The Effect of Relationships with Government-Owned Banks on Cash Flow Constraints: Evidence from India

by

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Abstract

We examine the effect of maintaining exclusive relationships with Government Owned Banks (GOBs) on real investment by publicly traded companies in India. Firms that maintain such exclusive relationships have an investment cash flow sensitivity that is almost 30% lower relative to other firms. GOB relationships also increase sensitivity of investment to Tobin's Q. Exclusive relationships with private banks *increase* cash flow sensitivity while exclusive relationships with foreign banks have no impact. The lower investment cash flow sensitivity by firms with exclusive GOB relationships is not the result of cherry picking of less constrained firms by GOBs. Rather, firms with exclusive GOB relationships are in worse financial condition relative to other firms – thus, GOBs appear to be doing reverse of cherry picking. Surprisingly, the results are driven by the large firms which benefit from GOB relationship and not the smaller firms which are the intended beneficiaries of government directed credit programs.

Keywords: banking; government owned banks; credit; cash flow; investment; India

1. Introduction

Government involvement in credit markets has been the subject of intense debate. On one hand, Gerschenkron (1962) and Stiglitz (1989) suggest a strong positive effect of such governmental involvement, mainly by mitigating the effect of market failures. On the other hand, there have also been several papers that suggest a negative effect of government on credit markets. Two theoretical explanations for a negative effect have been the political view - suggested by Shleifer and Vishny (1994); and the agency view - suggested by Bannerjee (1997). The political view postulates that politicians actively use government owned enterprises to further their political goals. The agency view suggests that agency conflicts and inefficient government owned banks lead to misallocation of resources (Qian and Yeung, 2015). At the macroeconomic level, countries with higher involvement of government in credit markets are shown to have lower growth (Barth et al, 2001; La Porta et al, 2002, Dinc, 2005). Several single-country studies, where more detailed examination of bank behavior is possible, find evidence in favor of the political view (Sapienza (2004) for Italy; Khwaja and Mian (2005) for Pakistan; Carvalho (2014) for Brazil, Cull et al (2015) for China). Thus, the overall evidence is more consistent with a net negative effect of government in credit markets.

The Indian economy has a large involvement of the government in credit markets via government owned banks (henceforth, GOBs). Further, Cole (2009) and Kumar (2017) have shown large effects of political events on agricultural lending in India. In contrast to the above mentioned studies, we examine corporate lending by GOBs to publicly traded corporations in India, and its effect on corporate investment. Relative to agricultural lending, where political motives might be the dominant one, politicians have fewer incentives to interfere in decision making for corporations, as votes are not directly at stake. Further, in contrast to agricultural lending, where

politicians officially play a key role in the allocation of credit, the formal power of government and politicians in directing bank lending to individual corporate borrowers is much more limited.

Our goal is to examine the real effects of GOB lending – focusing the investment behavior of firms that have *exclusive relationships with GOBs*. We use this sample of firms, as they are especially likely to be impacted by (potentially) poor lending decisions at GOBs, due to either agency or political incentives. First, we document that firms with exclusive relationships with GOBs, which constitute 47% of our sample, tend to have higher leverage, lower investment, lower profitability as well as lower growth prospects, as measured by the Market to Book ratio. These results suggest that such firms may be more credit constrained.

Next, we examine the investment behavior of such firms relative to other publicly traded firms. Specifically, we study the incremental effects of maintaining exclusive relationships with GOBs on investment cash flow sensitivity, which is our main measure of credit constraints. Our main result is that there is an economically large reduction in the sensitivity of investment to cash flow – of the order of 30%, when a firm maintains exclusive relationships with GOBs. This is a strong result, but even more remarkable when considering the fact that such firms - with exclusive GOB relationships, may be more credit constrained relative to other publicly traded firms. All our results control for unobservable firm heterogeneity using firm fixed effects; as well as industry*year fixed effects, to control for time varying industry and macro-economic factors that may impact investment. We also find that firms with exclusive GOB relationships have a higher sensitivity to growth prospects, as measured by the Market to Book ratio, suggesting a positive benefit for GOB relationships in terms of increasing the efficiency of investment.

One possibility is that the above effect is due to maintenance of banking relationships per se, not specifically GOB relationships. To test this, we redo our tests for firms maintaining exclusive

relationships with private banks, and foreign banks. In stark contrast to the effect of having exclusive GOB relationships, we find that having exclusive relationships with private banks *increases* cash flow sensitivity. However, private banking relationships have similar effects in terms of increasing the sensitivity of investment to Tobin's Q. Exclusive foreign banking relationships are found to have insignificant effects, both in terms of mitigating cash flow constraints, and in terms of higher sensitivity to growth. However, the small size of the sample of firms with exclusive relationships with foreign banks limits the inference that can be drawn from this result.

Having ruled out the possibility that the documented GOB effect is one due to banking relationships, we now evaluate other possible explanations for our result. One conjecture may be that GOBs cherry pick firms that are unobservably less constrained (a selection effect). Thus, the GOB exclusive relationship is an unobservable proxy for firms with lower cash flow constraints, which results in a lower cash flow sensitivity for this set of firms. There are several reasons that this is not likely. First, firms with exclusive GOB relationships have been shown to have greater constraints relative to the average, by other measures of credit constraints such as profitability and leverage. Second, GOBs have a mandate to lend to credit constrained firms. Lastly, using data from India, Gormley (2010) finds that the reverse is true – namely, foreign banks cherry pick borrowers.

Nevertheless, to further rule out cherry picking, we conduct a time series analysis of firms that switch into and switch out from exclusive GOB relationships. We find evidence that is consistent with the earlier univariate results – firms that switch into exclusive GOB relationships have lower profitability and cash flows, relative to firms that switch out. Thus, the evidence is

more consistent with private and foreign banks cherry picking better quality borrowers, similar to that documented by Gormley (2010).

Second, we conduct a logistic regression to examine the determinants of a firm maintaining an exclusive relationship with GOBs. We find evidence consistent with the notion that firms that are more credit constrained have a higher likelihood of being in such an exclusive relationship. This provides further evidence of cherry picking by private and foreign banks, relative to GOB cherry picking.

As a third test for cherry picking, we re-estimate our investment cash flow regression for the sub-sample of firms that have relationships with GOBs that are not exclusive, i.e., for the sub-sample of firms that have at least one relationship with a GOB, and also have relationships with other private or foreign banks. If GOBs cherry pick firms with unobserved lower cash flow constraints, then we should find no effect of the exclusive relationship with GOBs on cash flow sensitivity in this sub-sample. On the other hand, if private and foreign banks cherry pick lower constraint firms for exclusive relationships, the firms with exclusive GOB relationships, should continue to display cash flow sensitivity in a sub-sample of firms that have relationship with more than one bank ownership type.

