When do banks mitigate investment ineffiency?*

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Abstract:

We investigate the role of banks' monitoring on investment efficiency of US firms. Using debt ownership structure to proxy the reliance of firms on different debt sources, we find that, in general, firms with higher bank debt proportions have lower investment efficiency. This negative impact, however, is not present for smaller, loss-making, or high growth firms. Our findings suggest that while banks might not monitor all borrowers, they selectively discipline firms with certain level of risks and information asymmetry.

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1. Introduction

Banks are considered to play an active role in monitoring firms that borrow from them. Banks, for instance, have greater monitoring ability deriving from their large debt holdings and better ability to acquire and produce information compared to other debt providers (Diamond 1984; Myers and Majluf, 1984; Diamond, 1991; Houston and James, 1996). Concentrated holding of debts provides banks with cost efficiency, stronger incentive and higher power to conduct monitoring job (Diamond 1984; Myers and Majluf, 1984; Diamond, 1991; Houston and James, 1996). Furthermore, banks have a unique informational advantage from deposit relationship with their borrowers, allowing them to use day-to-day information within borrowing firms (Fama, 1985). Bank debts are often shorter termed, compared to other debt sources (Carey et al., 1993), triggering more frequent monitoring. Overall, the superior monitoring strength of banks should restrain managers of borrowing firms from investing in inefficient projects and to reduce agency issues among various stakeholders.

The recent evidence, however, poses a different picture in that banks might have no longer been as effective in their supervising role as it has long believed. Latest structural changes in the financial markets and side effects of required collaterals and strict debt covenants might have weakened the monitoring power of banks. More specifically, banks' incentive to monitor their borrowers is diluted with the existence of secondary bank loan market (Gande and Saunders, 2012). There have also been side effect of collaterals since most of bank loans are secured, meaning that banks would get part or whole of their money back in the case of financial distress. In addition, banks are also famous for their strictest covenants compared to other debt sources (Smith and Warner, 1979; Berlin and Mester, 1992, Carey et al., 1993). This,

on one hand, could help banks to early detect problems and prevent borrowing firms' misbehaviours. On the other hand, a too strict covenants would induce managers to misreport, worsening information asymmetry and related issues. (Brooke and Vikram, 2011). Thus, we alternatively could argue that bank debts could lead to misappropriation of funds by firms.

The above arguments raises an interesting question on the current role of banks. Our study attempts to answer this issue by observing investment behaviours across firms that have different levels of bank debt. We argue that since information problems could make firms invest under or above their optimal level (Jensen and Meckling, 1976; Myers, 1977; Myers and Majluf, 1984), if banks can actually monitor and mitigate information asymmetry, there should exist a relationship between bank debts and investment efficiency.

In a perfect market, without the presence of asymmetric information, firms are supposed to invest at the optimal level where the marginal benefit equals the marginal cost (Yoshikawa, 1980; Hayashi, 1982; Abel, 1983). However, in the real world , due to the presence of many frictions including information asymmetry, investment levels do deviate from their ideal levels, leading to under- and over- investment (Jensen and Meckling, 1976; Myers, 1977; Myers and Majluf, 1984). Over-investment could take place when managers, knowing that shareholders cannot fully observe their actions, invest in non-wealth-maximizing projects to protect their positions at the costs of shareholders (Jensen and Meckling, 1976; Hope and Thomas, 2008). Under-investment could happen as a consequence of adverse selection, mainly due to information asymmetry. Managers are better informed about firms' future prospects and try to time the market and sell overpriced securities. To avoid this, investors allot their capital and/or require higher returns for the supplied fund, thus reducing amount of funds and raising the

hurdle to accept a project. Consequently, some profitable opportunities are foregone, leading to underinvestment (Stiglitz and Weiss, 1981; Lambert et al., 1007; Biddle et al., 2009). Both under- and over- investment are problematic since they hamper investment efficiency and obstruct wealth maximization objective.

Debts, however, could be used to effectively discipline managers via the pressure of repayment and their monitoring function, as a result mitigating investment inefficiency (Myers, 1977). Not only debts in general but also where they come from might make a difference since debt sources have different strength to curb agency issues and thus reduce investment inefficiency. Traditionally, bank debts have the strongest monitoring power due to their highest holding concentration, superior information accessibility, short-term maturity and strictest covenants compared to other debt sources (Fama, 1985; Bester, 1994; Krishnaswami et al., 1999; Mester et al., 2007; Karapetyan and Stacescu, 2014). Therefore, firms with higher proportion of bank debts should have smaller investment efficiency, all else being equal. On the other hand, bank debts also have strictest requirements on collaterals and covenants among all debt sources (Smith and Warner, 1979; Berlin and Mester, 1992, Carey et al., 1993), hence generating a possible side effect that might downside banks' monitoring powers (Brooke and Vikram, 2011). The structural change in bank debt markets also contributes to reducing banks' power since it dilutes their monitoring incentives (Gande and Saunders, 2012). These factors elicit an alternative view on bank debts' role in that firms that rely more on bank debts have lower investment efficiency.

Investigating relationship between bank debt reliance and investment efficiency, therefore can shed some light on the puzzling importance of banks. Moreover, since borrowers are broadly

different in characteristics, it would be highly unlikely that banks monitor them similarly. Therefore, in addition to examining the overall impact of banks on investment efficiency, we also attempt to discover when banks do and do not carry out their monitoring function. We argue that when banks are more concerned about certain borrowers, they will reinforce supervision on these firms to keep credit risk under control. The question is what types of characteristics that banks pay attention to when they do their monitoring. Since monitoring is to mitigate information asymmetry, as a result preventing opportunistic behaviours, banks might feel they need to supervise harder when a firm has more severe information problem than the others. Second, given firms with the same level of information problems, those that perform badly and are closer to bankruptcy should also be target for enhanced monitoring by banks since these borrowers are being at the edge of default and banks have a credible risk of losing their money if they do not closely supervise these firms out of the difficulties.

Our study contributes to the literature in some different ways. To begin with, this is the first study actually investigating the linkage between bank debts and investment efficiency. To the best of our knowledge, the closest research to ours is the study by Liu (2006). The author examines impacts of private debt sources on investment and finds that firms with more bank loans will invest more while those with more non-bank private loans will invest less. However, since the study only looks at the impact of debt sources on general investment level, which is not known to be above or under the optimal level, we cannot conclude if bank debts have positive or negative impact on investment efficiency. Our study fills this gap by testing the direct link between bank debts and investment efficiency. Second, we examine what kind of firms that banks impose more supervision on, given the vast diversity in firms' characteristics. Finally, we examine impact of bank debts on investment efficiency while controlling for their

combinations with other debt sources. As such, we infer that the role of banks observed is not merely an absorption of the impact of other debt sources.

Our analysis produces three main findings. First, bank debts, overall, have a negative impact on investment efficiency, suggesting that bank debts can worsen investment problems of firms. The more bank debts in capital structure, the further firms invest under or above their optimal level. In a nutshell, if considering bank debts in general, we find no evidence of monitoring power of banks or e could say that bank do not always monitor. So when do they? Our study then finds that banks impose more supervision on firms with more severe informational problems, measured by firm size and growth. Finally, banks intensify their monitoring when borrowers made a loss in previous period.

