto two years. However, this effect becomes statistically insignificant after 2010.

Insert Table 6 about here

4.6 Demand Side Interpretation of the Results

To confirm that our results capture the effects of the structure of executive ownership on credit demand rather than credit supply, we conduct two additional analyses. First, 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 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 3,000 to 1,256. However, this sample allows 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 will be 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.[8] 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 7 and A10 of the Online Appendix. The coefficients for the interaction term $ExecutiveOwnership_{it} \times CreditPush_t$ for both book leverage (Table 7) and market leverage (Table A10 of the Online Appendix) are positive and significant at one percent level. In fact,

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

the estimated coefficients, after controlling for prior banking relationship, are very similar to those estimated for the baseline specification reported in Table 2.

Insert Table 7 about here

In addition to the test discussed above, we also show 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: 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. These results are described in more detail in Section C of the Online Appendix.

Additionally, to explore if the characterization of bank-firm relationship has changed over time, we compared bank-firm relationship 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 remained stable. We provide a detailed discussion in Section D of the Online Appendix.

5 Propensity Score Matching

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. 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.[9]

We use the 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:

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

[9] Section E of the Online Appendix provides a detailed description of the PSM procedure.

The model described above is similar to the equation (3) with one modification. We use the dummy variable $TopQuartile_{2008}$ instead of $ExecutiveOwnership_{it}$. 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 (2009) 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 8. In Panel A, 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 0.023 and is significant at the one 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 0.023 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 4.6% (0.023 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.

In Panel B we present the results using the market leverage as the dependent variable in equation 8. Column 1 (firm controls included but no fixed effects) shows that the coefficient β_3 of the interaction term $TopQuartile_{2008} \times CreditPush_t$ is 0.019 and significant at the five percent level. This is equivalent to around 6.2% (0.019 divided by the sample mean market leverage of 0.30) 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).

Insert Table 8 about here

6 Robustness Tests

In this section we discuss more robustness tests that validate our findings from section 4.

6.1 Time Fixed Effects

We also estimate our baseline specification using the data from 2007-2010 (Long Event Sample) 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 9. The main variable of interest is β_3, the coefficient for the interaction term $Executive\,Ownership_{it} \times Credit\,Push_t$. In panel A, 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. Panel B reports the results for market leverage and again we find that the coefficient for the interaction term is positive and significant across all specifications.

Insert Table 9 about here

6.2 Placebo Test

A possible concern about our findings is the validity of our natural experiment. Although Figure 5 shows a clear discontinuity around 2008, to establish a stronger claim for causality, we design a falsification test in which we designate 2012 as a placebo "post-credit push" year by assigning a fake credit push at the end of 2011. We rerun all our tests on the 2011 and

2012 panel data, effectively simulating a two year period around the fake credit stimulus. The results of this placebo test are presented in Table A12 of the Online Appendix.

Since there was no policy shift in the placebo period, we expect 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 $ExecutiveOwnership_{it} \times Post2012$ is statistically insignificant.[10]

6.3 Firm-Fixed Effects

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 A13 of the Online Appendix reports the results of our panel regressions that include firm fixed effects. As in the previous table, Panel A of Table A13 of the Online Appendix describes our estimation results using book leverage as the dependent variable. 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 2008 to 2009 for a specific firm is entirely due to managerial ownership, the credit push and the interaction of these two factors. The coefficient for $ExecutiveOwnership_{it} \times CreditPush_t$ (β_3) is positive and significant at 5% level for book leverage. Thus, even for the same firm, an increase in executive-ownership implies a significantly larger increase in leverage following the credit push. 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

[10] 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.

the size and the significance of the coefficient for $ExecutiveOwnership_{it} \times CreditPush_t$ (β_3) remains largely unchanged.

The results reported in Panel B of Table A13 of the Online Appendix employ market leverage as the dependent variable. The results are even stronger - the coefficient for $ExecutiveOwnership_{it} \times CreditPush_t$ (β_3) is positive and significant at one percent level. The estimated values of the β_3 are consistently above 0.20 in all specifications (columns 1 to 3).

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 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 Chen et al. (2012) and Liao et al. (2014) and use the ultimate controller of the firms. 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 A14 of the Online Appendix.

The coefficient for $ExecutiveOwnership_{it} \times CreditPush_t$ continues to be positive and significant for both measures of leverage. The other variables of interest continue to have coefficients that are of same sign and significance as reported in our main results of Table 2. Thus, our result that heterogeneity in managerial compensation structure is systematically related to changes in firm's leverage, continues to hold for the sample that excludes 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: air transport, civil engineering, construction, electricity production and distribution, road transport, water transport, and telecom, 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 the Short Event Sample (Table A15 of the Online Appendix) as well as for the Long Event Sample (see Table A16 of the Online Appendix). The interaction coefficient remains positive and significant for both book and market leverage across the two samples.

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 results for the short event sample (2008-2009) are reported in Table A17 of the Online Appendix. The coefficient for interaction term ranges from 1.017 to 0.866 and is significant at the one percent level across all specifications. As the model estimated is a log-linear specifica-

tion, the coefficients are best interpreted as the impact of one standard deviation increase in executive ownership on increase in debt following the credit stimulus. For a coefficient estimate of 1.017 and the standard deviation executive ownership of 0.07 (Table 1), it translates into an increase of 7% in debt ($e^{1.107\times0.07}= e^{0.0707}$) .

We observe a similar trend for the long event sample (2007-2010) as well. We find that, one standard deviation increase in executive ownership implies an increase of $e^{0.703\times0.07}$ which is $e^{0.04921}$(see Online Appendix Table A18). For this small value, one can interpret that one standard deviation increase in executive ownership translates into approximately 5% increase in debt in the post credit push period compared to a similar increase in executive ownership in the pre-credit push period.

6.7 Pre-Credit Push Compensation

A possible concern is that 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 A19 of the Online Appendix show that our original findings remain robust to this alternative specification.

Additionally, we estimate the following model in which we interact the top quartile executive ownership dummy (based on 2008 executive ownership levels) and individual year dummies.

The specification is :

$$Leverage\,Ratio_{it} = \beta_0 + \beta_1 TopQuartile_{2008} + \sum_{m=2007}^{2010} \beta_m Year_m + \\ + \sum_{m=2007}^{2010} \beta_m TopQuartile_{2008} \times Year_m + \\ + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it}. \tag{11}$$

As the credit shock occurred at the end of 2008, we use 2008 as the base year to compare the effect of the shock on the leverages of the firms. For this reason, we use the period of 2007-2010 to run this analysis. We again find results that support our base model (See Table A20 and A21 of the Online Appendix). We also plot the changes in the the interaction coefficients in Figures A5 and A6 of the Online Appendix.

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 Alternate Measure of Pay-Performance Sensitivity

We use equity-to-salary ratio as an alternative way to measure the executive pay-performance sensitivity. We provide a detailed discussion in Section F of the Online Appendix. The results confirm our earlier findings.

7 Conclusions

How the private sector reacts to a government-initiated credit stimulus is an important topic for economists as well as for policy makers. After all, the ultimate goal for expansionary credit policies is to induce greater borrowing by households and corporations. However, when faced with 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: 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.

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

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

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

3. Agarwal, S., Deng, Y., Gu, Q., He, J., Qian, W., and Ren, Y. (2019). Mortgage Debt, Hand-to-Mouth Households, and Monetary Policy Transmission. *SSRN 3298878*.