As a fourth test for cherry picking, we estimate a propensity score matching model to model the choice of firms into exclusive GOB relationships. For each firm, we match another firm which was equally likely to have been in an exclusive relationship but was not. Using this matched sample of observations, we re-estimate the investment cash flow sensitivity regression and find similar results.

In the last section of the analysis, we examine if these results hold for large and small firms. Our motivation for examining firm size is that relationship lending effects are often thought to be

most prevalent for small firms (Bharat et al, 2011). On the other hand, such firms are also most vulnerable to hold up by their banks (Santos and Winton, 2008). In the Indian context, it is not clear which effect should predominate. On one hand, GOBs have much more market power in India which should make the benefits lower for small firms. On the other hand, GOBs also have a stronger incentive to engage in the social objective of increasing lending and promoting growth of small and medium enterprises in support of several government policies such as mandated minimum lending to small and medium firms.

To test the above, we re-estimate our baseline model for large and small firms, using the median in-sample firm size to divide the sample. Surprisingly, we find that large firms have a large and significantly negative reduction in cash flow sensitivity, whereas small firms derive insignificant benefits from maintaining lending relationships with GOBs. To test the robustness of the above result, we also conduct a propensity score matching method within the set of large and small firms, and find similar results. *This suggests that the benefit of GOB relationship is concentrated exclusively on large firms.*

Overall, our results, suggest that the political/agency view can co-exist with the social view of government involvement in credit markets. Specifically, for corporate lending in India, we find that GOB relationships are effective in mitigating investment cash flow sensitivity, thereby, reducing credit constraints. This result complements the cross-country study in Andrianova et al (2008), who find that the large deposit share of GOBs is a result of poor institutional quality and lack of trust in private banks. Here, we document that a large share in the lending market may also be rational, given the lack of support by private banks in terms of mitigating cash flow constraints of their borrowers.

Apart from contributing to the state versus market debate, we also make a contribution to the determinants of choice of lender type, something which has not been studied at the micro level, with the exception of Berger at al (2008). In contrast to their focus on multiple types of banking relationships, we examine the choice of exclusive relationships with GOBs. We also contribute to the notion that foreign lenders cherry pick best borrowers (Gormley, 2010), but add to this literature by demonstrating that firms can undo some of the cherry picking effect by maintaining exclusive relationships with GOBs.

The remainder of this paper is organized as follows. In section 2, we present the institutional background of lending in India. In section 3, we conduct the empirical analysis, and in section 4, we present conclusions and limitations of our analysis.

2. Institutional background of lending in India.

The Indian financial sector is heavily dominated by the banking sector which is the primary channel for mobilizing savings and delivery of credit in India. The Reserve Bank of India classifies banks into public sector, private and foreign banks. At the time of independence in 1947, most large banks were privately owned. The Government of India through a series of nationalizations took control of the largest banks in the country. In 1955, the government took control of the largest bank, the Imperial Bank of India, which is today the State Bank of India. State Bank of India later took over the provincial banks which operate as its associate banks. In 1969, the Government of India nationalized 14 of the largest commercial banks. Further, in 1980, the government nationalized another 6 large banks. As a result of nationalization of large banks in India, commercial banking is dominated by government owned banks. These banks which are controlled by the government are called public sector banks. In our study, we refer to this group as

Government Owned Banks (GOBs). The primary reason given by the Indian Government for nationalization was that the banks were not lending to agriculture and smaller firms which were severely credit constrained.

Since nationalization, the government policy required banks to lend to the sectors that government considered as "priority sector" – namely agriculture, small industries and some retail borrowers. All commercial banks are required to lend 40% of net bank credit to the priority sector.[1] In the case of most industry segments, a firm qualifies for priority sector loans if investment in plant and machinery is Rs. 10 million or lower. In 2013, total loans and advances given by scheduled commercial banks in India was Rs. 58,797 billion.[2] Of this, Rs. 17,142 billion (29% of total bank lending) was given to the priority sector[3]. The shortfall of any bank against the target for priority sector loan for priority sector lending has to be placed with government financial institutions that specialize in banking for the priority sector such as the National Bank for Agriculture and Rural Development (NABARD) and Small Industries Development Bank of India (SIDBI).

In the early 1990s, economic and financial sector reforms were initiated in India. The banking sector reforms led to the establishment of de novo banks in the private sector, entry of foreign banks, deregulation of branch expansion, reduction of government stake in public sector banks through IPOs, and deregulation of interest rates. Between 1994 and 2000, several de novo private banks began operations in India. In 2001, there were 28 banks with majority government ownership, 36 private banks and 46 foreign banks.

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[1] These limits were lower for foreign banks for the time period of our study.
[2] Reserve Bank of India, 2013, A profile of banks.
[3] Reserve Bank of India, 2013, Report on trend and progress in banking.

Since the nationalization of the largest banks, the government owned banks have dominated the banking sector. In 2001, government owned banks had a share of 79.4% of the total credit by commercial banks in the country with private bank's share of total bank credit of 12.6% and foreign bank's share being 8%.[4] Data for 2012-13, the last year in our sample, indicates that there has been a marginal decline in the share of government owned banks in total credit to 76.1%, private banks share in total bank credit increased to 19.4% while foreign banks share declined to 4.5%.[5] So while the government owned banks continue to dominate the banking sector, the private sector has been increasing its market share. It may also be noted that, while on average, private sector banks have higher return on assets and lower non-performing assets, compared to GOBs, the GOBs have improved their profitability from an ROA of 0.57% in 1999-2000 to 0.78% in 2012-13. While the government is the majority owner of the GOBs, the banks are managed by professionals, with the government appointing the board and CEO. The finance minister, as representative of the owner, holds review meetings with GOB CEOs during which the government's view on what banks should do are also conveyed. It has been reported in newspapers that in such meetings, the banks are told that there is a need to lend more or lower interest rates in line with the prevailing view of the government.[6] However it is not clear if banks do take the government views into account in their business decisions.

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[4] Reserve Bank of India, 2002, Report on trend and progress in banking.
[5] Reserve Bank of India, 2013, A profile of banks.
[6] Here are some related headlines: (1) Live Mint, "Finance Minister prods banks to lend more", November 20, 2014, (2) The Hindu, "Pranab asks public sector banks to hold lending rates", August 14, 2010, (3) India Today, "Review interest rates, Chidambaram urges banks", July 3, 2013, (4) The Hindu, "Chidambaram warns bankers denying loan to deserving students," December 31, 2013, (5) The Times of India, "Chidambaram (FM) to banks: keep EMIs affordable, cut interest rates", August 18, 2012. Pranab Mukherjee and P. Chidambaram were Finance Ministers at the time of these news reports.