The remainder of our paper proceeds as follows. Next section discusses in detail research model, variable construction and sample. Section 3 reports the results of the main model. Section 5 carries out some robustness check and the final section concludes the paper.

2. Research design and Data

2.1. Data

We use four different sources to collect data for the study. We obtained accounting data from Computstat and used CRSP to calculate firm ages. Debt sources are hand collected from Mergent Online. Investment efficiency are estimated based on data of all US non-financial firms from year 2004 to 2015. Finally, in order to check interaction between bank debts and

corporate governance, we obtain corporate governance data information, poison pill provisions, from BoardEx.

We hand collect debt ownership structure data for a random sample of 1100 US non-financial firms listed on NYSE, AMEX and NASDAQ for three distinct financial years 2004, 2009 and 2014. The reason we choose a 5-year gap in data time is because debt ownership structures might be pretty consistent and observing them over continuous years could hardly reveal any notable findings due to the potential lack of statistical variance. The outstanding amount and features of each debt source are collected from firms' annual reports and SEC 10K filings available on Mergent Online database. Firms with no outstanding debts are deleted. Firms with major restructuring activities are also removed from the sample to prevent unusual events distorting the true relationship between investment efficiency and bank debts. We winsorize the all variables except for debt sources at 10% and 90%. The final sample consists of 2134 firm year observations.

2.2 Model specification

Following Comariz and Ballesta (2014), Biddle et al. (2009) and Chen et al. (2011), we employ the following models with adjustment to capture the impact of debt sources on investment efficiency.

$$\begin{aligned} II_{i,t} = {} & \beta_o + \beta_1 Short\_debt_{i,t-1} + \beta_2 Size_{i,t-1} + \beta_3 Age_{i,t-1} + \beta_4 Tang_{i,t-1} \\ & + \beta_5 CFOvol_{i,t-1} + \beta_6 SalesVol_{i,t-1} + \beta_7 TobinQ_{i,t-1} + \beta_8 Zscore_{i,t-1} \\ & + \beta_9 Loss_{i,t-1} + \beta_{10} CFO/TA_{i,t-1} + \beta_{11} Cycle_{i,t-1} + \beta_{12} Ind_i \\ & + \beta_{13} BankDebt_{i,t-1} + \beta_{12} PrivatePlacementDebt_{i,t-1} \\ & + \beta_{13} PublicDebt_{i,t-1} + e_{i,t} \end{aligned}$$

where *II* represents investment inefficiency of firms respectively.

II are estimated based on the model employed by Gomariz and Ballesta (2014).

$$Investment_{i,t} = \beta_o + \beta_1 SalesGrowth_{i,t} + \varepsilon_{i,t}$$

where $Investment_{i,t}$ is natural logarithm of total investment of firm i in year t, measured by net change in tangible and intangible assets divided by total assets of year t-1. $SalesGrowth_{i,t}$ is the change rate of sale from year t-2 to year t-1 at firm i. This variable proxies for the growth opportunity of firm i.

We regress investments on the lagged sale growth by year and industry to find the residual $\varepsilon_{i,t}$, which then are used to construct the investment inefficiency *II*. Investment inefficiency $II_{i,t}$ are measured by multiplying absolute values of the residuals with negative 1 so that *II* is always smaller than 0. By this way of construction, a zero value of *II* suggests that investment is at its optimal level and the closer to zero *II* is, the lower investment inefficiency of firms. If a right-hand side variable in the main model is positive, it can reduce investment inefficiency *II* and vice versa.

Bank debt variables are constructed in two ways: (i) proportion of bank borrowings in total outstanding debts to proxy firms' reliance on bank financing $BankPercent_{i,t}$ = *log(1+bank debt*100/total debts)* and (ii) dummy variable $Bankdum_{i,t}$ to proxy the presence of bank debts. The rationale behind our choice of measures is that each of these two variables can allow us to assess impact of banks from a different angle. It is important to know if the presence of or firms' reliance on bank debts is the source of banks' impact. On one hand, we can argue that once firms have some bank debts in their capital structure, they will bear the same disciplinary pressure regardless of how much bank debts they have. This is because banks might have to follow the same procedure and conduct the similar due diligence procedures to make lending decisions and monitor firms no matter how much firms rely on them. On the other hand, how

much firms rely on bank financing could decide how seriously they conform to the banks' supervision, and therefore partly affecting their impact. While bank debt dummy is a clear-cut choice for the presence of bank debts, there are quite a few choices for proxies of bank reliance. In previous literature, bank debts have been scaled by total debt (James and Houston, 1996; Johnson, 1997), total assets (Liu, 2006), or total market equity (Shen, 2014). Among these measures, we choose proportion of bank debts as our main variable as we believe that it can better reveal the importance of bank debts than the other ones. The reason is that when we scale bank debts by total assets or market equity, we will end up with constructing bank leverage ratios, which is hard to distinguish if what we observe is actually the influence of banks or simply the absorption of financial leverage effect. By using debt ownership structure, we are in a better position to separate bank reliance from financial leverage. Moreover, the proportion of bank debts can serve as a more reliable proxy of bank reliance compared to the first one since scaling debts by total assets or market equity could blur a firm' reliance on a given debt source.

We also control for other main debt sources that have been extensively discussed in literature; namely, non-bank private debts and public debts (e.g. Fama, 1985, Carey et al., 1993, Johnson, 1997; Denis and Mihov, 2003, Liu, 2006). Non-bank private debts are from non-bank financial institutions and exempt from SEC registration. They can either be issued under the 144A rule to Qualified Institutional Buyers (Insurance companies or registered investment companies) or via US Private Placements to a small number of investors (mainly investment companies and US pension funds). Public debts are publicly registered debt securities issued by firms under Security Act 1933 and regulated by SEC. We control for other debt sources since they might also have impact on investment efficiency and omission of these variables can distort the true effect of bank debts. Moreover, since each debt source has different characteristics that might

create difference in monitoring power, it would be interesting to study role of bank debts in different combinations to other debt sources. We also construct two measures for each of these two debt sources: (i) non-bank private debt proportion $PriPercent_{it}$ = *log(1+ nonbank private debt*100/total assets)* and non-bank private debt dummy $PriDummy_{it}$; and (ii) public debt proportion $PubPercent_{it}$ = *log(1+ public debt*100/total assets)* and public debt dummy $PubDum_{it.}$

For control variables, we follow previous studies (Biddle et al., 2009, Chen et al., 2011, Gomariz and Ballesta, 2014) to include short term debt, firm size, firm age, tangibility, standard deviation of cash flow and sales, Tobin'Q, Alman's Z-score, presence of loss, cash flow from operations, operating cycle length and industry dummies in our models. Short term debt, $Short\_debt_{i,t,}$, proxy for the curing impact of debt maturity on investment problem and is measured by proportion of short-term debt in total debts. We use natural logarithm of total assets as a proxy for firm size $Size_{i,t}$. Firm age is measured by the natural logarithm of the years since the firm's establishment, defined by its first year of data in CRSP. $Tang_{i,t}$ is the proxy for the tangibility of firms' assets, measured by the ratio of tangible assets on total assets of firms. $CFOvol_{i,t}$ and $SalesVol_{i,t}$ are volatility of firms operation cash flow and volatility of sales, measured by their deviations from t-2 to t. To control for firms' growth options, we use $TobinQ_{i,t}$, measured by the ratio between market value of equity and debt over total assets. $Zscore_{i,t}$ is the proxy of the financial solvency of firms, calculated following the paper of Altman (1968). We also control for the presence of loss by a dummy variable $Loss_{i,t}$, taking 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is added to capture impact of cash flow on investment efficiency. It is measured by ratio between operation cash flow and average total assets. We also added $Cycle_{i,t}$ to control for the length of operating

cycle and finally 48 industry dummies Ind_i to proxy impact of industry on investment efficiency. In order to investigate interaction between bank debts and corporate governance, we construct a dummy variable *Poison* that equals 2 when firms have poison pill anti-takeover tactic and 0 otherwise. Market to book ratio, *MB*, is also interacted with bank debts in some tests. We construct *MB* by dividing market value of assets by total book value of firm assets.