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

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

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

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

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

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

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

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

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

13. D'Acunto, F., and Rossi, A. (2017). Regressive mortgage credit redistribution in the

post-crisis era. *Robert H. Smith School Research Paper No. 2833961.*

14. Dahiya, S., Ge, L., and Gete, P. (2018). A Model of Managerial Compensation, Firm Leverage and Credit Stimulus. *Georgetown McDonough School of Business Research Paper No. 3083563.*

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

16. Dell'Ariccia, G., Laeven, L. and 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.

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

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

19. Edmans, A. and Gabaix, X. (2016), Executive compensation: A modern primer, *Journal of Economic Literature*, 54(4), 1232–1287.

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

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

22. Firth, M., Lin, C. and 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.

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

24. Gambacorta, L., and Shin, H. S. (2018). Why bank capital matters for monetary policy. *Journal of Financial Intermediation*, 35, 17-29.

25. Garvey, G. T. and Hanka, G. (1999), Capital structure and corporate control: The

effect of antitakeover statutes on firm leverage, *The Journal of Finance*, 54(2), 519–546.

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

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

28. Gopalan, R., Milbourn, T., Song, F. and Thakor, A. V. (2014), Duration of executive compensation, *The Journal of Finance*, 69(6), 2777–2817.

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

30. Huang, G. and Song, F. (2006), The determinants of capital structure: Evidence from China, China Economic Review, 17(1), 14–36.

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

32. Jiang, F. and Kim, K. A. (2015), Corporate governance in China: A modern perspective, *Journal of Corporate Finance*, 32, 190–216.

33. Jiang, F., and Kim, K. (2020). Corporate governance in China: A survey. *Review of Finance*.

34. Kato, H. K., Lemmon, M., Luo, M. and 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.

35. Lemmon, M. L., Roberts, M. R. and 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.

36. Li, K., Wang, T., Cheung, Y.L. and Jiang, P. (2011), Privatization and risk sharing: Evidence from the split share structure reform in China, *Review of Financial Studies*, 24(7), 2499–2525.

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

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

39. Malmendier, U., Tate, G. and 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.

40. Michaely, R. and Roberts, M. R. (2011), Corporate dividend policies: Lessons from private firms, *The Review of Financial Studies*, 25(3), 711–746.

41. Milidonis, A. and Stathopoulos, K. (2014), Managerial incentives, risk aversion, and debt, *Journal of Financial and Quantitative Analysis*, 49(02), 453–481.

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

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

44. Ouyang, M. and 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.

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

46. Piotroski, J. D. and 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.

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

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

49. Rosenbaum, P. R. and Rubin, D. B. (1983), The central role of the propensity score in

observational studies for causal effects, *Biometrika*, 70(1), 41–55.

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

51. 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 the continuous variables are winsorized at the 1% and 99% level.

1. Main variables:

Book Leverage is the ratio of total debt to total assets of the firm.

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

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.

Equity-to-Salary is the ratio of the market value of shares held by the executives to the annual cash compensation for executives.

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 t = 2012 and zero otherwise.

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

$\mathbf{Year}_t$ represent year dummies

$\mathbf{Quartile}_i$ represents the i-th quartile of executive ownership with Quartile 1 being the lowest quartile and Quartile 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.

Firm Size is the logarithm of the total sales 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.

Stock Holding Concentration is the sum of squares of the percent of shares of the five largest shareholders.

Institutional Share is the ratio of shares held by the institutional investors to the total shares of the firm.

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

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

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	3007	1530	0.50	0.51	0.19	0.05	1.00
Market Leverage	3007	1530	0.30	0.26	0.19	0.05	0.81
Executive Ownership	3007	150	0.02	0.00	0.07	0.00	0.63
Equity-to-Salary	2999	1529	61.43	0.00	275.07	0.00	2801.08
Interest Expense (%)	1956	1180	2.89	2.78	1.76	0.01	8.18
B. Control Variables							
ROA (net)	3007	1530	0.05	0.05	0.08	-0.42	0.39
Firm Size	3007	1530	21.74	20.96	1.48	14.4	28
Market Book	3007	1530	1.79	1.36	1.52	0.14	1.08
Asset Tangibility	3007	1530	0.28	0.25	0.19	0.00	0.92
Dividend	3007	1530	0.54	1.00	0.50	0.00	1.00
Positive Net Profit	3007	1530	0.87	1.00	0.34	0.00	1.00
SOE	3007	1530	0.51	1.00	0.50	0.00	1.00
Stock Holding Concentration	3007	1530	0.18	0.15	0.12	0.00	0.76
Institutional Share	3007	1530	0.07	0.03	0.10	0.00	0.68
Bank Holding	3007	1530	0.03	0.00	0.17	0.00	1.00
Foreign Holding	3007	1530	0.06	0.00	0.24	0.00	1.00
CEO Turnover	3007	1530	0.19	0.00	0.40	0.00	1.00
CEO Chairman	2921	1510	0.85	1.00	0.36	0.00	1.00
Compensation Committee	3007	1530	0.85	1.00	0.36	0.00	1.00
Board Size	2957	1526	9.19	9.00	1.89	4.00	18.00
Board Independence	2957	1526	0.36	0.33	0.05	0.09	0.71

This table reports the summary statistics of the 1,530 public-listed Chinese firms over 2008-2009. The unit of observation is firm-year. Variables are defined in the Appendix.

Table 2. Executive Ownership and Firm Leverage, 2008-2009

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.354	0.391	0.393

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.604	0.636	0.640

This table estimates equation 3 for 2008-2009. 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. Variables are defined in the Appendix. p-values are in parentheses. *, ** and *** denote significance at 10%, 5% and 1% level. Standard errors are clustered at the firm level.

Table 3. Executive Ownership and Firm Leverage, 2007-2010

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.310	0.348	0.364

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.584	0.613	0.642

This table reports the long event sample that covers 2007-2010. The 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 4. Top Quartile Executive Ownership and Firm Leverage, 2008-2009

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.354	0.392	0.393

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.606	0.638	0.641

This table reports the estimation of equation 4. The sample covers 2008-2009. The 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 5. Executive Ownership Quartiles and Book Leverage, 2008-2009

	(1)	(2)	(3)
$Quartile3_{2008} \times$Credit $Push_t$	-0.044***	-0.041***	-0.037***
	(0.002)	(0.002)	(0.007)
$Quartile2_{2008} \times$Credit $Push_t$	-0.056***	-0.049***	-0.047***
	(0.000)	(0.000)	(0.001)
$Quartile1_{2008} \times$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 x Year FE	No	No	Yes
Observations	1501	1501	1501
R^2	0.416	0.466	0.468

This table estimates equation 5 for non-zero executive ownership firms over the period 2008-2009 with Book Leverage as the dependent variable. The 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. Dynamic Regression for 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$_{2010}$	0.275***	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 x Year FE	No	No	Yes
Observations	10221	10221	10221
R^2	0.319	0.356	0.361

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

	(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 x Year FE	No	No	Yes
Observations	1256	1256	1256
R^2	0.398	0.429	0.430

This table reports the estimation of equation 7 with Book Leverage as the dependent variable. The sample covers 2008 and 2009. The Bank-Borrower Relationship is a indicator that equals one if firm i had borrowed from bank b at least once during the 2006–2008 period (pre-credit push) and zero otherwise. 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 return to assets, size of the firm, market-to-book ratio, assets tangibility, dividend, positive net profit, state owned enterprise, ownership concentration, institutional ownership, bank holding and foreign holding. 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 8. Executive Ownership and Firm Leverage: Propensity Score Matching

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	1204	1204	1204
R^2	0.371	0.410	0.412

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	1204	1204	1204
R^2	0.627	0.658	0.665

This table estimates equation 8 for 2008-2009. It consists of 301 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. Significance levels are same as in Table 2. All 16 firm characteristic variables from Panel B of Table 1 have been used to calculate the propensity scores. p-values are in parentheses. Standard errors are clustered at the firm level.