Capital markets are relatively small in terms of funds mobilized relative to the commercial banks. In 2013, the funds raised through public debt issues was Rs. 169.8 billion, while equity issues raised Rs. 154.73 billion. Commercial paper outstanding on March 31, 2013 was Rs. 10.92 billion. While the public debt issuance is limited, the market for private placement of debt is relatively much bigger. In 2013, Rs. 2,760 billion of debt was raised through private placement[7].

During the period 2000 to 2013, the total bank loans and advances in the country increased from Rs. 4,434.7 billion in 2000 to Rs. 58,797 billion in 2013, representing an annual growth rate of 22%. Despite this growth in total credit during this period, several reports have indicated that limited access to credit has been a major impediment to firm's growth. The Prime Minister's Task Force on Micro, Small and Medium Enterprises which submitted its report in 2010 concluded that "access to adequate and timely credit at a reasonable cost is the most critical problems faced by this sector." Banerjee and Duflo (2014) also pointed to the presence of financial constraints for firms in India.

3. Empirical Analysis

We use the Prowess database of Indian companies and identify all publicly traded companies between years 1999 and 2013 with sales exceeding Rs. 10 million (approximately $ 160,000) which gives 34,036 firm-years and 3,884 unique firms. We exclude 3,932 firm-years with negative equity. This leaves 30,104 firm-years from 1999 to 2013. As variables such as investments are calculated using change in values between *t* and *t-1*, the data set used for the analysis is from 2000 to 2013. There are 1,976 observations for the year 1999 which are used to calculate variables such as investments and sales growth in year 2000 but otherwise not used in our analysis. Excluding

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[7] Government of India, 2013, Economic Survey.

the observations for the year 1999, there are 28,128 firm-year observations corresponding to 3,508 unique firms for the period 2000 to 2013. As observations for firms begin on different years, variables that are calculated using lagged values such as investments, cash flow and growth in sales have fewer observations. Prowess provides data on the names of all banks that the firm has a relationship with in a given year. We take this list and classify all the banks that a given firm lists as its bankers into government owned, private and foreign. This provides us with a dataset of the firm's financial information and bankers by ownership type.

3.1 Univariate analysis

Table 1 presents summary statistics for the period from 2000 to 2013 for the overall sample by firm year. Table 2 presents summary statistics for firm years stratified by firms that had exclusive GOB relationships in a given year and firms that did not. Firms that maintain exclusive relationships with GOBs have lower investments, lower cash flow, lower return on assets, lower sales growth, higher leverage, and are smaller firms. Thus, this stratification suggests that firms with exclusive GOB relationships (henceforth, GOB firms), are more financially constrained. This focus of GOB lending on more credit constrained firms is not surprising – GOBs have a mandate to lend to develop the economy by lending to smaller, possibly more constrained firms. As such, this has also been documented in other studies such as Sapienza (2004). A definition of all variables used is presented in Appendix 1.

Figure 1 presents the distribution of firm year graphically, segregating them into those where firms had exclusive relationships with GOB, private banks, foreign banks, as well as those where firms maintained relationships with multiple categories of banks. Firms with exclusive relationships with GOB constitute approximately 45% of the sample. In contrast, firms with

exclusive relationships with private and foreign banks constitute only 5% and 1% of the sample respectively. However, a large fraction of firms maintain GOB relationships and at the same time maintain banking relationship with non-government owned banks, namely private and foreign owned banks. In fact, 49% of sample firm years are those where firms maintain relationships with multiple types of banks.

3.2. Multivariate analysis

We motivate our principal empirical tests, where we draw on the long literature on investment cash flow sensitivity starting with Fazzari, Hubbard and Peterson (1988, 2000). Specifically, our main measure of credit constraints is the sensitivity of investment to cash flow, and the incremental impact of maintaining an exclusive relationship with GOBs on this sensitivity. Our baseline specification to test this is as follows:

$$\text{Investment}_{i,t} = a + b * \text{Cash Flow}_{i,t} + c * \text{Cash Flow}_{i,t} * \text{GOBE}_{i,t}$$

$$+ d * Q_{i,t-1} + \text{other controls} + e_{i,t} \qquad (1)$$

where suffix 'i' is for the firm, and suffix 't' is for the year. 'Investment' is defined as the change in total fixed assets in year t from year t-1, scaled by the total assets in year t-1. This variable is meant to measure real investment of the firm in the given year. 'Cash flow' is the net cash flow from operating activities in the current year, also scaled by total assets in the previous year.[8] 'GOBE' is a dummy variable that takes a value of 1 if a firm maintains banking relationships exclusively with GOBs and 0 otherwise. Q measures growth opportunities of the firm, and is computed as the ratio of market value of assets to book value of assets (Kee and Pruitt, 1994).

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[8] We scale cash flow by total assets to be able to easily interpret the marginal effect of this variable.

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Other control variables used in the specifications include leverage and firm size. Leverage can impact firm investment (Whited, 1992; Lang et al, 1996, Firth et al, 2008). Firm size can be negatively related to investment as small firms are more likely to have larger investment opportunities, but also negatively – as small firms may also be more capital constrained. Depending on the specification, we employ firm fixed effects to control for unobservable firm level heterogeneity and/or industry*year fixed effects to control for time varying investment patterns at the level of the industry year. We map the Prowess industry classifications to the Fama-French industry classifications and use this to generate the industry dummy variables.

Table 3 presents the results of this estimation. Model (1) presents the baseline specification without any interactions. Unlike the univariate results, there is no aggregate negative association of GOBE with investment. This suggests that there is significant cross-sectional variation in the type of firms that select into exclusive GOB relationships. However, in the estimation with firm fixed effects, this impact is captured by the firm specific dummies. Cash flow has an economically large impact on investments – in fact, much larger than Q itself, suggesting that cash flow constraints play an important role in investment decisions, even for publicly traded Indian companies. The magnitude of the coefficient on cash flow, suggests that a reduction of cash flow reduces investment by almost 10%.

Leverage has a negative effect as documented by prior literature (Lang et al, 1996). Note that this may also be because larger firms have greater debt capacity and lower investment opportunities. Firm size has a strong positive effect, suggesting that the net effect of financing is larger than the effect of growth options that smaller companies are more likely to have. It may also reflect the fact that in emerging economies, such as India, larger firms are able to overcome external financing frictions.

Next, in model (2), we examine the interactive effect of GOBE on cash flow sensitivity. We find that there is a strong negative effect of maintaining exclusive relationships with GOBs on cash flow sensitivity. In particular, for this specification, there is a reduction of cash flow sensitivity by almost 30% (0.033/0.111) by maintaining strong (exclusive) relationships with GOBs.