Following Petersen (2009), we estimate the model using t-statistics based on standard errors clustered at the firm and year level, which are robust to both heteroscedasticity and within-firm serial correlation.

3. Results

3.1. Descriptive statistics

Table 1 presents the descriptive statistics, including mean, standard deviation, min, max, 25% quartile, median and 75% quartile for the continuous variables. Investment inefficiency in the sample has a mean of – 0.67 and a median of – 0.6. These values are much higher compared to previous studies (Gomariz and Ballesta, 2014, Biddle et. al, 2009), in which means and medians of investment inefficiency are just around – 0.09 and - 0.05 respectively. This is simply due to the way we construct investment variable in the first model. Differently from previous studies where investments are measured in the level of total assets growth, we instead take natural logarithm of asset growth. When we use level investment in regressions, statistical characteristics of investment inefficiency are similar to those in prior literature. The reason we use logarithm variable is that when comparing the plots of level- and logarithm measures, we see that logarithm investment is to a great extent more normally distributed.

[Insert Table 1 here]

Bank debts account for 43% of total debts held by sample firms with the median level of 29%, proving that bank debts are the most popular borrowing sources. Public debts are only 20% of total outstanding borrowings while that of private placement debts is even lower at 11%. Both public debts and private placement debts have medians of 0, meaning that not many firms in the sample choose to borrow from these two sources. Comparing with prior study by Houston and James (1996), bank debt proportion is smaller while that of public debts and nonbank private debt are greater. However, this is sensible given the decreasing trend in bank debts and rising trend in public and non-bank private debts found in Houston's paper.

3.2. Regression results

Table 2 reports the estimation outputs of the main model using different measures of bank debts. In the first two columns, we use bank debt proportion to investigate impact of bank reliance on investment inefficiency. In the last two columns, we look at impact of bank debts presence. In both regressions, bank debts consistently show significant negative impact at 1%, suggesting that bank debt in general worsen investment inefficiency. This results support that bank debts can adversely drive firms' investment decisions instead of disciplining them due to the structural market changes and side-effects of strict requirements on collaterals and covenants in bank debt contracts.

The loading of bank debt proportion is – 0.0115, suggesting that investment inefficiency increases by 0.0115% for every 1% increase in bank debt proportion. Bank debt presence has coefficient of - 0.0389, which means firms that have bank debts have lower investment efficiency by an average of 0.0389% than firms with no bank debts. Both bank debt reliance and the presence of bank debts are important in explaining investment inefficiency.

[Insert Table 2 here]

In terms of the control variables, in all regressions, firm size (*Size*) has a positive and significant coefficient, showing that bigger firms have higher investment efficiency than smaller firms. Cash flow volatility (*CFOVol*) and ratio of operating cash flow over total assets (*CFO/AT*) are also significant but in different directions. While higher cash flow volatility can worsen investment issues, cash flow ratio lowers investment inefficiency. The length of operating cycle also reduces investment inefficiency.

In Table 3, we extend the previous analysis by testing whether banks' mitigation power on investment inefficiency increases when firms have higher information problem. We add the interaction terms between bank debt proportion and bank debt dummy with firm size, Size, and market to book ratio, MB, to the original model. The first and the last 4 columns respectively show estimation outputs of interaction terms with Size and MB.[1] We observe when interacting firm size with bank debt proportion, Bankpercent, it turns positive (0.0354) and significant at 5% while the interaction term is significant and negative (-0.0082) at 1%. This finding suggests

[1] Since MB and TobinQ are highly correlated, we drop TobinQ when testing interactive impact of MB.

that bank debts can help mitigate investment inefficiency when firms are smaller but this role decreases with firm size. Interaction term between bank debt dummy and firm size is, however, insignificant although the signs are consistent with the above findings. Market to book ratio add more support to our prediction as it shows positive and significant interaction terms for both bank debt proportions (0.0164) and bank debt dummy (0.0667). Since MB proxies for firm growth and level of moral hazard, a positive coefficient between MB and bank debts suggest that banks reinforce supervision when firms pose higher moral hazard risk. These findings suggest the mitigation impact of bank debts on investment inefficiency is enhanced when firms have smaller size and higher growth. This implies that banks conduct differential supervision on firms with high and low information asymmetry.

[Insert Table 3 here]

Banks might also apply different levels of disciplining to firms that have bad previous performance or are closer to bankruptcy. We interact bank debt variables with Zscore and Loss to test this argument. Table 4 reports the regression outputs. Both bank debt measures are consistently significant and negative across all tests. Among two interaction terms of *Loss*, interaction with bank debt proportion is significant and positive at 5%, suggesting that if a firm make a loss in previous period, banks will intensify monitoring. Zscore shows no significant interaction with bank debt variables although the signs are in line with what we predict. It seems banks base on realized performance rather than bankruptcy indicator to conduct their disciplinary job.

[Insert Table 4 here]

Finally, we investigate interaction between bank monitoring and corporate governance to see whether there is any substitution effect between the two mechanisms. To proxy for corporate governance, we use the presence of poison pill provision at firms. If a firm has poison pill tactic, managers are trying to hinder active market control and building their empire. This suggests a poor governance quality where there is high agency conflict between managers and shareholders. On the contrary, if firms do not have poison pill, they are considered to have better corporate governance quality. We argue that monitoring power of banks is smaller in firms with good corporate governance and vice versa. In this part, we are going to add the interaction term between bank debts and presence of poison pill. Since only some firm-year observations have available data of poison pill provision, we lose a substantial number of observations and only have been left with 760 firms. Contrary to your expectation, as can be seen in Table 5, the interaction term between bank debts and *Poison* is insignificant, suggesting that banks' mitigation impact on investment inefficiency may not depend on corporate governance quality.