Table 9. Executive Ownership and Firm Leverage with Year FE, 2007-2010.

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.327	0.361	0.364

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.601	0.633	0.642

This table estimates equation 9 with a sample that covers 2007-2010. The variables are defined in the Appendix. The remaining 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.

Figures

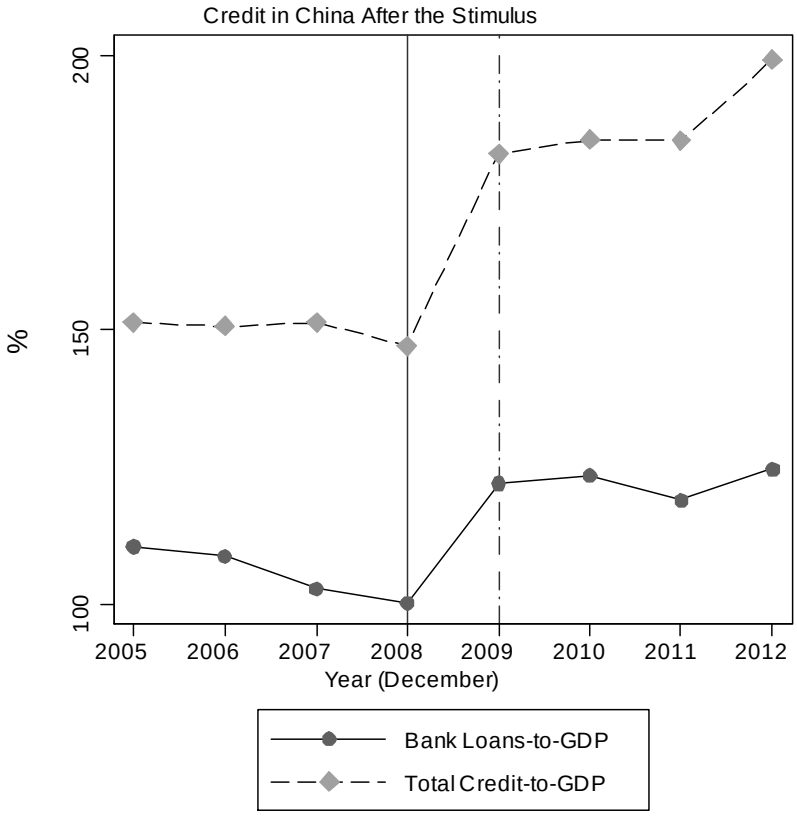

Figure 1. The credit-to-GDP ratio vs the bank loans-to-GDP ratio. The Credit-to-GDP is the ratio of the credit to GDP for the non-financial sector. The Bank Loans-to-GDP is the ratio of the aggregate bank loans to GDP. The vertical solid line is end of 2008, which is when the credit stimulus was announced by the Chinese government. The vertical dashed-line is the end of 2009, one year after the credit push. *Sources: Bank for International Settlements, CSMAR database and China Banking Regulatory Commission (CBRC).*

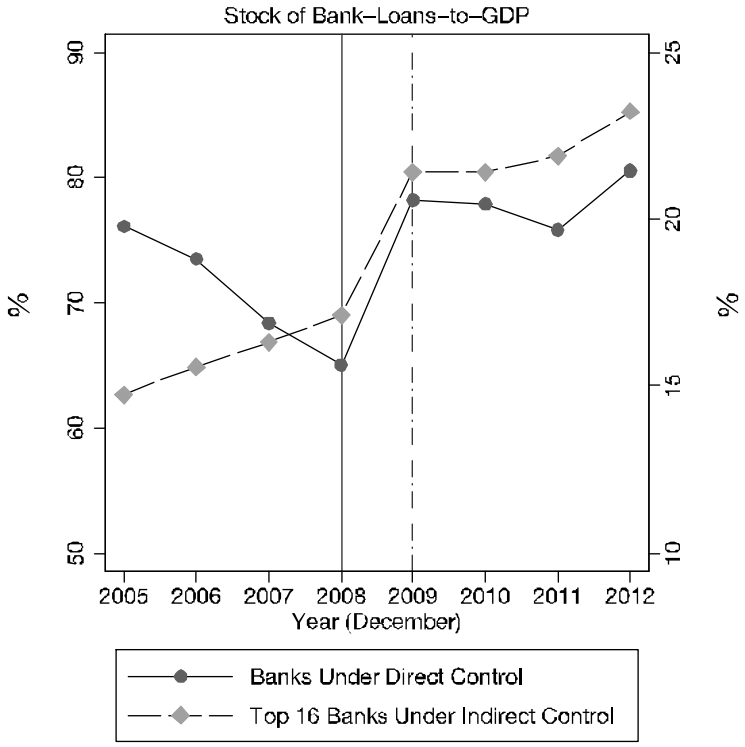

Figure 2. Bank-loans-to-GDP ratio in China for different types of banks. The vertical line is end of 2008, which is when the credit stimulus was announced by the Chinese government. The vertical dashed-line is end of 2009, one year after the credit push. 2008-09 is the sample we study in the empirical 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. *Source: China Banking Regulatory Commission (CBRC).*

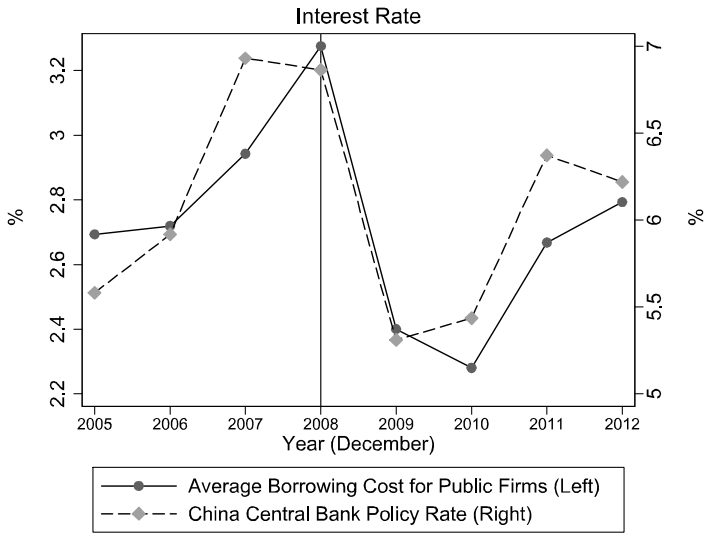

Figure 3. Cost of borrowing in China. This figure plots the policy rate of China's Central Bank (dashed line) and the average cost of debt for the Chinese public firms (solid line). The vertical line is end of 2008, which is when the credit stimulus was announced by the Chinese government. *Source: Wind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