In model (3), we examine if maintaining exclusive relationships with GOBs also enable firms to better capitalize on growth options, by interacting GOBE with Q. We find a positive effect, suggesting that this is indeed the case. While there is a large percentage increase in sensitivity to Q (almost 45%, computed as 0.004/0.009), the absolute size of the Q effect is much smaller than that of cash flow. Lastly, in model (4), we run the combined specification and find similar results and coefficients.

Next, we conduct a similar test for firms that maintain exclusive relationships with private and foreign banks, the corresponding variables being names PBE and FBE (Table 4). In this specification, we include all control variables in Table 3, but do not report them to economize on presentation. We find some similarities as well as some differences. First, maintaining exclusive relationships with private banks have a similar effect on Q as maintaining exclusive relationships with GOBs – which is increasing investment sensitivity to Q. In contrast, when interacted with Cash Flow, maintaining exclusive relationships with private banks has the effect of *increasing* investment sensitivity to cash flow – a result that is in stark contrast to that obtained for GOBs. Foreign bank relationships have an insignificant incremental effect on sensitivity of investment to Q or Cash flow. This may also be potentially because of the small size of this sample.

In Table 5, we include additional variables – proportion of funds borrowed from Development Financial Institutions (FI loans) and the proportion of fund raised from the debt market through bonds, debentures and commercial paper. Access to funds from FIs and the debt market would be

available only to a select group of firms. FIs mainly give term loans for new projects while market source of funding could be both long term and short term. Firms that are able to access funds from FIs and the debt market are firms that meet additional screening criteria. A priori, firms that are able to obtain funds from the FIs and the debt market should be able to make higher investments. While the FI loans and debt market funds have a positive impact on corporate investment which is along expected lines, our basic result that GOBE reduces investment's cash flow sensitivity and PBE increases cash flow sensitivity continue to be obtained.

The above results suggest that maintaining exclusive relationships with GOBs has value, over and above the value of typical banking relationships, a fact not well recognized in the literature. Nevertheless, evidence suggestive of this has been documented in Berger et al (2008), also in the context of lender choice in India.

One concern here may be the interpretation of the positive impact of cash flow in investment regressions as a valid measure of financial constraints (Kaplan and Zingales, 2000; Erikson and Whited, 2002). We should note that later papers have successfully designed experiments where cash flow changes are uncorrelated with investment (Rauh, 2006; Lamont, 2007; Petersen and Faulkender, 2012). These papers continue to find a positive impact of cash flow on investment. These results have been obtained in the institutional context of the United States. Such constraints are likely to be even larger in emerging markets where the lack of external capital markets makes banks even more important, and this is confirmed by other studies (Cull et al, 2015; Francis et al, 2013).

3.3 Selection of low constraint firms by GOBs

One possible interpretation of our results is that GOBs somehow select firms that are unobservably less credit constrained relative to other firms. Our univariate results strongly suggest that this is not the case. We provide several additional tests to alleviate this concern. First, we conduct multivariate analysis of the determinants of the likelihood of maintaining exclusive relationships with GOBs. Second, we re-estimate our empirical results for a sub-sample of firms that already have at least one GOB relationship. Third, we examine the time series of switching behavior of firms that switch in and switch out of exclusive GOB relationships.

3.3.1 Likelihood of choosing exclusive relationships with GOBs

We elaborate on the first approach now. Using GOBE as the dependent variable, and other firm characteristics as the independent variable, we estimate the likelihood of a firm maintaining exclusive relationships with GOBs. We estimate this model, both using a linear probability model and a logistic model. In practice, marginal effects using both models are often similar (Angrist and Pischke, 2009). One important advantage of the linear probability model is that can use a relatively large cross-section of observations with fewer time series observations per firm. With firm fixed effects, estimating non-linear models of the probability of selection of exclusive GOB relationships can sometimes lead to convergence issues, and further, only observations corresponding to the subset of firms which switch out or into exclusive GOB relationships can be used in a logistic model. Another advantage of the linear probability model in this context is that we can directly infer the marginal effects from the coefficient values.

The results of this estimation are presented in Table 6. Models 1 and 2 present the results for the logistic estimation and model 3 present the results for the linear probability model. We use both firm and industry-year fixed effects for model 3. Unfortunately, due to the large number of

fixed effects, we are unable to obtain adequate convergence for the logistic model when using both of these types of fixed effects together.

The findings confirm the univariate analysis. High leverage firms and low profitability firms are much more likely to have exclusive GOB relationships. Likewise, smaller firms are much more likely to maintain exclusive GOB relationships. The only factor against this interpretation is that such firms have significantly higher tangible assets. This has two interpretations – (1) GOBs mainly lend to firms with tangible assets (more collateral can be pledged), or (2) Other types of banks are more likely to lend to service firms, specifically, software firms, which are among the most profitable firms in the Indian economy. Given all the other variables suggesting GOBs lending to more constrained firms, the first explanation is less likely. However, a full investigation of this issue would require much more analysis. In any case, the overall thrust of these results is more consistent with GOBs lending to more constrained firms, which completely goes against the notion that the measured effect is the result of selection of less constrained firms.

3.3.2 Using only firms with at least one GOB relationship as the counter factual

We now elaborate on the second method of examining if our results are potentially due to the selection of firms that are unobservably less credit constrained by GOBs. In the current regression specification that we ran (Tables 3-5), the counter factual relative to which the GOBE effect was measured was all remaining firms. From Figure 1, recall that this included firms with exclusive relationships with private and foreign banks, as well as firms that borrowed from more than one type of bank. Within this sub-sample of firms that borrowed from more than one type of bank, there is a large fraction where one of the types is a GOB.

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We re-estimate equation (1) for the sub-sample of firms that maintain at least one GOB relationship, i.e., in terms of Figure 1, we exclude all firms that relied exclusively on private and foreign banks. Thus, in this sub-sample, the counter factual relative to which effects are measured is the set of firms that have relationships with multiple types of banks *and* one of these types is a GOB.

The purpose is as follows: If GOBs somehow selected firms with low credit constraints, then the incremental effect of maintaining exclusive GOB relationships, in a sub-sample of firms that already have a GOB relationship should be zero. On the other hand, if the mitigation of credit constraints is causal, then, a firm that has exclusive GOB relationships should have greater access to capital and therefore lower cash flow sensitivity, even in the sample of firms that has non-exclusive GOB relationship. *Thus, if the mitigation of cash flow constraints is additive, a firm with exclusive GOB relationships should have lower constraints relative to a firm with a non-exclusive GOB relationship.*

Table 7 presents the results of this estimation. We find that maintaining exclusive GOB relationships has a strong economic effect, both on cash flow sensitivity and sensitivity to Q. The coefficient estimates are quite similar to that obtained earlier with the full sample. This presents further evidence that an alternative explanation that GOBs somehow selected unobservably lower cash constrained firms does not drive the results that we document in terms of lower cash flow sensitivity.