[Insert Table 5 here]

4. Robustness check

4.1. Alternative investment model

We follow the model developed by Chen et al. (2011) to re-estimate the expected level of investment. In general, this model is similar to the model used in previous part except that it adds a dummy variable, $SGRDum_{i,t}$, that equals 1 if sale growth is negative and 0 otherwise. The inclusion of this variable is based on the authors' reasoning that impact of sale growth on investment can be different depending on whether the growth is positive or negative.

$$Investment_{i,t} = \beta_0 + \beta_1 SalesGrowth_{i,t-1} + \beta_2 SGRDum_{i,t-1} + SalesGrowth_{i,t-1} SGRDum_{i,t-1} + \varepsilon_{i,t} \qquad (4)$$

Table 5, 6 and 7 repeat the tests previous section using residuals generated from the above alternative investment model to construct investment inefficiency variable. Table 5 reports the results of the main model which tests general impact of bank debt variables. In both regressions, bank debt proportion *Bankpercent* and bank debt dummy *Bankdum* are significant and negative at 1%, which is consistent with previous findings.

[Insert Table 6 here]

We continue regressing investment inefficiency on bank debts and its interaction terms with firm size and market to book ratio. The results, as shown in table 6, are similar to the patterns we have seen using original investment model. Size interaction term is negative and significant, suggesting that banks monitor more when firms are smaller and vice versa. As for market to book ratio, the positive and significant coefficients of the interaction terms confirm that firm growth increases supervision intensity from banks.

[Insert Table 7 here]

In line with previous findings, we find that banks care more about realized loss rather than bankruptcy risk of borrowers when disciplining them. Table 7 shows significant interaction between bank debts and loss but insignificant interaction between bank debts and Zscore. However, although *Loss* shows similar negative interactive effect, the statistical significance is lower at 10% compared to 5% as in Table 4.

[Insert Table 8 here]

Table 9 tests the substitution effect between bank debts and corporate governance. Consistent with previous findings, we find no interaction between bank monitoring and corporate governance, again confirming that corporate governance does not impact banks' influence on investment efficiency.

[Insert Table 9 here]

4.2. Alternative measures of bank debt reliance

In this section, we conduct further robustness check by employing alternative measures of bank debt reliance. One might argue that debt ownership structures cannot reflect the relative size of bank debts or how much of firm assets are financed with bank borrowings. Thus, given the same proportion, bank debts' impact might be greatly different. In order to address this concern, we redo all tests with two alternative measures of bank debts that allow us to control for relative size of bank debts. We, respectively, scale bank debts by total assets and market equity to get bank debts to assets ratio *BankAT* and bank debts to market equity ratio *BankME*. In Table 8, Panel A shows estimation results for *BankAT* while panel B reports impact of *BankME*. In both panels, the first two columns test impact of bank debt reliance on investment inefficiency in general and the other columns examine interaction impact of bank debt reliance with information problem variables (*Size* and *MB*) and financial distress variables (*Loss* and *Zscore*).

As shown in panel A, when bank debts are scaled by total assets, it still shows significant negative impact on investment inefficiency in general with coefficient of – 0.0131, suggesting that bank debts reduce investment efficiency of firms. However, the significance level drops from 1% to 10%. The interaction effects between bank debts and Size, MB and Loss are consistent with what we found using debt ownership structure. *BankAT*Size* is significant

negative at 1%, confirming that banks mitigation role decreases when firm size increase. *BankAT*MB* is positive and significant, suggesting an increase in banks monitoring when firms have higher growth. Loss interaction is also significant and positive, proving that banks supervise more if firms have a loss in previous period. One new finding is that, Zscore interaction is now significant at 10% and the positive coefficient of 0.0027, suggesting that banks do look at bankruptcy risks of firms when they monitor. When they perceive that firms are closer to default, they enhance supervision and vice versa.

[Insert Table 10 here]

Panel B reports similar patterns to those discussed in panel A. When *BankME* is used, we consistently find overall negative impact of bank debt reliance, negative interaction effect between bank debts and firm size, positive interaction between bank debts and *MB, Zscore*. However, *Loss* interactive term is no longer significant although its positive sign is in line with our prediction. Corporate governance in both panels similarly show no evidence as a substitution mechanism with bank debts in mitigating investment inefficiency. In conclusion, both alternative measures of bank debt reliance generally show similar findings of bank debt impact found in previous sections.

5. Conclusions

Traditionally bank debts have been assumed to have superior monitoring power while recent evidence argue that bank debts are no longer special or unique. This raises a question about the real impact of banks and their ability to mitigate information problems and discipline misbehaviours. Our study addresses this question by examining impact of bank debts on

investment efficiency of firms, using a random sample of 1100 firms over three different periods 2005, 2010 and 2015. The results indicate that, in general, bank debts has significant and negative impact on investment efficiency of firms, suggesting that either banks are losing their monitoring power or they just simply do not monitor all firms. This is consistent with recent findings on the waning importance of banks. We then extend our analysis by investigating what kinds of firms banks intensively monitor. We find that banks enhance their monitoring when firms have smaller size and higher market to book ratio. Supervision is also stronger when firms have bad performance previously. In conclusions, bank monitoring is existing but possibly not for every firm. Banks selectively monitor borrowers that pose more severe information problems and higher risk.

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Table 1: Descriptive statistics.

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good sold)*360. Bank debt proportion *BankPercent* is the percentage of banks debt in total outstanding debt. Controls for public debt *PubPercent* and nonbank private debt *PriPercent* are proportion of these debt sources in total debts.

Variable	N	Mean	Std. Dev.	Min	25% Quartile	Median	75% Quartile	Max
II	2134	-0.67	0.45	-1.79	-1	-0.6	-0.27	0
Short_debt	2134	0.24	0.29	0	0.01	0.09	0.38	0.83
Size	2134	6.01	1.62	3.21	4.85	6	7.13	8.99
Age	2131	2.88	0.73	0	2.4	2.89	3.43	4.17
Tang	2134	0.83	0.16	0.53	0.71	0.88	0.99	1
CFOVol	2134	31.19	48.88	1.55	3.82	11.1	31.34	193.78
SaleVol	2134	0.13	0.1	0.03	0.05	0.1	0.18	0.37
TobinQ	2134	1.84	0.91	0.92	1.16	1.53	2.24	3.99
Zscore	2134	3.39	2.86	-0.32	1.46	2.97	4.82	10.62
CFO/TA	2134	-2.55	0.65	-3.37	-3.37	-2.49	-1.99	-1.49
Cycle	2134	110.4	64.9	25.54	54.95	100.49	156.96	225.78
Loss	2134	0.32	0.47	0	0	0	1	1
MB	2134	1.84	0.94	0.92	1.16	1.52	2.24	3.98
BankPercent	2134	42.93	42.76	0	0	28.68	96.57	100
PubPercent	2134	19.56	34.74	0	0	0	26.94	100
PriPercent	2134	11.42	27.84	0	0	0	0	100

Table 2: Regression of investment inefficiency on bank debts

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt proportion. Bank debt proportion *BankPercent* is log(1+bank debts/total outstanding debt). Bankdum is dummy variable that equal 1 if firms have bank debts and 0 otherwise. Controls for public debt *Pub* are *PubPercent* and *Pubdum*. Controls for nonbank private debt are *PriPercent* and *Pridum*. *Pubpercent* and *PriPercent* are log(1+proportion of Public debts/total debts) and log(1+nonbank private debts/total debts). *Pubpercent* and *PriPercent* are used when regressing on *BankPercent; Pubdum* and *Pridum* are used when regressing on *Bankdum*. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets.
***, ** and *: Significances at 1%, 5% and 10% level respectively