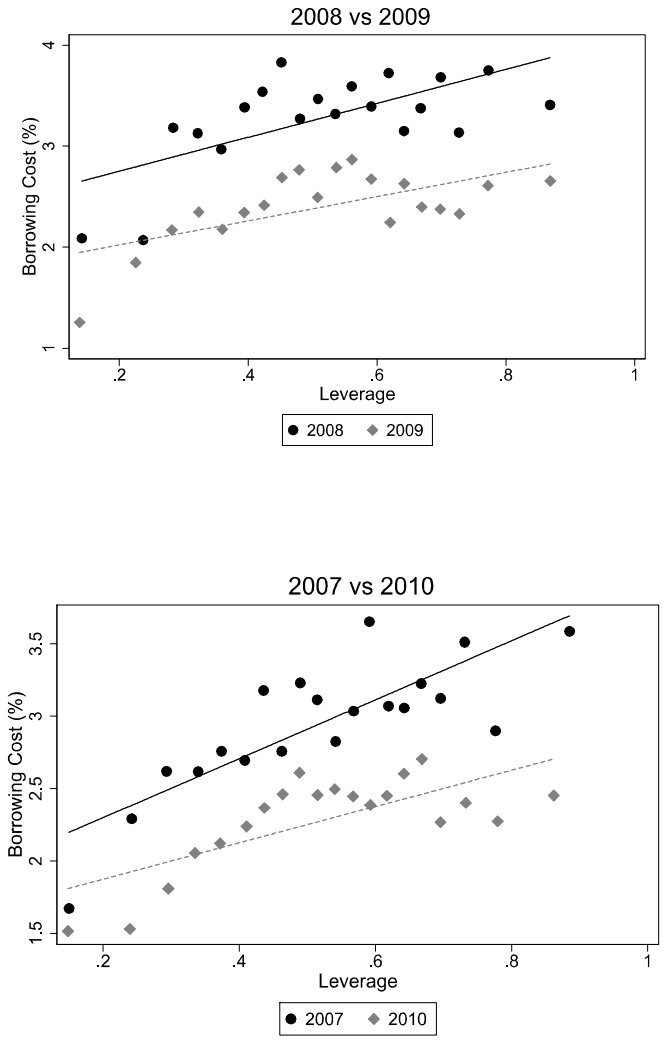

Figure 4. Borrowing cost versus leverage for public non-financial firms in China before and after the 2008 credit push. The figure in the upper panel compares 2008 vs 2009. The figure in the bottom panel compares 2007 vs 2010. For ease of appearance, the points are grouped into 20 bins of around 70 observations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

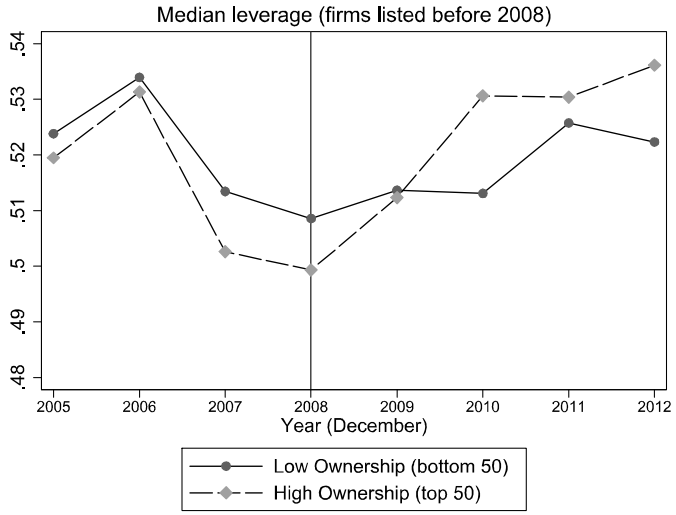

Figure 5. The median book leverage ratio for the non-financial public firms. The vertical line is end of 2008, which is when the credit stimulus was announced by the Chinese government. The solid line is the median leverage for the group of firms with top 50 percentile executive ownership in 2008, the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

NOT FOR PUBLICATION
ONLINE APPENDIX

A. Database Descriptives

This online appendix provides additional results and robustness tests. The tables in this appendix follow the order in which they are mentioned in the main paper. For our baseline specification we focus on the 2008-2009 period which we denote as the "short sample period". We have 3,007 firm-observations over this period. Table A1 provides the industry-sector composition of this sample. The 3,007 firm-year observations consist of 1,482 observations that are related to 760 firms with zero executive ownership and 1,525 observations that are related to 770 firms with non-zero executive ownership.

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 (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.

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 1,525 non-zero executive ownership firm-year observations, of which, 386 are by top-quartile executive ownership firms and the 1,139 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.

B. Estimation of Average Borrowing Cost: Pre and Post 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 borrowing costs, we test this more formally by estimating a regression model of the following form:

$$\text{Borrowing Cost} = \beta_0+\beta_1 LeverageRatio_{it}+\beta_2 Credit\,Push_t+\beta_3 LeverageRatio_{it}\times Credit\,Push_t+ \\ +\textstyle\sum_k \beta_k Controls_{itk}+\alpha_j+u_{it} \quad \text{(A2)}$$

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 $Controls_{itk}$ 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 -0.30 for *CreditPush*$_t$. The coefficient for $BookLeverage_{it} \times Credit\,Push_t$ is -0.845, 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.

C. 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. 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.[11] 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 and others) 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,

[11] 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.

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.

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 increase in the leverages was observed due to 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 $Top\,Quartile$ 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 $Top\,Quartile$ 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. 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 characterstics.

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 *EquitytoSalary*. This ratio is defined as:

$$\text{EquitytoSalary} = \frac{EquityValue \times ExecutiveOwnership}{Ex.CashSalary} \qquad \text{(A3)}$$

Where *EquityValue* is market value of the firm at the end of the year and the *Executive-Ownership* is executive ownership level of the firm. So, the numerator is market value of the stock held by the executives. The *Ex.CashSalary* is the cash salary of the top three executives of the firms.[12]

We modify the baseline specification of equation (3) above by replacing $ExecutiveOwnership_{it}$ by $EquitytoSalary_{it}$:

$$Leverage\,Ratio_{it} = \beta_0 + \beta_1 EquitytoSalary_{it} + \beta_2 Credit\,Push_t + \beta_3 EquitytoSalary_{it} \times Credit\,Push_t + \sum_k \beta_k Controls_{itk} + \alpha_{jt} + u_{it} \qquad \text{(A4)}$$

The results from estimation of various regression models are described in Table A22. Again we use both book leverage (Panel A) as well as market leverage (Panel B) as our dependent variables. The first column of both panels shows that the firms with higher equity to salary ratio increased their leverage ratios significantly more in response to the credit push. The coefficient on the interaction term is positive and significant at the one percent level in both panels. Columns 2 and 3 provide estimations of expanded regressions that include industry and industry-year fixed effects. The size and statistical significance remain essentially unchanged. Thus, our core findings are robust to this alternative definition of pay for performance sensitivity of executives.

G. Additional Robustness Tests

[12] Data on executive ownership for Chinese firms is only available as an aggregate measure.

We conduct a number of robustness tests such as using different sample period, non-linear specifications, and placebo tests. These results are discussed in the main draft of the paper but to conserve space the tables reporting the results of these additional tests are included in this online appendix.