3.3.3 Time series effects of switching in and switching out

As a third test of selection effects, we examine the set of firms that switch from having exclusive GOB relationships to having a multiple types of bank ownerships types in a given year,

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and the reverse as well. We define firms that switch from exclusive GOB relationships in the previous year to having relationships with multiple types of creditors as 'firms that switch out.' Firms that switch from having multiple types of creditors to exclusive GOB relationships are defined as 'firms that switch in.'

For our full sample, there are 226 firms that switch out and 52 firms that switch in. Figure 2 presents a plot for investment, ROA, cash flow and leverage. As a group, firms that switch out have higher ROA, higher investment, higher cash flow and lower leverage. This is true both prior to the switch and after the switch. Again, this evidence is inconsistent with GOBs selecting firms with lower unobservable constraints.

3.3.4 Propensity Score Matching

As a last test of selection constraints, we employ a propensity score matching method to evaluate if the results of our regressions are the result of selection of less cash flow constrained firms by GOBs. To do this, we match each firm that has an exclusive GOB relationship with another firm that did not have an exclusive GOB relationship but was similar in the likelihood of maintaining such a relationship. We employ the methods suggested in Rosenbaum and Rubin (1983) and Heckman and Robb (1985). We use a one-to-one matching method using the nearest neighbor matching technique drawing without replacement. We use a caliper of 0.01. Further, we require each GOBE observation to be matched to another observation in the same year. The first stage regression has a similar specification to that in Section 3.3.1.

Next, we use the matched sample as described above and re-estimate the regression specification in Table 3. The results of this estimation are presented in Table 8. We find results similar to our baseline results in terms of the impact of GOBE in reducing cash flow constraints. However, the magnitude of the impact is much larger in this case (-.055 as opposed to the estimate

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of -0.033 in Table 3). Overall, the results of this sub-section strongly suggest that exclusive relationships with GOBs do not proxy for unobserved lower credit constraints. Hence the evidence we document in Tables 3-5 are consistent with GOBs mitigating credit constraints.

3.4 Impact of Size on benefits of GOB relationship

Lastly, we examine if the benefits of reduction in cash flow constraints are similar for large and small firms. We are motivated in this examination by the large impact of size in relationship lending. In fact, early studies of relationship lending (Berger and Udell, 1995) only used small firms as the benefits of such lending was thought to be most prominent among such firms. More recently, Bharath et al (2011) also document a strong size effect in relationship lending – they find that largest firms do not derive any benefits from relationship lending in terms of lower lending rate. Further, they find that smallest firms derive the largest benefits. In contrast, Santos and Winton (2008) find that unrated (small) firms are most susceptible to hold up by their banks in terms of loan interest rate. This suggests that the benefits may be smaller for small firms.

Adding a complication to the above argument is the fact that GOBs may have some differing objectives relative to non-GOBs. In particular, the social objective of promoting growth may lead them to favor small firms even more in terms of mitigation of cash flow constraints. Thus, ex-ante, we should expect a larger reduction in cash flow constraints for small firms relative to large firms, given that we examine GOB relationship effects, as opposed to banking relationship effects.

To examine the above, we re-estimate the regression specification in Table 3, splitting our sample into large and small firms based on the in-sample median sales. The results are presented in Table 9. Surprisingly, we find no effect of GOB relationship for smaller firms, while we find a

large and economically significant effect for large firms. To test this further, we re-estimate the same regression using propensity score matching as in Section 3.3.3, and find similar results (Table 10). Thus, in our sample, contrary to expectations, the benefits of GOB relationships are concentrated exclusively on large firms.

4. Conclusion

We studied the effect of maintaining exclusive relationships with government owned banks for publicly traded industrial corporations in India. A priori, there were strong theoretical reasons for such relationships to be detrimental to borrowers. The empirical evidence around the world, as well as that based on agricultural lending in India, suggested that political motivations played a large part in lending decisions.

However, contrary to expectation, we found that GOBs in India mitigate cash flow constraints of their borrowers significantly. This effect is not found either for private banks or foreign banks. This result is even more interesting considering the fact that GOBs tend to lend to firms with poorer prospects. Our findings suggest that GOBs can be effective in mitigating credit constraints, even in an economy with relatively poor quality of institutions, such as India. Our results also contribute to the positive effect of GOB lending that is documented by Lin, Srinivasan and Yamada (2015) who examine GOB effects during the crisis in Japan. In contrast to that paper, we show that positive effects of GOB lending are present even in non-crisis periods. Taken in conjunction with the results in Cole (2009), this suggests that GOB can be simultaneously serving political motives, having agency problems, while at the same time, also mitigating market failures.

What exactly is the mechanism for the lower investment cash flow sensitivity that we document? One possible mechanism is the lower cost of debt for firms that maintain such

relationships. Another is an increase in debt capacity of the firms. Since we don't have individual loan information, we are unable to study these issues in this paper. This suggests that there may be other benefits of maintaining such relationships.

At the same time, the finding of a size effect presents a conundrum. GOBs do not appear to be fulfilling social objectives for the smaller firms who require their help the most, despite government directed credit programs for the small and medium enterprises. Further, in conjunction with the finding that firms that maintain exclusive relationships with GOBs have more tangible assets, this suggests that GOB's engage more in collateral based lending. We leave these questions for future research.

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Table 1: Summary Statistics

All variables are defined in the Appendix.

Variable	N	Mean	P_{25}	P_{50}	P_{75}	SD
Investments	24442	0.060	0.004	0.026	0.077	0.113
Tobin's Q	28128	0.903	0.448	0.641	0.942	0.960
Cash flow	24108	0.063	0.005	0.065	0.128	0.122
Leverage	28128	0.283	0.109	0.278	0.429	0.201
ROE	28033	0.038	0.009	0.076	0.165	0.409
ROA	28033	0.034	0.004	0.028	0.066	0.078
Book to Market	28128	2.406	0.596	1.316	2.793	3.244
Growth in sales	24054	0.181	-0.022	0.123	0.291	0.442
Total Assets	28128	6597	263	970	3666	23210

Table 2
Firms with exclusive relationships with GOBs and remaining firms.
All variables are defined in the Appendix. P values are in parentheses for the difference of means and difference of medians test.