II	Estimate	t-stat	Estimate	t-stat
Short_debt	-0.0327	-0.71	-0.0327	-0.68
Size	0.0501***	3.54	0.0494***	3.48
Age	0.0217	1.24	0.0215	1.25
Tang	0.0414	0.41	0.0452	0.45
CFOVol	-0.0009**	-2.36	-0.0009**	-2.41
SaleVol	-0.1021*	-1.67	-0.1026	-1.6
TobinQ	-0.03	-0.94	-0.03	-0.91
Zscore	0.0042	1.26	0.005	1.35
CFO/TA	0.1081***	8.91	0.1075***	9.2
Cycle	0.0006***	4.43	0.0006***	4.42
Loss	-0.0173	-0.61	-0.016	-0.56
Pub	-0.0029	-1.55	0.004	0.53
Pri	0.0078	0.93	0.044	1.38
BankPercent	**-0.0115*** **	**-4.35**		
Bankdum			**-0.0389*** **	**-3.49**
Intercept	-0.7996***	-3.21	-0.816***	-3.18
Industry effect	Yes		Yes	
R	0.1298		0.1295	
F	5.83		5.82	
p>F	0		0	
Obs.	2131		2131	

Table 3: Impact of bank debts and interactions with information problems on investment inefficiency

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt proportion Bank debt proportion *BankPercent* is log(1+bank debts/total outstanding debt). Bankdum is dummy variable that equal 1 if firms have bank debts and 0 otherwise. Controls for public debt *Pub* are *PubPercent* and *Pubdum*. Controls for nonbank private debt are *PriPercent* and *Pridum*. *Pubpercent* and *PriPercent* are log(1+proportion of Public debts/total debts) and log(1+nonbank private debts/total debts). *Pubpercent* and *PriPercent* are used when regressing on *BankPercent; Pubdum* and *Pridum* are used when regressing on *Bankdum*. *MB* is the ratio between market value of assets and book value of assets at t-1. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets. ***, ** and *: Significances at 1%, 5% and 10% level respectively

II	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Short_debt	-0.034	-0.77	-0.0326	-0.68	-0.036	-0.76	-0.0354	-0.75
Size	0.073***	7.88	0.0637***	10.57	0.0484**	3.27	0.0482***	3.23
Age	0.0204	1.18	0.0216	1.3	0.0204	1.21	0.0206	1.23
Tang	0.034	0.33	0.0435	0.43	0.0513	0.51	0.0572	0.59
CFOVol	-0.001***	-2.84	-0.001***	-2.77	-0.001**	-2.48	-0.001***	-2.6
SaleVol	-0.0943*	-1.9	-0.1014*	-1.74	-0.108*	-1.83	-0.099	-1.63
Zscore	0.0034	1.12	0.0042	1.38	0.0036	1.21	0.0042	1.4
CFO/TA	0.1059***	9.01	0.105***	9.81	0.1056***	9.45	0.105***	9.58
Cycle	0.0005***	4.24	0.0005***	4.37	0.0006***	4.19	0.0006***	4.19
Loss	-0.0161	-0.57	-0.0154	-0.54	-0.0174	-0.64	-0.0149	-0.54
Pub	-0.0058***	-2.69	0.004	0.58	-0.0028	-1.3	0.0091	0.85
Pri	0.0071	0.86	0.0447	1.47	0.0077	0.96	0.0462	1.51
TobinQ	-0.0255	-0.85	-0.027	-0.89				
MB					-0.0647	-1.55	-0.066	-1.31
Bankpercent	**0.0354****	**2.29**						
Bankpercent*Size	**-0.0082*****	**-3.55**						
Bankdum			**0.0856**	**0.85**				
Bankdum*size			**-0.0209**	**-1.23**				
Bankpercent					**-0.043*****	**-5.07**		
Bankpercent*MB					**0.0164*****	**3.49**		
Bankdum							**-0.166*****	**-2.59**
Bankdum*MB							**0.0667****	**1.98**
Intercept	-0.9121***	-4.21	-0.9	-4.68	-0.719***	-2.66	-0.74263	-2.55
Industry effect	Yes		Yes		Yes		Yes	
R	0.1327		0.1307		0.1343		0.1337	
F	5.8		5.72		5.99		5.97	
p>F	0		0		0		0	
Obs.	2131		2131		2131		2131	

Table 4: Impact of bank debts and interactions with presence of loss and bankruptcy risk on investment inefficiency

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt proportion Bank debt proportion *BankPercent* is log(1+bank debts/total outstanding debt). Bankdum is dummy variable that equal 1 if firms have bank debts and 0 otherwise. Controls for public debt *Pub* are *PubPercent* and *Pubdum*. Controls for nonbank private debt are *PriPercent* and *Pridum*. *Pubpercent* and *PriPercent* are log(1+proportion of Public debts/total debts) and log(1+nonbank private debts/total debts). *Pubpercent* and *PriPercent* are used when regressing on *BankPercent; Pubdum* and *Pridum* are used when regressing on *Bankdum*. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets.

***, ** and *: Significances at 1%, 5% and 10% level respectively

II	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Short_debt	-0.038	-0.8	-0.034	-0.69	-0.0324	-0.7	-0.032	-0.67
Size	0.05***	3.57	0.049***	3.48	0.0504***	3.57	0.0497***	3.59
Age	0.022	1.22	0.022	1.26	0.0212	1.22	0.021	1.19
Tang	0.038	0.37	0.044	0.43	0.0408	0.4	0.045	0.45
CFOVol	-0.001**	-2.35	-0.001**	-2.4	-0.001**	-2.37	-0.001**	-2.48
SaleVol	-0.1014*	-1.73	-0.103*	-1.65	-0.103*	-1.7	-0.1026	-1.61
TobinQ	-0.027	-0.85	-0.029	-0.87	-0.0302	-0.94	-0.0301	-0.9
Zscore	0.004	1.08	0.004	1.27	0.0026	0.92	0.003**	1.96
CFO/TA	0.106***	9.2	0.107***	9.58	0.108***	9.11	0.107***	9.66
Cycle	0.0006***	4.33	0.0006***	4.39	0.0006***	4.46	0.0006***	4.45
Loss	-0.07***	-4.8	-0.041*	-1.91	-0.017	-0.6	-0.0153	-0.55
Pub	-0.004**	-2.02	0.0034	0.47	-0.003	-1.55	0.005	0.58
Pri	0.0074	0.89	0.0431	1.36	0.008	0.92	0.044	1.4
Bankpercent	**-0.019*** **	**-3.54**						
Bankpercent*Loss	**0.0215****	**2.01**						
Bankdum			**-0.052****	**-2.55**				
Bankdum*Loss			**0.038**	**1.03**				
Bankpercent					**-0.014*** **	**-3.09**		
Bankpercent*Zscore					**0.0008**	**1.23**		
Bankdum							**-0.0507***	**-1.85**
Bankdum*Zscore							**0.0033**	**0.64**
Intercept	-0.778***	-3.09	-0.808***	-3.15	-0.793***	-3.18	-0.81111	-3.09
Industry effect	Yes		Yes		Yes		Yes	
R	0.1317		0.1298		0.1299		0.1296	
F	5.75		5.71		5.75		5.75	
p>F	0		0		0		0	
Obs.	2131		2131		2131		2131	

Table 5: Impact of bank debts and interactions with corporate governance risk on investment inefficiency

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt proportion Bank debt proportion *BankPercent* is log(1+bank debts/total outstanding debt). Bankdum is dummy variable that equal 1 if firms have bank debts and 0 otherwise. Controls for public debt *Pub* are *PubPercent* and *Pubdum*. Controls for nonbank private debt are *PriPercent* and *Pridum*. *Pubpercent* and *PriPercent* are log(1+proportion of Public debts/total debts) and log(1+nonbank private debts/total debts). *Pubpercent* and *PriPercent* are used when regressing on *BankPercent; Pubdum* and *Pridum* are used when regressing on *Bankdum*. *Poison* is a dummy variable that equals 1 if firms have poison pill anti-takeover tactics and 0 otherwise. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets.