Online Appendix Tables

Table A1. Decomposition Per Sector

			Mean			
Industry	# Obs	% Obs	Int. Cost	Book Lev.	Market Lev.	Ex. Own.
Agriculture	50	1.66	3.42	0.41	0.18	3.15
Mining	113	3.76	2.47	0.45	0.22	0.17
Manufacturing	1732	57.60	3.07	0.48	0.28	2.56
Energy	157	5.22	4.02	0.60	0.43	0.02
Building	80	2.66	1.78	0.68	0.47	1.73
Wholesale & Retail	246	8.18	2.60	0.56	0.33	0.10
Transportation	123	4.09	2.82	0.44	0.31	0.01
Hotel and Catering	18	0.60	2.69	0.33	0.15	0.15
Information	84	2.79	2.14	0.37	0.18	6.43
Real Estate	253	8.41	2.08	0.57	0.36	0.52
Leasing & Business	32	1.06	2.54	0.46	0.27	3.22
Science & Technology	8	0.27	0.96	0.49	0.19	0.19
Environment	29	0.96	3.34	0.48	0.26	0.03
Education	2	0.07	4.40	0.56	0.34	0.04
Health & Social Welfare	4	0.27	0.99	0.17	0.06	0.00
Culture $ Sports	31	1.13	2.22	0.48	0.22	0.22
Comprehensive	45	1.50	2.88	0.51	0.33	0.01
Total	3007	100	2.89	0.50	0.30	1.85

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 2008-2009. 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)	1525	1482	0.59	0.47	-4.19	0.00
Firm Size	1525	1482	21.16	20.92	-4.35	0.00
Market Book	1525	1482	1.79	1.79	-0.07	0.94
Stock Holding Concentration	1525	1482	0.15	0.20	11.56	0.00
Institution Ownership	1525	1482	0.07	0.06	-2.46	0.01
SOE	1525	1482	0.48	0.54	3.58	0.00
Positive Net Profit	1525	1482	0.89	0.85	-3.23	0.00
Foreign Holding	1525	1482	0.05	0.08	3.57	0.00
Dividend	1525	1482	0.60	0.47	-7.38	0.00
Bank Holding	1525	1482	0.03	0.03	0.24	0.81
Asset Tangibility	1525	1482	0.27	0.28	1.42	0.15
CEO Turnover	1525	1482	0.17	0.22	3.02	0.00
CEO Chairman	1475	1446	0.82	0.88	4.51	0.00
Compensation Committee	1525	1482	0.84	0.85	0.74	0.46
Board Size	1502	1455	9.23	9.15	-1.20	0.23
Board Independence	1502	1455	0.36	0.36	1.73	0.08

This table compares between the zero and non-zero executive ownership firms across the sixteen firm characteristic variables. The variables are defined in the Appendix.

Table A3. Comparison Between Fourth-Quartile Executive Ownership Firms and Other Firms

Variable	# Obs.		Fourth-Quartile	Others		
	Top Quartile	Others	Mean	Mean	t-stat	p-values
ROA (net)	386	1139	0.08	0.05	-6.82	0.00
Firm Size	386	1139	20.52	21.37	11.21	0.00
Market Book	386	1139	2.57	1.53	-12.54	0.00
Stock Holding Concentration	386	1139	0.15	0.15	-0.24	0.81
Institution Ownership	386	1139	0.05	0.08	4.05	0.00
SOE	386	1139	0.10	0.61	19.17	0.00
Positive Net Profit	386	1139	0.95	0.87	-4.52	0.00
Foreign Shareholding	386	1139	0.06	0.04	-1.28	0.20
Dividend	386	1139	0.70	0.57	-4.37	0.00
Bank Holding	386	1139	0.00	0.04	3.53	0.00
Asset Tangibility	386	1139	0.23	0.29	4.90	0.00
CEO Turnover	386	1139	0.14	0.18	1.84	0.07
CEO Chairman	370	1105	0.66	0.87	9.14	0.00
Compensation Committee	386	1139	0.71	0.89	8.77	0.00
Board Size	383	1139	8.77	9.39	5.71	0.00
Board Independence	383	1139	0.37	0.36	-2.04	0.04

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

Table A4. Cost of Leverage Before and After the Credit Push

	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

This table estimates equation A2. The sample covers 2008 and 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. The variables are defined in the Appendix. Standard errors are clustered at the firm level.

Table A5. Top Quartile Executive Ownership and Firm Leverage, 2007-2010

Panel A: Book Leverage

	(1)	(2)	(3)
$TopQuartile_{2008} \times$Credit $Push_t$	0.028***	0.022***	0.022***
	(0.001)	(0.005)	(0.008)
$TopQuartile_{2008}$	-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 x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.309	0.348	0.364

Panel B: Market Leverage

	(1)	(2)	(3)
$TopQuartile_{2008} \times$Credit $Push_t$	0.027***	0.023**	0.027***
	(0.000)	(0.000)	(0.000)
$TopQuartile_{2008}$	-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 x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.584	0.613	0.642

This table gives the estimates of equation 4 but for the sample covering 2007-2010 period. The 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 A6. Executive Ownership Quartiles and Market Leverage, 2008-2009

	(1)	(2)	(3)
$Quartile3_{2008} \times$Credit $Push_t$	-0.060***	-0.060***	-0.054***
	(0.000)	(0.000)	(0.000)
$Quartile2_{2008} \times$Credit $Push_t$	-0.096***	-0.092***	-0.083***
	(0.000)	(0.000)	(0.000)
$Quartile1_{2008} \times$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 x Year FE	No	No	Yes
Observations	1501	1501	1501
R^2	0.631	0.676	0.679

This table estimates equation 5 for non-zero executive ownership firms over the period 2008-2009 with Market Leverage as the dependent variable. The 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 A7. Executive Ownership Quartiles and Book Leverage, 2007-2010

	(1)	(2)	(3)
$Quartile3_{2008} \times$Credit $Push_t$	-0.029**	-0.026*	-0.024*
	(0.046)	(0.060)	(0.078)
$Quartile2_{2008} \times$Credit $Push_t$	-0.028**	-0.024*	-0.023*
	(0.040)	(0.067)	(0.077)
$Quartile1_{2008} \times$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 x Year FE	No	No	Yes
Observations	2933	2933	2933
R^2	0.372	0.428	0.444

This table reports the estimation of equation 5 for non-zero executive ownership firms over the period 2007-2010 with Book Leverage as the dependent variable. The 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 A8. Executive Ownership Quartiles and Market Leverage, 2007-2010

	(1)	(2)	(3)
$Quartile3_{2008} \times$Credit $Push_t$	-0.023**	-0.024**	-0.026**
	(0.038)	(0.025)	(0.011)
$Quartile2_{2008} \times$Credit $Push_t$	-0.022**	-0.021**	-0.027***
	(0.030)	(0.037)	(0.006)
$Quartile1_{2008} \times$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 x Year FE	No	No	Yes
Observations	2933	2933	2933
R^2	0.595	0.637	0.674

This table reports the estimation of equation 5 for non-zero executive ownership firms over the period 2007-2010 with Market Leverage as the dependent variable. The 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 A9. Dynamic Regression for 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 x Year FE	No	No	Yes
Observations	10221	10221	10221
R^2	0.597	0.631	0.644

This table estimates equation 6 with Market Leverage as the dependent variable. The sample covers 2006-2012. The definition of the variables are given 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 A10. Executive Ownership and Market Leverage: Controlling Bank-Firm Relations.

	(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 x Year FE	No	No	Yes
Observations	1256	1256	1256
R^2	0.656	0.682	0.684

This table reports the estimation of equation 7 with Market Leverage as the dependent variable. The sample covers 2008 and 2009. The Bank-Borrower Relationship is a indicator that equals one if firm i had borrowed from bank b at least once during the 2006–2008 period (pre-credit push) and zero otherwise. 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 return to assets, size of the firm, market-to-book ratio, assets tangibility, dividend, positive net profit, state owned enterprise, ownership concentration, institutional ownership, bank holding and foreign holding. 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 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	

"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. Variables are defined in the Appendix.

Table A12. Executive Ownership and Firm Leverage: Placebo Test

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	3001	3001	3001
R^2	0.322	0.377	0.377

Panel B: Market Leverage

	(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	-0.000562	-0.000137	-0.121***
	(0.804)	(0.950)	(0.000)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry x Year FE	No	No	Yes
Observations	3001	3001	3001
R^2	0.590	0.657	0.657

This table reports the estimation of equation 3 but using placebo years. The sample covers 2011 and 2012. The 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 A13. Executive Ownership and Firm Leverage: Firm Fixed Effects

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.021	0.149	0.156

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.664	0.696	0.703

This table redoes Table 2 with firm FE over 2008-2009. Variables are defined in the Appendix. Controls and significance levels are as in Table 2. p-values are in parentheses. Standard errors are clustered at the firm level.