Variable	A: Firms with exclusive relationships with Government Owned Banks (GOBE=1)			B: All remaining firms (GOBE=0)			Difference of Means (A-B)	Difference of Medians (A-B)
	N	Mean	Median	N	Mean	Median		
Investments	10740	0.054	0.022	13702	0.064	0.030	-0.009***	-0.008***
							(6.52)	(9.75)
Tobin's Q	12387	0.745	0.589	15741	1.041	0.708	-0.296***	-0.120***
							(27.15)	(28.99)
Cash flow	10541	0.059	0.060	13567	0.067	0.070	-0.008***	-0.009***
							(4.86)	(6.70)
Leverage	12387	0.306	0.301	15741	0.265	0.258	0.041***	0.044***
							(-17.12)	(-17.82)
ROE	12339	0.009	0.056	15694	0.060	0.092	-0.051***	-0.036***
							(10.23)	(21.78)
ROA	12339	0.023	0.021	15694	0.042	0.035	-0.019***	-0.015***
							(20.32)	(24.43)
Book to Market	12387	2.871	1.696	15741	2.041	1.072	0.830***	0.624***
							(-21.05)	(-32.13)
Growth in sales	10551	0.159	0.106	13503	0.197	0.134	-0.038***	-0.028***
							(6.64)	(8.07)
Total Assets	12387	2336.29	506.50	15741	9949.69	1898.8	-7613.40***	-1392.30***
							(30.28)	(54.05)

Table 3 – Impact of GOB relationships on cash flow sensitivity

The dependent variable is investment, defined as change in total fixed assets from the previous year, scaled by the total assets in the previous year. Cash flow is the operating cash flow also scaled by total assets in the previous year. GOBE is a dummy variable that takes a value of 1 if the firm maintains banking relationships only with government owned banks in a given year and zero otherwise. See Appendix for a detailed definition of all variables. All models have a firm fixed effect and industry interacted with year fixed effects. Robust standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)
$Q_{i,t-1}$	0.011***	0.011***	0.009***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)
Cash flow$_{i,t}$	0.097***	0.111***	0.097***	0.111***
	(0.007)	(0.009)	(0.007)	(0.009)
Leverage$_{i,t-1}$	-0.094***	-0.094***	-0.095***	-0.095***
	(0.007)	(0.007)	(0.007)	(0.007)
Ln Total Assets$_{i,t}$	0.032***	0.032***	0.033***	0.033***
	(0.002)	(0.002)	(0.002)	(0.002)
GOBE$_{i,t}$	-0.000	0.002	-0.003	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)
GOBE$_{i,t}$ * $Q_{i,t-1}$			0.004*	0.004*
			(0.002)	(0.002)
GOBE$_{i,t}$ * Cash flow$_{i,t}$		-0.033**		-0.033**
		(0.013)		(0.013)
N	23980	23980	23980	23980
R-squared	0.3128	0.3130	0.3129	0.3132
Adjusted R-squared	0.191	0.191	0.191	0.191

Table 4 – Impact of Private and Foreign Bank relationships on cash flow sensitivity

The dependent variable is investment, defined as change in total fixed assets from the previous year, scaled by the total assets in the previous year. Cash flow is the operating cash flow also scaled by total assets in previous year. PBE is a dummy variable that takes a value of 1 if the firm maintains banking relationships only with private banks in a given year and zero otherwise. FBE is a dummy variable that takes a value of 1 if the firm maintains banking relationships only with foreign banks and zero otherwise. See Appendix for a detailed definition of all variables. All models have a firm fixed effect and industry interacted with year fixed effects. Robust standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level respectively. All control variables in Table 3 are also employed for the estimation in this table, but not reported to conserve space.

	(1)	(2)
$PBE_{i,t}$	-0.012*	
	(0.007)	
$PBE_{i,t} * Q_{i,t-1}$	0.009**	
	(0.004)	
$PBE_{i,t} * $ Cash flow$_{i,t}$	0.077***	
	(0.025)	
$FBE_{i,t}$		-0.004
		(0.013)
$FBE_{i,t} * Q_{i,t-1}$		0.008
		(0.006)
$FBE_{i,t} * $ Cash flow$_{i,t}$		-0.093
		(0.060)
N	23980	23980
R-squared	0.3133	0.3130
Adjusted R-squared	0.192	0.191

Table 5 – Impact of GOB relationships on cash flow sensitivity
Additional Controls

The dependent variable is investment, defined as change in total fixed assets from the previous year, scaled by the total assets in the previous year. See Appendix for a detailed definition of all variables. All models have a firm fixed effect and industry interacted with year fixed effects. Robust standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level respectively. All control variables in Table 3 are also employed for the estimation in this table, but not reported to conserve space.

	(1)	(2)	(3)
FI loans	0.160^{***}	0.160^{***}	0.160^{***}
	(0.013)	(0.013)	(0.013)
Debt Market funds	0.098^{**}	0.098^{**}	0.100^{**}
	(0.047)	(0.047)	(0.047)
$GOBE_{i,t}$	-0.001		
	(0.003)		
$GOBE_{i,t} * Q_{i,t-1}$	0.004^{*}		
	(0.002)		
$GOBE_{i,t} * Cash\ flow_{i,t}$	-0.033^{**}		
	(0.013)		
$PBE_{i,,t}$		-0.013^{**}	
		(0.007)	
$PBE_{i,,t} * Q_{i,t-1}$		0.010^{**}	
		(0.004)	
$PBE_{i,,t} * Cash\ flow_{i,t}$		0.076^{***}	
		(0.025)	
$FBE_{i,t}$			-0.005
			(0.012)
$FBE_{i,t} * Q_{i,t-1}$			0.008
			(0.006)
$FBE_{i,t} * Cash\ flow_{i,t}$			-0.098
N	23980	23980	23980
R-squared	0.3181	0.3183	0.3180
Adjusted R-squared	0.197	0.197	0.197

Table 6 – Determinants of GOB Relationships

The dependent variable is a dummy variable (GOBE) that takes a value of 1 if the firm maintains relationships exclusively with Government Owned Banks in the given year, and zero otherwise. All variables are defined in the appendix. Models 1 and 2 employ the logistic model for estimation and model 3 employs the linear model. Robust standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level respectively.

	(1) Logistic model	(2) Logistic Model	(3) Linear Model
Leverage	1.087***	1.017***	0.011
	(0.217)	(0.081)	(0.018)
ROA	-0.813**	-0.797***	-0.099***
	(0.352)	(0.188)	(0.030)
Tangibility	1.699***	0.600***	0.075***
	(0.308)	(0.100)	(0.026)
Ln Total Assets	-1.052***	-0.462***	-0.070***
	(0.038)	(0.009)	(0.004)
EM Score	-0.003	-0.005***	-0.000
	(0.003)	(0.001)	(0.000)
Constant			
N	11824	29304	29385
χ^2 statistic	1178	3336	R^2: 0.722
Prob > χ^2	0.0000	0.0000	Adj. R^2: 0.678
Fixed Effects	Firm fixed	Industry-year	Firm and Industry year

Table 7 – Sub-sample test for firms with at least one GOB relationship

The dependent variable is investment, defined as change in total fixed assets from the previous year, scaled by the total assets in the previous year. See Appendix for a detailed definition of all variables. All models have a firm fixed effect and industry interacted with year fixed effects. Robust standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level respectively. The sample used is the set of firms that maintain at least one relationship with a Government Owned Bank.