***, ** and *: Significances at 1%, 5% and 10% level respectively

II	Estimate	t-value	Estimate	t-value
Short_debt	0.0531	0.8	0.0585	0.88
Size	0.0235	0.96	0.0187	0.76
Age	0.0324	1.09	0.0295	0.98
Tang	0.131	1.18	0.1376	1.23
CFOVol	-0.001**	-2.39	-0.001**	-2.16
SaleVol	-0.2182	-1.04	-0.235	-1.12
TobinQ	-0.0445*	-1.74	-0.049*	-1.9
Zscore	-0.0057	-0.6	-0.0026	-0.27
CFO/TA	0.1513***	4.58	0.145***	4.38
Cycle	-7.7E-05	-0.23	-7.4E-05	-0.22
Loss	-0.0363	-0.78	-0.034	-0.72
Poison	-0.009	-0.18	-0.0226	-0.4
Pub	-0.0128	-1.16	-0.0023	-0.05
Pri	-0.026**	-2.37	-0.0589	-1.48
Bankpercent	-0.029***	-2.63		
*Bankpercent*Poison*	0.0075	0.45		
Bankdum			-0.0787*	-1.87
*Bankdum*Poison*			0.0431	0.64
Intercept	-0.1733	-0.56	-0.1676	-0.55
Industry effect	Yes		Yes	
R	0.1343		0.128	
F	1.99		1.88	
p>F	0.0002		0	
Obs.	2131		2131	

Table 6: Regression of investment inefficiency on bank debts – Alternative investment model

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt proportion *BankPercent* is log(1+bank debts/total outstanding debt). Bankdum is dummy variable that equal 1 if firms have bank debts and 0 otherwise. Controls for public debt *Pub* are *PubPercent* and *Pubdum*. Controls for nonbank private debt are *PriPercent* and *Pridum*. *Pubpercent* and *PriPercent* are log(1+proportion of Public debts/total debts) and log(1+nonbank private debts/total debts). *Pubpercent* and *PriPercent* are used when regressing on *BankPercent; Pubdum* and *Pridum* are used when regressing on *Bankdum*. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets. ***, ** and *: Significances at 1%, 5% and 10% level respectively

II	Estimate	t-value	Estimate	t-value
Short_debt	-0.033	-0.73	-0.0328	-0.7
Size	0.05***	3.43	0.049***	3.37
Age	0.022	1.28	0.0219	1.29
Tang	0.0406	0.42	0.0444	0.46
CFOVol	-0.001**	-2.24	-0.0009**	-2.28
SaleVol	-0.1064*	-1.94	-0.1071*	-1.85
TobinQ	-0.03	-0.92	-0.0296	-0.9
Zscore	0.0042	1.3	0.0046	1.4
CFO/TA	0.1055***	8.87	0.1049***	9.15
Cycle	0.0006***	4.42	0.0006***	4.43
Loss	-0.0192	-0.67	-0.018	-0.62
Pub	-0.0033*	-1.8	0.0026	0.38
Prip	0.0076	0.9	0.0432	1.35
Bankpercent	**-0.0115*** **	**-4.28**		
Bankdum			**-0.0393*** **	**-3.43**
Intercept	-0.80432	-3.28	-0.8204***	-3.24
Industry effect	Yes		Yes	
R	0.1288		0.1285	
F	5.75		5.74	
p>F	0		0	
Obs.	2131		2131	

Table 7: Impact of bank debts and interactions with information problems on investment inefficiency – Alternative investment model

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt proportion *BankPercent* is log(1+bank debts/total outstanding debt). Bankdum is dummy variable that equal 1 if firms have bank debts and 0 otherwise. Controls for public debt *Pub* are *PubPercent* and *Pubdum*. Controls for nonbank private debt are *PriPercent* and *Pridum*. *Pubpercent* and *PriPercent* are log(1+proportion of Public debts/total debts) and log(1+nonbank private debts/total debts). *Pubpercent* and *PriPercent* are used when regressing on *BankPercent; Pubdum* and *Pridum* are used when regressing on *Bankdum*.. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets. ***, ** and *: Significances at 1%, 5% and 10% level respectively

II	Estimate	t-value	Estimate	t-value	Estimate	t-value	Estimate	t-value
Short_debt	-0.035	-0.8	-0.033	-0.7	-0.0362	-0.79	-0.0357	-0.77
Size	0.073***	7.82	0.063***	10.54	0.0481	3.15	0.048***	3.11
Age	0.0209	1.22	0.0221	1.34	0.0214	1.29	0.0216	1.32
Tang	0.033	0.34	0.043	0.43	0.0497	0.52	0.0554	0.6
CFOVol	-0.001***	-2.73	-0.001***	-2.65	-0.001**	-2.35	-0.0009**	-2.46
SaleVol	-0.099**	-2.27	-0.106**	-2.03	-0.1116**	-2.2	-0.1032**	-1.97
Zscore	0.0035	1.18	0.0042	1.45	0.0034	1.16	0.004	1.36
CFO/TA	0.103***	9.03	0.1026***	9.92	0.1025***	9.39	0.102***	9.53
Cycle	0.0006***	4.21	0.0005***	4.33	0.0006***	4.24	0.0006***	4.24
Loss	-0.018	-0.63	-0.0172	-0.61	-0.0194	-0.71	-0.017	-0.61
Pub	-0.006***	-2.81	0.0026	0.41	-0.0032	-1.56	0.0072	0.73
Pri	0.0068	0.82	0.044	1.43	0.0075	0.93	0.0454	1.49
TobinQ	-0.0254	-0.84	-0.027	-0.88				
MB					-0.0607	-1.45	-0.0618	-1.23
Bankpercent	**0.0351****	**2.2**						
Bankpercent*Size	**-0.008*****	**-3.39**						
Bankdum			**0.085**	**0.82**				
Bankdum*size			**-0.021**	**-1.19**				
Bankpercent					**-0.041*****	**-4.95**		
Bankpercent*MB					**0.0157*****	**3.38**		
Bankdum							**-0.1597****	**-2.51**
Bankdum*MB							**0.0635***	**1.91**
Intercept	-0.916***	-4.33	-0.904***	-4.85	-0.74***	-2.77	-0.764***	-2.66
Industry effect	Yes		Yes		Yes		Yes	
R	0.1316		0.1297		0.1327		0.1321	
F	5.72		5.66		5.88		5.85	
p>F	0		0		0		0	
Obs.	2131		2131		2131		2131	