Table A14. Executive Ownership and Firm Leverage: Non-SOE Sample

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	1469	1469	1469
R^2	0.372	0.405	0.406

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	1469	1469	1469
R^2	0.597	0.629	0.634

This table reports the estimation of equation 3 but now the sample consists only of the public-listed Chinese firms which are not directly controlled by the Government (non-SOE firms). The sample covers 2008 and 2009. The 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 A15. Executive Ownership and Firm Leverage Without Infrastructure Firms, 2008-2009

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	2563	2563	2563
R^2	0.339	0.357	0.358

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	2563	2563	2563
R^2	0.602	0.618	0.620

The sample covers 2008-2009. The 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 A16. Executive Ownership and Firm Leverage Without Infrastructure Firms, 2007-2010

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	5025	5025	5025
R^2	0.291	0.312	0.330

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	5025	5025	5025
R^2	0.588	0.602	0.628

The sample covers 2007-2010. The 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 A17. Executive Ownership and Log of Debt, 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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.758	0.808	0.809

This table reports the estimation of equation 10 using log of debt as the dependent variable. The sample covers 2008-2009. The 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 A18. Executive Ownership and Log of Debt, 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 x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.752	0.802	0.808

This table reports the estimation of equation 10 using log of debt as the dependent variable. The sample covers 2007-2010. The 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 A19. Executive Ownership and Firm Leverage: Ownership at 2008 level

Panel A: Book Leverage

	(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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.355	0.392	0.393

Panel B: Market Leverage

	(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 x Year FE	No	No	Yes
Observations	3007	3007	3007
R^2	0.604	0.636	0.639

The sample covers 2008-2009. The 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 A20. Top Quartile Executive Ownership and Book Leverage, 2007-2010

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Year}_{2007}$	0.034***	0.031***	0.030***
	(0.000)	(0.001)	(0.002)
$\text{TopQuartile}_{2008} \times \text{Year}_{2009}$	0.039***	0.033***	0.035***
	(0.000)	(0.000)	(0.000)
$\text{TopQuartile}_{2008} \times \text{Year}_{2010}$	0.042***	0.036***	0.034***
	(0.000)	(0.000)	(0.001)
$\text{TopQuartile}_{2008}$	-0.055***	-0.048***	-0.047***
	(0.004)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.327	0.362	0.365

This table reports the estimation of equation 11 with Book Leverage as the dependent variable. The sample covers 2007-2010. The 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 A21. Top Quartile Executive Ownership and Market Leverage, 2007-2010

	(1)	(2)	(3)
$\text{TopQuartile}_{2008} \times \text{Year}_{2007}$	0.090***	0.087***	0.080***
	(0.000)	(0.000)	(0.000)
$\text{TopQuartile}_{2008} \times \text{Year}_{2009}$	0.070***	0.066***	0.065***
	(0.000)	(0.000)	(0.000)
$\text{TopQuartile}_{2008} \times \text{Year}_{20010}$	0.065***	0.059***	0.060***
	(0.000)	(0.000)	(0.000)
$\text{TopQuartile}_{2008}$	-0.073***	-0.068***	-0.066***
	(0.000)	(0.000)	(0.000)
Firm's Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry x Year FE	No	No	Yes
Observations	5898	5898	5898
R^2	0.605	0.637	0.645

This table reports the estimation of equation 11 with Market Leverage as the dependent variable. The sample covers 2007-2010. The 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 A22. Executive Ownership and Firm Leverage: Equity-to-Salary Ratio

Panel A: Book Leverage

	(1)	(2)	(3)
EquitytoSalary$_{it}$×Credit Push$_t$	0.0000545***	0.0000447***	0.0000446***
	(0.000)	(0.002)	(0.002)
EquitytoSalary$_{it}$	-0.0000445**	-0.0000318*	-0.0000315*
	(0.012)	(0.060)	(0.066)
Credit Push$_t$	0.063***	0.057***	0.012**
	(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	2999	2999	2999
R^2	0.351	0.389	0.391

Panel B: Market Leverage

	(1)	(2)	(3)
EquitytoSalary$_{it}$×Credit Push$_t$	0.0000783***	0.0000606***	0.0000654***
	(0.000)	(0.000)	(0.001)
EquitytoSalary$_{it}$	-0.0000568***	-0.0000489**	-0.0000445**
	(0.009)	(0.015)	(0.033)
Credit Push$_t$	-0.048***	-0.056***	-0.039*
	(0.000)	(0.000)	(0.092)
Firm's Controls	Yes	Yes	Yes
Industry FE	No	Yes	No
Industry x Year FE	No	No	Yes
Observations	2999	2999	2999
R^2	0.601	0.634	0.637

This table reports the estimation of equation A4. The sample covers 2008 and 2009. The 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.

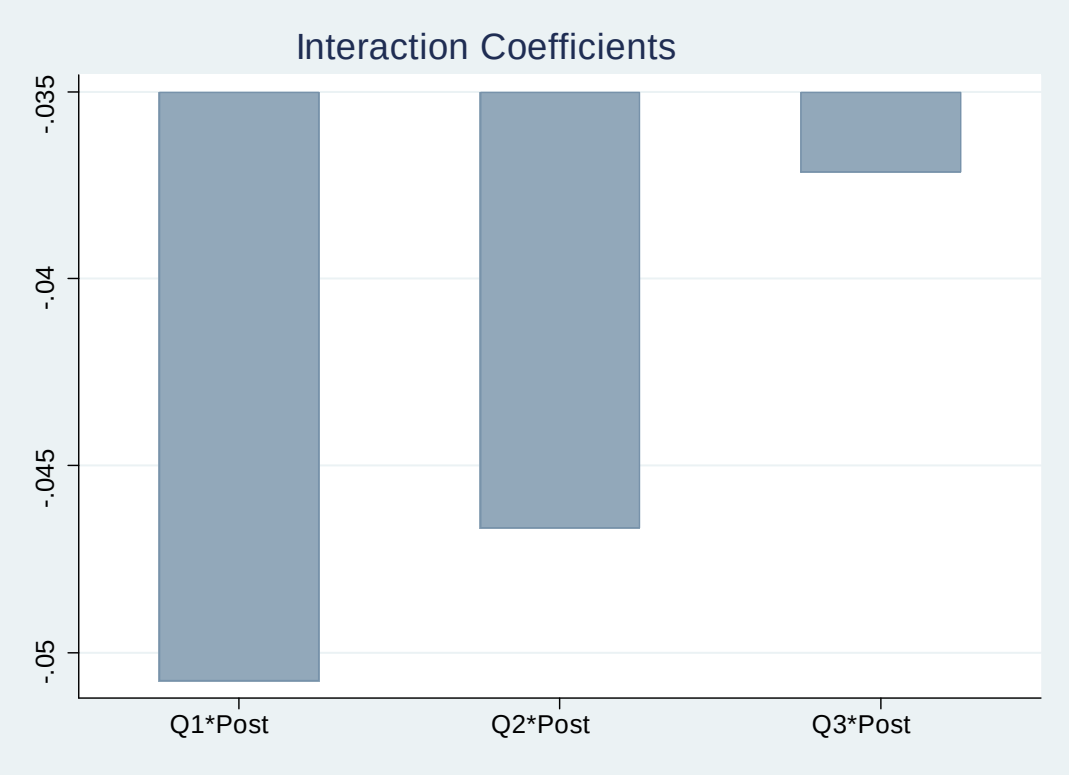

Figure A1. Interaction Between Executive Ownership Quartiles and Credit Shock with Book Leverage, 2008-2009. This figure illustrates the monotonous increase in the impact of the interaction term between different quartiles of executive ownership and credit shock on Book Leverage of the firms for the period 2008-2009.