	(1)	(2)	(3)	(4)
$Q_{i,t-1}$	0.011^{***}	0.008^{***}	0.011^{***}	0.008^{***}
	(0.001)	(0.002)	(0.001)	(0.002)
Cash flow$_{i,t}$	0.093^{***}	0.093^{***}	0.107^{***}	0.107^{***}
	(0.007)	(0.007)	(0.010)	(0.010)
Leverage$_{i,t-1}$	-0.095^{***}	-0.097^{***}	-0.095^{***}	-0.097^{***}
	(0.007)	(0.007)	(0.007)	(0.007)
Ln Total Assets$_{i,t}$	0.032^{***}	0.033^{***}	0.032^{***}	0.033^{***}
	(0.002)	(0.002)	(0.002)	(0.002)
GOBE$_{i,t}$	0.001	-0.006^{*}	0.003	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)
GOBE$_{i,t}$ * $Q_{i,t-1}$		0.008^{***}		0.008^{***}
		(0.003)		(0.003)
GOBE$_{i,t}$ * Cash flow$_{i,t}$			-0.029^{**}	-0.030^{**}
			(0.014)	(0.014)
N	22080	22080	22080	22080
R-squared	0.3139	0.3143	0.3141	0.3145
Adjusted R-squared	0.187	0.187	0.187	0.188

Table 8 – Propensity Score Matching

The dependent variable is investment, defined as change in total fixed assets from the previous year, scaled by the total assets in the previous year. See Appendix for a detailed definition of all variables. All models have a firm fixed effect and industry interacted with year fixed effects. Robust standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)
$Q_{i,t-1}$	0.012***	0.012***	0.013***	0.013***
	(5.35)	(5.33)	(4.53)	(4.52)
Cash Flow$_{i,t}$	0.104***	0.131***	0.104***	0.131***
	(7.84)	(6.97)	(7.84)	(6.98)
Leverage$_{i,t-1}$	-0.124***	-0.123***	-0.123***	-0.123***
	(-11.58)	(-11.55)	(-11.57)	(-11.53)
Ln Total Assets$_{i,t}$	0.040***	0.040***	0.040***	0.040***
	(13.53)	(13.53)	(13.52)	(13.51)
GOBE$_{i,t}$	-0.001	0.002	-0.000	0.003
	(-0.36)	(0.53)	(-0.04)	(0.63)
GOBE$_{i,t}$*Cash Flow$_{i,t}$		-0.055**		-0.055**
		(-2.30)		(-2.30)
GOBE$_{i,t}$*$Q_{i,t-1}$			-0.001	-0.001
			(-0.32)	(-0.30)
Constant	-0.160***	-0.162***	-0.160***	-0.162***
	(-5.61)	(-5.71)	(-5.61)	(-5.71)
Observations	16,111	16,111	16,111	16,111
R^2	0.102	0.103	0.102	0.103

Table 9 – Effect of size

The dependent variable is investment, defined as change in total fixed assets from the previous year, scaled by the total assets in the previous year. See Appendix for a detailed definition of all variables. All models have a firm fixed effect and industry interacted with year fixed effects. Robust standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level respectively. All control variables in Table 3 are also employed for the estimation in this table, but not reported to conserve space.

	(1)	(2)	(3)	(4)
Panel A: Large Firms				
$GOBE_{i,t}$	0.000	0.004	-0.005	-0.001
	(0.04)	(0.79)	(-0.74)	(-0.16)
$GOBE_{i,t}*Cash\ Flow_{i,t}$		-0.064**		-0.065**
		(-2.01)		(-2.02)
$GOBE_{i,t}*Q_{i,t-1}$			0.007	0.007
			(0.90)	(0.92)
Constant	-0.093*	-0.094*	-0.090*	-0.091*
	(-1.81)	(-1.85)	(-1.76)	(-1.80)
Observations	13,011	13,011	13,011	13,011
R^2	0.107	0.108	0.108	0.108

	(1)	(2)	(3)	(4)
Panel B: Small Firms				
$GOBE_{i,t}$	0.001	0.002	0.000	0.001
	(0.20)	(0.40)	(0.00)	(0.17)
$GOBE_{i,t}*Cash\ Flow_{i,t}$		-0.015		-0.015
		(-0.56)		(-0.56)
$GOBE_{i,t}*Q_{i,t-1}$			0.001	0.001
			(0.22)	(0.22)
Constant	-0.248***	-0.248***	-0.248***	-0.248***
	(-7.21)	(-7.26)	(-7.21)	(-7.26)
Observations	10,969	10,969	10,969	10,969
R^2	0.134	0.134	0.134	0.134

Table 10 – Effect of size with Propensity Score Matching

The dependent variable is investment, defined as change in total fixed assets from the previous year, scaled by the total assets in the previous year. See Appendix for a detailed definition of all variables. All models have a firm fixed effect and industry interacted with year fixed effects. Robust standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level respectively. All control variables in Table 3 are also employed for the estimation in this table, but not reported to conserve space.

Panel A: :Large Firms				
	(1)	(2)	(3)	(4)
$GOBE_{i,t}$	-0.007	-0.001	-0.006	-0.000
	(-0.96)	(-0.11)	(-0.66)	(-0.05)
$GOBE_{i,t}*Cash\ Flow_{i,t}$		-0.091**		-0.091**
		(-2.05)		(-2.05)
$GOBE_{i,t}*Q_{i,t-1}$			-0.001	-0.000
			(-0.09)	(-0.04)
Constant	-0.050	-0.050	-0.050	-0.051
	(-0.60)	(-0.61)	(-0.61)	(-0.61)
Observations	7,331	7,331	7,331	7,331
R^2	0.125	0.127	0.125	0.127