Table 8: Impact of bank debts and interactions with presence of loss and bankruptcy risk on investment inefficiency – Alternative investment model

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt proportion *BankPercent* is log(1+bank debts/total outstanding debt). Bankdum is dummy variable that equal 1 if firms have bank debts and 0 otherwise. Controls for public debt *Pub* are *PubPercent* and *Pubdum*. Controls for nonbank private debt are *PriPercent* and *Pridum*. *Pubpercent* and *PriPercent* are log(1+proportion of Public debts/total debts) and log(1+nonbank private debts/total debts). *Pubpercent* and *PriPercent* are used when regressing on *BankPercent; Pubdum* and *Pridum* are used when regressing on *Bankdum*. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets. ***, ** and *: Significances at 1%, 5% and 10% level respectively

II	Estimate	t-value	Estimate	t-value	Estimate	t-value	Estimate	t-value
Short_debt	-0.038	-0.82	-0.034	-0.71	-0.033	-0.72	-0.0325	-0.69
Size	0.049***	3.46	0.049***	3.37	0.0502***	3.46	0.05***	3.47
Age	0.0225	1.26	0.0224	1.3	0.0216	1.26	0.0214	1.23
Tang	0.0373	0.38	0.0436	0.44	0.04	0.41	0.0443	0.46
CFOVol	-0.001**	-2.24	-0.0009**	-2.28	-0.001**	-2.25	-0.001	-2.35
SaleVol	-0.1055**	-2	-0.1075*	-1.91	-0.107**	-1.97	-0.107*	-1.87
TobinQ	-0.0273	-0.84	-0.0285	-0.86	-0.03	-0.93	-0.03	-0.89
Zscore	0.0037	1.13	0.0043	1.32	0.0027	0.98	0.003**	2.2
CFO/TA	0.104***	9.14	0.1041***	9.52	0.1052***	9.06	0.1044***	9.61
Cycle	0.0006***	4.38	0.0006***	4.45	0.0006***	4.45	0.0006***	4.46
Loss	-0.073***	-4.63	-0.042**	-1.86	-0.0188	-0.66	-0.017	-0.61
Pub	-0.0042**	-2.24	0.0021	0.31	-0.0033*	-1.79	0.0034	0.44
Pri	0.0072	0.85	0.0424	1.33	0.0074	0.88	0.0433	1.37
Bankpercent	**-0.019*** **	**-3.43**						
***Bankpercent*Loss**	**0.0211***	**1.94**						
Bankdum			**-0.0516****	**-2.46**				
***Bankdum*Loss**			**0.0364**	**0.96**				
Bankpercent					**-0.014*****	**-3.18**		
***Bankpercent*Zscore**					**0.0008**	**1.33**		
Bankdum							**-0.0512***	**-1.89**
***Bankdum*Zscore**							**0.0034**	**0.66**
Intercept	-0.785***	-3.16	-0.813***	-3.21	-0.8***	-3.24	-0.82***	-3.15
Industry effect	Yes		Yes		Yes		Yes	
R	0.1306		0.1288		0.1289		0.1286	
F	5.67		5.63		5.67		5.67	
p>F	0		0		0		0	
Obs.	2131		2131		2131		2131	

Table 9: Impact of bank debts and interactions with corporate governance risk on investment inefficiency – Alternative investment model

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt proportion *BankPercent* is log(1+bank debts/total outstanding debt). Bankdum is dummy variable that equal 1 if firms have bank debts and 0 otherwise. Controls for public debt *Pub* are *PubPercent* and *Pubdum*. Controls for nonbank private debt are *PriPercent* and *Pridum*. *Pubpercent* and *PriPercent* are log(1+proportion of Public debts/total debts) and log(1+nonbank private debts/total debts). *Pubpercent* and *PriPercent* are used when regressing on *BankPercent; Pubdum* and *Pridum* are used when regressing on *Bankdum*. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets. ***, ** and *: Significances at 1%, 5% and 10% level respectively

II	Estimate	t-value	Estimate	t-value
Short_debt	0.0531	0.8	0.0586	0.88
Size	0.0226	0.92	0.0176	0.71
Age	0.0329	1.1	0.0299	0.99
Tang	0.1292	1.16	0.1356	1.21
CFOVol	-0.001**	-2.32	-0.001**	-2.09
SaleVol	-0.222	-1.05	-0.24	-1.13
TobinQ	-0.045*	-1.76	-0.0496*	-1.93
Zscore	-0.0056	-0.59	-0.0024	-0.25
CFO/TA	0.1493***	4.51	0.1429***	4.31
Cycle	-8.8E-05	-0.26	-8.4E-05	-0.25
Loss	-0.037	-0.81	-0.035	-0.74
Poison	-0.007	-0.14	-0.021	-0.37
Pub	-0.0126	-1.14	-0.0007	-0.02
Pri	-0.026**	-2.38	-0.0589	-1.48
Bankpercent	-0.029***	-2.61		
Bankpercent*Poison	0.0072	0.43		
Bankdum			-0.0784*	-1.86
Bankdum*Poison			0.0418	0.62
_cons	-0.1487	-0.49	-0.168	-0.55
Industry effect	Yes		Yes	
R	0.1313		0.1271	
F	1.79		1.86	
p>F	0.0001		0.0003	
Obs.	760		760	

Table 10: Impact of bank debt reliance on investment inefficiency – alternative measures

$II_{i,t}$ are level of investment inefficiency. $Short\_debt_{i,t-1}$ is the proportion of short-term debt in total debts. $Size_{i,t-1}$ is the natural logarithm of total assets. $Age_{i,t-1}$ is the natural logarithm of the years since the firm's establishment. $Tang_{i,t-1}$ is the ratio of tangible assets on total assets of firms. $CFOvol_{i,t-1}$ and $SalesVol_{i,t-1}$ are deviations of firms' operation cash flow and volatility of sales from t-2 to t. $TobinQ_{i,t-1}$ is the ratio between market value of equity and debt over total assets. $Zscore_{i,t-1}$ is calculated following the paper of Altman (1968). Dummy variable $Loss_{i,t-1}$ equals 1 if net income before extraordinary items is negative and 0 otherwise. $CFO/TA_{i,t}$ is the ratio between operation cash flow and average total assets. Operating cycle $Cycle_{i,t-1}$ is calculated as (average accounts receivables/sales)*360 + (average inventory/cost of good solds)*360. Bank debt to assets *BankAT* is the log(1+ banks debt/total assets). Bank debt to market equity *BankME* is the log(1+ banks debt/market equity). Controls for public debt *PubAT*, *PubME* and nonbank private debt *PriAT*, *PriME* are calculated in similar way to *BankAT* and *BankME*. *Poison* is a dummy variable that equals 1 if firms have poison pill anti-takeover tactics and 0 otherwise. All the estimates have been carried out using pooled time-series cross-sectional regressions OLS coefficients. t-statistics clustered at the firm and year level (Petersen, 2009) robust both to heteroscedasticity and within firm serial correlation in brackets. ***, ** and *: Significances at 1%, 5% and 10% level respectively