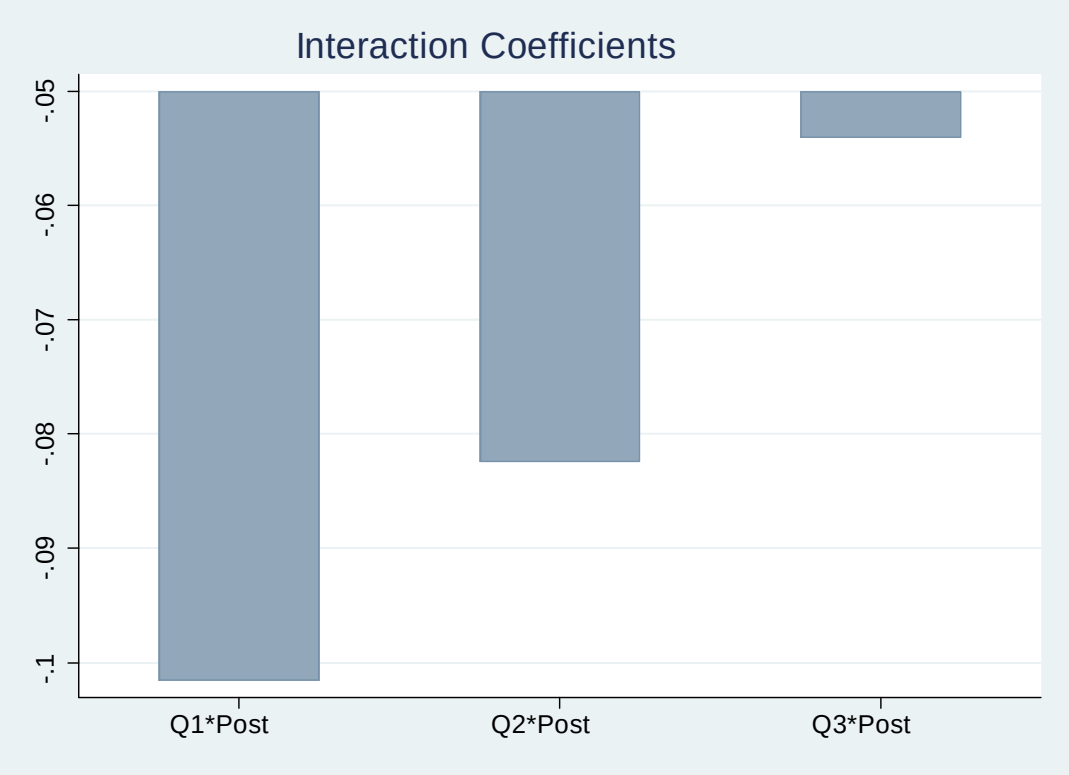

Figure A2. Interaction Between Executive Ownership Quartiles and Credit Shock with Market Leverage, 2008-2009. This figure illustrates the monotonous increase in the impact of the interaction term between different quartiles of executive ownership and credit shock on Market Leverage of the firms for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

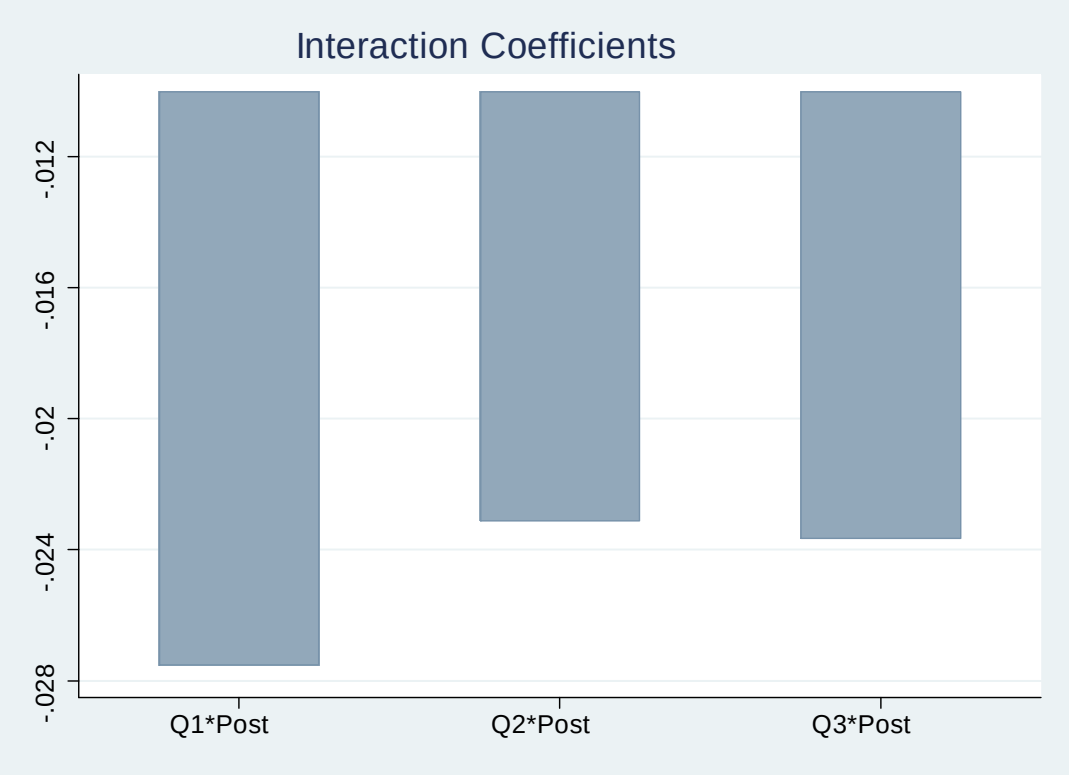

Figure A3. Interaction Between Executive Ownership Quartiles and Credit Shock with Book Leverage, 2007-2010. This figure illustrates the monotonous increase in the impact of the interaction term between different quartiles of executive ownership and credit shock on Book leverage of the firms for the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