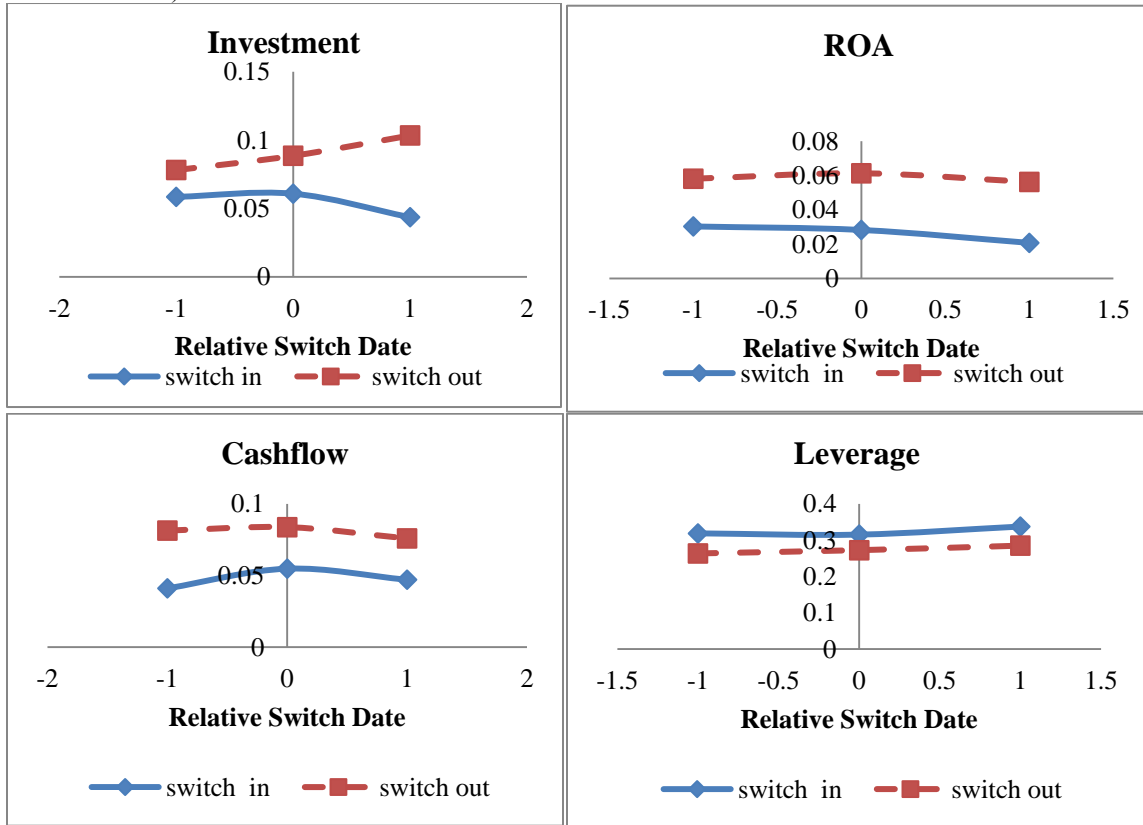| Panel B: Small Firms				
	(1)	(2)	(3)	(4)
$GOBE_{i,t}$	-0.000	0.002	-0.003	-0.001
	(-0.04)	(0.30)	(-0.49)	(-0.18)
$GOBE_{i,t}*Cash\ Flow_{i,t}$		-0.032		-0.032
		(-1.02)		(-1.01)
$GOBE_{i,t}*Q_{i,t-1}$			0.004	0.004
			(0.65)	(0.63)
Constant	-0.259***	-0.260***	-0.259***	-0.260***
	(-6.53)	(-6.64)	(-6.52)	(-6.63)
Observations	7,630	7,630	7,630	7,630
R^2	0.154	0.155	0.155	0.155

Figure 1
Bank Loan Distribution by ownership type
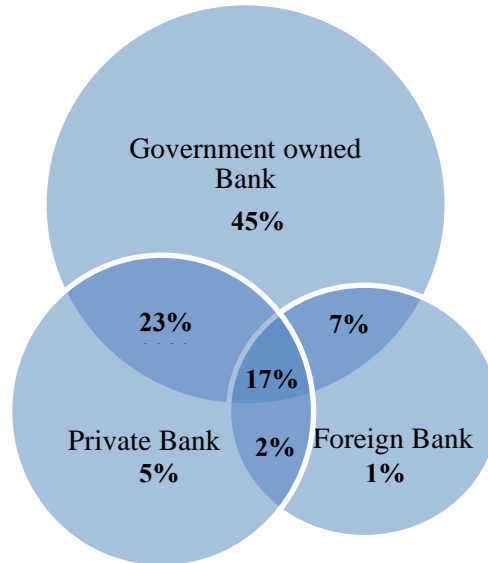
Note: The data is obtained using the following filters: (1) firms with sales greater than or equal to Rs. 10 million, (2) networth is positive, (3) firm's bank name is reported and (4) the firms are publicly listed with stock price available on Prowess.

Figure 2

Investment, ROA, Cash flow and Leverage of firms that switch bank relationship. "Switch out" is the group (226 firms) that switch from having only government owned banks to also include relationships with private and foreign banks. "Switch in" is the group (52 firms) that switches from having relationship with banks of diverse ownership types to relationship to only government owned banks. The relative switch date gives the date relative to switch year (-1 indicates one year before the switch, 0 is year of switch and +1 is the year after the switch).

Appendix 1: Definitions of variables used in study

Dummy variables of bank ownership	
GOBE	A dummy variable that takes a value of 1 if firm borrows exclusively from state owned banks in a given year, and 0 otherwise
PBE	A dummy variable that takes a value of 1 if firm borrows exclusively from private banks in a given year, and 0 otherwise
FBE	A dummy variable that takes a value of 1 if firm borrows exclusively from foreign banks in a given year, and 0 otherwise
Variables based on accounting information	
Total assets	Sum total of all the assets held by a company as on the last day of an accounting period. It includes net fixed assets, capital work in progress and net pre-operative expenses pending allocation if any, investments, inventories, receivables, loans & advances, cash & bank balances, deferred tax assets and miscellaneous expenses not written off.
Investment	Change in gross fixed assets, scaled by total assets in the previous year
Q	Tobin's Q, calculated as sum of market value of equity & debt divided by total assets
Book to Market	Book value of firm to market value of firm
Cash flow	Net cash flow from operating activities scaled by total assets in the previous year
Leverage	Total borrowing divided by total assets
Firm Size	Natural logarithm of total assets, Rupees millions
Growth in sales	The median increase in annual net sales, scaled by net sales in the previous year of firms in a given industry
FIs loans	Borrowing from development financial institution outstanding, scaled by total assets in the previous year.
Debt market funds	Total debt market funds (sum of the debentures, bonds & commercial papers) outstanding for firm, scaled by total assets in the previous year
ROA	Profit after tax divided by total assets
ROE	Profit after tax divided by total equity
Tangibility	Plant and machinery at time t divided by total assets at time t
EM Score	6.56*(working capital/Total assets) + 3.26* (Retained profit/Total assets) + 6.72*(PBDITA/Total assets) + 1.05 Book value of equity + 3.25