Panel A: BankAT

II	(1)	(2)	(3)	(4)	(6)	(6)
Short_debt	-0.0375	-0.0382	-0.0412	-0.0421	-0.0355	0.0298
	(-0.82)	(-0.89)	(-0.92)	(-0.89)	(-0.76)	(0.45)
Size	0.047***	0.0653***	0.0467***	0.047***	0.0488***	0.0237
	(3.76)	(8.06)	(3.58)	(3.79)	(4.05)	(0.98)
Age	0.0205	0.0188	0.0179	0.0203	0.0186	0.0287
	(1.15)	(1.04)	(1.05)	(1.13)	(1.01)	(0.97)
Tang	0.0409	0.0358	0.0508	0.0371	0.0436	0.1113
	(0.4)	(0.35)	(0.52)	(0.35)	(0.44)	(0.99)
CFOVol	-0.001**	-0.001***	-0.001**	-0.0009**	-0.0009**	-0.001**
	(-2.24)	(-2.61)	(-2.37)	(-2.24)	(-2.32)	(-2.46)
SaleVol	-0.108**	-0.1027**	-0.1055**	-0.106**	-0.109**	-0.22
	(-2.03)	(-2.2)	(-2.5)	(-2.08)	(-2.17)	(-1.05)
TobinQ	-0.029		-0.055	-0.0264	-0.0294	-0.032
	(-0.91)		(-1.29)	(-0.82)	(-0.91)	(-1.23)
MB		-0.0248				
		(-0.82)				
Poison						-0.0146
						(-0.31)
Zscore	0.004	0.0034	0.0043	0.0034	0.0015	-0.0125
	(1.34)	(1.26)	(1.37)	(1.09)	(0.87)	(-1.23)
CFO/TA	0.1073***	0.1043***	0.1038***	0.1051***	0.1064***	0.1507***
	(8.52)	(8.95)	(9.7)	(8.97)	(8.66)	(4.57)
Cycle	0.0006***	0.0006***	0.0006***	0.0006***	0.0006***	-4E-05
	(4.49)	(4.44)	(4.3)	(4.59)	(4.59)	(-0.12)
Loss	-0.018	-0.0169	-0.0157	-0.061***	-0.016	-0.038
	(-0.67)	(-0.62)	(-0.62)	(-3.39)	(-0.62)	(-0.83)
PubAT	0.0019	0.0007	0.002	0.0011	0.0022	-0.019
	(0.31)	(0.1)	(0.35)	(0.17)	(0.36)	(-1.27)
PriAT	0.0145	0.0144	0.0144	0.0141	0.0143	-0.033**

	(1.16)	(1.18)	(1.14)	(1.11)	(1.14)	(-2.16)
BankAT	-0.0131*	0.0505**	-0.054**	-0.022**	-0.0206***	-0.0467***
	(-1.75)	(2.4)	(-2.1)	(-2.02)	(-2.45)	(-2.87)
*BankAT*Size*		-0.0108***				
		(-3.35)				
*BankAT*MB*			0.0231**			
			(2)			
*BankAT*Loss*				0.027*		
				(1.78)		
*BankAT*Zscore*					0.0027*	
					(1.83)	
*BankAT*Poison*						0.0166
						(0.65)
Intercept	-0.7944***	-0.8866***	-0.752***	-0.778***	-0.796***	-0.1004
	(-3.22)	(-3.92)	(-2.84)	(-3.07)	(-3.29)	(-0.33)
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
R	0.1298	0.1321	0.1332	0.1312	0.1302	0.1312
F	5.77	5.74	5.91	5.68	5.72	2.1
p>F	0	0	0	0	0	0
Obs.	760	760	760	760	760	760
Panel B: BankME						
II	(1)	(2)	(3)	(4)	(6)	(6)
Short_debt	-0.0332	-0.0323	-0.0324	-0.0372	-0.0308	0.0399
	(-0.8)	(-0.86)	(-0.79)	(-0.88)	(-0.73)	(0.6)
Size	0.047***	0.064***	0.0464***	0.0466***	0.04804***	0.0234
	(3.84)	(6.59)	(3.76)	(3.78)	(4.09)	(0.97)
Age	0.013	0.0106	0.011	0.0126	0.0119	0.0266
	(0.72)	(0.58)	(0.62)	(0.7)	(0.64)	(0.9)
Tang	0.045	0.0412	0.0645	0.0418	0.0487	0.1234
	(0.42)	(0.39)	(0.65)	(0.38)	(0.46)	(1.1)
CFOVol	-0.0009**	-0.001***	-0.0009**	-0.0009**	-0.0009**	-0.001**
	(-2.42)	(-2.78)	(-2.41)	(-2.41)	(-2.47)	(-2.54)
SaleVol	-0.149***	-0.1454***	-0.1408***	-0.1479***	-0.1477***	-0.2089
	(-3.79)	(-4.27)	(-4.51)	(-3.96)	(-3.91)	(-0.99)
TobinQ	-0.036		-0.0602	-0.0351	-0.0358	-0.0525**
	(-1.16)		(-1.51)	(-1.12)	(-1.14)	(-2.06)
MB		-0.0315				
		(-1.03)				
Poison						-0.0245
						(-0.54)
Zscore	0.0025	0.0023	0.0041	0.0018	0.001	-0.0105
	(0.72)	(0.7)	(1.04)	(0.5)	(0.37)	(-1.07)
CFO/AT	0.1056***	0.1008***	0.1017***	0.103***	0.1048***	0.1477***
	(8.08)	(8.45)	(9.88)	(8.92)	(8.13)	(4.5)

Cycle	0.0005***	0.0005***	0.0005***	0.0005***	0.0005***	-2.2E-05
	(4.11)	(4.06)	(3.95)	(4.16)	(4.2)	(-0.06)
Loss	-0.019	-0.0175	-0.0122	-0.0496**	-0.0159	-0.031
	(-0.71)	(-0.65)	(-0.49)	(-2.14)	(-0.63)	(-0.67)
PubME	0.0024	0.003521	0.003404	0.001536	0.0029	-0.0104
	(0.51)	(0.71)	(0.82)	(0.28)	(0.61)	(-0.77)
PriME	0.0096	0.010448	0.009942	0.009003	0.00996	-0.02497
	(0.82)	(0.92)	(0.83)	(0.75)	(0.85)	(-1.67)
BankME	-0.0178**	0.0437***	-0.054**	-0.0247**	-0.0223***	-0.0479***
	(-2.22)	(3.2)	(-2.04)	(-2.03)	(-2.7)	(-3.18)
*BankME*Size*		-0.0102***				
		(-4.87)				
*BankME*MB*			0.0251*			
			(1.83)			
*BankME*Loss*				0.0171		
				(1.33)		
*BankME*Zscore*					0.0022*	
					(1.87)	
*BankME*Poison*						0.0207
						(0.86)
Intercept	-0.7324***	-0.83***	-0.722***	-0.72***	-0.746***	-0.0966
	(-2.92)	(-3.49)	(-2.91)	(-2.78)	(-3.06)	(-0.32)
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
R	0.124	0.1266	0.1274	0.1248	0.1243	0.1363
F	5.49	5.47	5.65	5.37	5.43	2.02
p>F	0	0	0	0	0	0.0001
Obs.	760	760	760	760	760	760