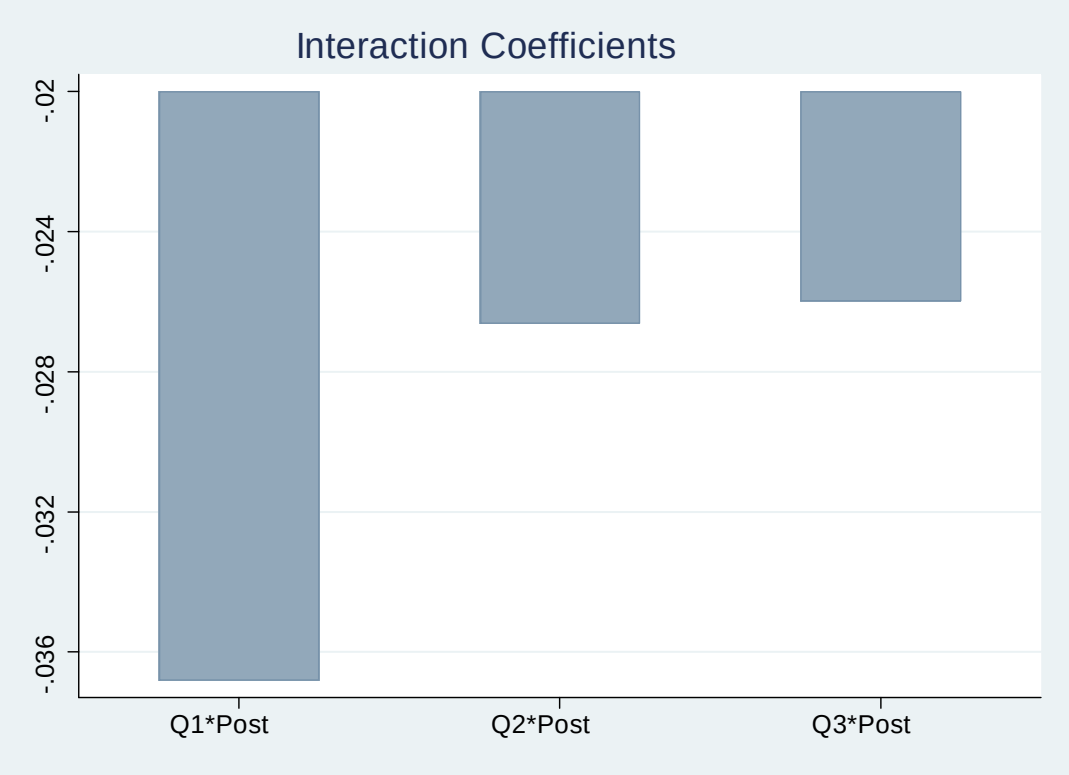

Figure A4. Interaction Between Executive Ownership Quartiles and Credit Shock with Market Leverage, 2007-2010. This figure illustrates the monotonous increase in the impact of the interaction term between different quartiles of executive ownership and credit shock on Market Leverage of the firms for the period 2007-2010.

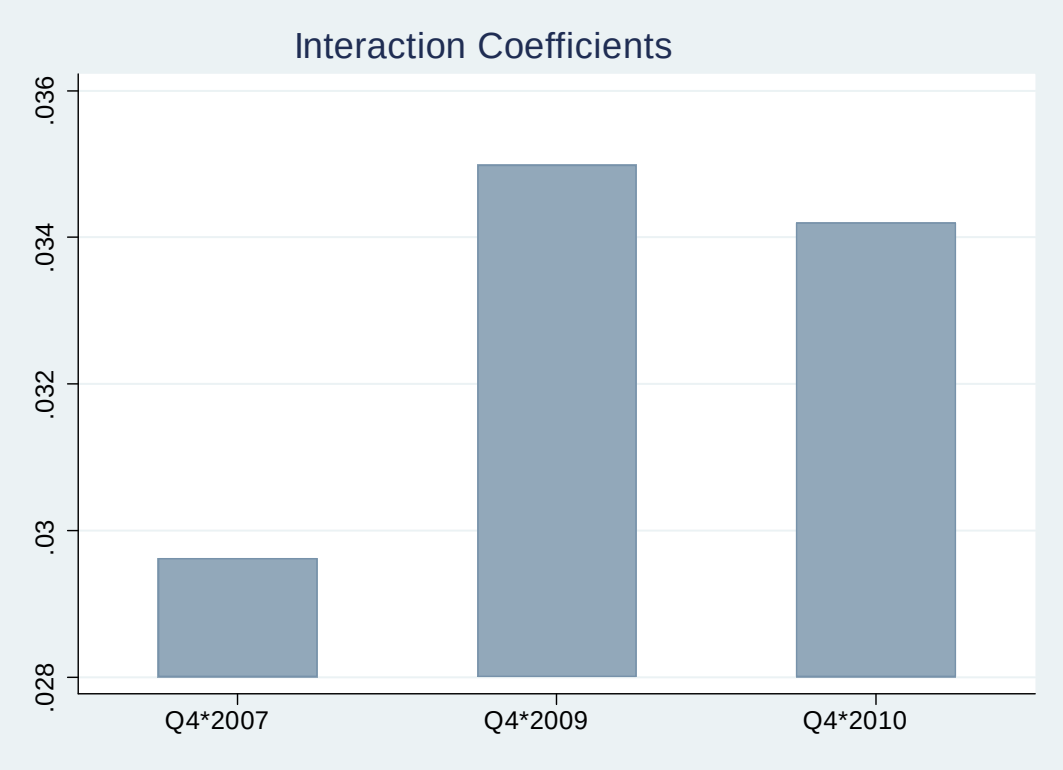

Figure A5: Interaction Plots of Top Quartile and Year Dummies with Book Leverage, 2007-2010. This figure illustrates the variation in the impact of the interaction term between top quartile of executive ownership level and credit shock on Book Leverage of the firms for the period 2007-2010.

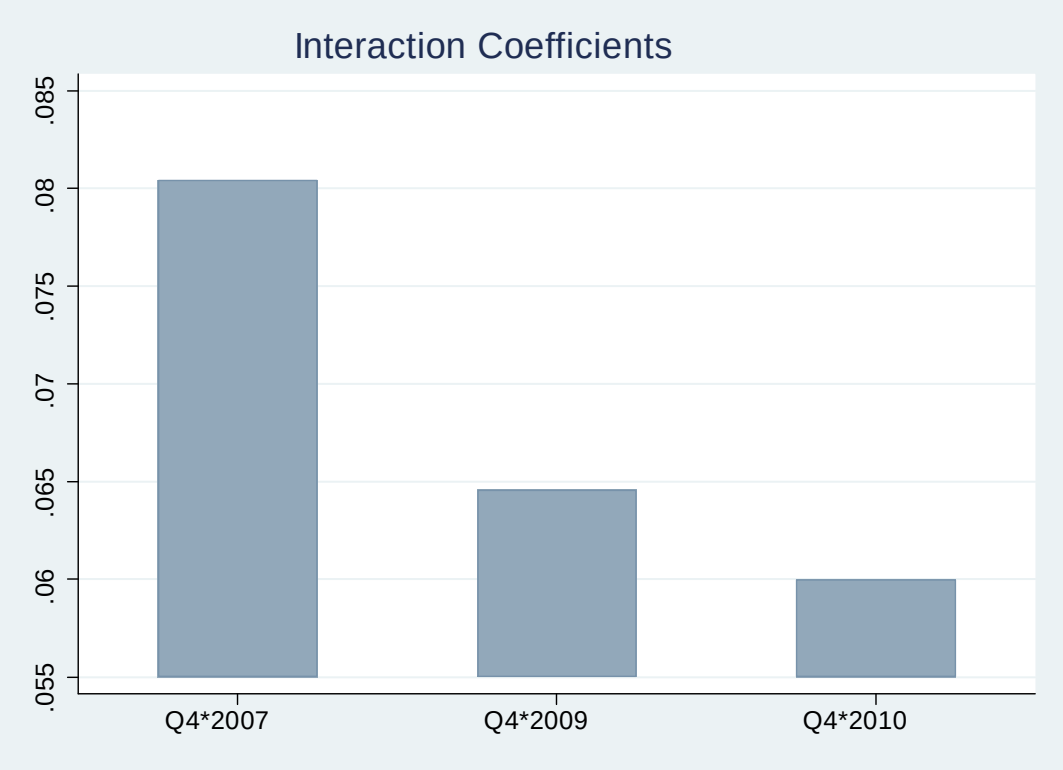

Figure A6: Interaction Plots of Top Quartile and Year Dummies with Market Leverage, 2007-2010. This figure illustrates the variation in the impact of the interaction term between top quartile of executive ownership level and credit shock on Market Leverage of the firms for the period 2007-2010.