State-Owned versus Private Banks in South Asia:

Financial Resilience and Real Costs of Distress

Katie Kibuuka and Martin Melecky[#]

World Bank

**** PRELIMINARY DRAFT NOT FOR CIRCULATION OR CITATION ****

February, 2020

Abstract

Economists keep debating the pros and cons of state banking. This paper contributes to the debate by studying distress episodes at state-owned and private banks, the drivers of distress, bank adjustments in distress, and real costs of bank distress. It does so by using bank-level data for India spanning years 2009-18 and the difference in differences methodology. Distresses are identified with thresholds for the interest coverage ratio, capital adequacy ratio, and return on assets. The authors assume several adjustment channels through which banks cope with distress and study the relative intensity with which state-owned and private banks in distress use these channels. Finally, matching firms with banks, the paper studies how firm links with state-owned versus private banks impact their access to financing and investments—notably in times of bank distress.

Keywords: State-owned and private banks; India; Bangladesh; Pakistan; bank distress; adjustments in distress costs; bank recapitalization; firm access to financing; firm investment.

JEL Classification: G21, G28, H44, H81.

[#] Corresponding author: mmelecky@worldbank.org

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1. Introduction

Two countries stand out in the world because of banking systems dominated by state-owned commercial banks (SOCBs), Belarus and India—with about 70% share of SOCBs in total banking system assets (Cull, Martinez Peria, and Verrier, 2017). In fact, SOCBs take an unprecedently high share of total banking system assets across South Asia—of about 40% on average. However, the use of SOCB is not confined to developing economies. While in the U.S. the SOCB share near 0%, in Germany, the share hovers above 40%. The SOCBs could be set up to create markets and fulfill social goals, be a legacy of problem bank resolutions, or support fiscal policy (revenues, investments). But because of possible inefficiencies, misuse, and distress, the operation of SOCBs has its downside. The upside and downside of operating SOCBs are increasingly scrutinized by policymakers and the global community.

The upside of using commercial/hybrid[1] state owned banks (SOBs) could involve state effort to address market failures and create positive externalities (Atkinson and Stiglitz, 1980; Stiglitz, 1993; Cull et al. 2017). Namely, the state could use the SOBs to: (i) promote competition, reach of service delivery, and market creation in the financial sector (Cull, Martinez Peria, and Verrier, 2017; Ferrari, Mare, Skamelos, 2017; Mazzucato and Penna, 2016); (ii) help resolve coordination failures (de la Torre, Gozzi, and Schmukler, 2007), and (iii) play countercyclical and safe-haven roles in crises after the markets had failed to internalize individual contributions to systemic risk (Bertay, Demirgüç-Kunt, Huizinga, 2015). The state may use the SOCBs to create positive externalities by (a) financing projects with high non-monetary social returns that have negative net present value—that is, their internal rate of return does not cross the private sector hurdle rate for investable projects (Levy-Yeyati, Micco, and Panizza, 2004), and (b) promoting strategically important industries, jump-starting economic development, helping create new markets and national champions, and provide source of revenue for social investments (Gerschenkron, 1962; Ferrari, Mare, Skamelos, 2017). De Luna-Martinez and Vicente (2012) provide global overview of development, hybrid, and commercial state-owned banks with an explicit social mandate and at least 30% state ownership stake.

The downside of using SOCBs involves risks of inefficiency and misallocation costs due to agency problems and political misuse (Cull, Martinez Peria, and Verrier, 2017). The agency problem relates to the conflict of interest that bureaucrats/technocrats tasked with managing government-owned banks tend to have. The conflict is between the government interest in maximizing social welfare and the bureaucrats/technocrats interest in maximizing own moneymaking. This conflict gives rise to red tape, operational inefficiencies, and misallocation of resources (Banerjee, 1997; Hart, Shleifer, Vishny, 1997). Politicians could misuse SOCBs to pursue their interests such as reelection and personal profit by pushing SOCBs to finance their supporters or those willing to pay the highest bribes. This misuse induces resource misallocation and economic inefficiency (Shleifer and Vishny, 1994; Shleifer, 1998). Perotti and Vorage (2010) suggest that politicians are more likely to favor government bank ownership when public

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[1] Some SOCBs operate as commercial banks while still implementing some government programs typically finances directly from the budget—they could be called hybrid commercial banks (Ferrari et. al, 2017).

accountability and judicial independence are low because they can extract more benefits with less personal consequences.

The upsides and downsides of using SOCBs create tensions in practice, and sound practices have been proposed to reap benefits and mitigate costs. For instance, when SOCBs allocate credit inefficiently, their countercyclical role could be uncertain (Bertay, Demirgüç-Kunt, and Huizinga, 2015; Coleman and Feler, 2015). To address such tensions several studies reviewed and proposed some good practices to improve SOCB operations in practice (Gutierrez, Rudolph, Homa & Beneit, 2011; de la Torre, Gozzi and Schmukler, 2007).[2]

Data suggest that, in practice, state-owned commercial banks have rarely explicitly defined roles in terms of market failures to address or positive externalities to create—at least in Europe and Central Asia (Ferrari, Mare, Skamnelos, 2017). If SOCBs have some social mandate, it may change over time, for instance, when the underlying market failure has been overcome or when policy makers reweigh competing social priorities. Because SOCBs—in contrast to government-owned development financial institutions (DFIs)—most often operate without explicit social mandate—including in several South Asian countries such as India and Bangladesh—economists increasingly worry about the downside of SOCB operations. However, the downside (protracted inefficiency and distress), behavior of SOCBs in distress, and the distress costs for central government and the economy are still under-researched. Our study aims to help fill this gap.

Using bank level data for India, this paper identifies distress at banks using a rule of thumb threshold for the interest rate coverage ratio and for alternative financial soundness indicators as a robustness check. Highlighting the role of bank ownership, it studies the factor behind bank distress, bank adjustments in distress, as well as the wider economic impact of bank distress on firm access to finance and investment. The latter analysis relies on bank-firm matched data from the Prowess database over 2009-2018.

We find that state-owned banks, smaller banks, and banks financing their loans less from own deposits are more prone to distress. The higher vulnerability of state-owned banks to distress increases with the share of state ownership. SOCBs adjust in distress differently from private banks. Although weaker state banks experience distress more often than private banks, when private banks get into distress, they reduce lending much more than state banks in distress. State banks enjoy softer budget constraints—readily gaining state equity and debt support. The softer budget constraint and conditions of government recapitalization help state banks sustain own investments in distress and lending to clients.

Bank distress and ownership affect the access to financing and investment of the client firms. For SMEs, the distresses at banks with which they do business impairs access to financing. If the distressed bank with which an SME is linked is a state bank, the negative effect of banks distress on the SME access to finance is insignificant. Distress at banks lowers firm investment. SMEs could be less affected because they finance investments mostly from retained earnings.

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[2] While most of the prominent OECD guidelines on corporate governance could be implied also to SOCBs, they are not really tailored to the risk managing business of commercial/hybrid banks: https://www.oecd.org/corporate/guidelines-corporate-governance-soes.htm.

State ownership can help sustain firm investment in times of bank distress. This sustaining effect declines with higher state ownership of the distress bank.

The rest of the paper is organized as follows. Section two reviews the context for state-owned commercial banks in India and South Asia (Bangladesh and Pakistan). Section three presents a simple framework that underpins our empirical analysis. Section four describes the data and reviews selected summary statistics. Section five discusses the estimation results. Section six concludes.

2. Context for South Asia

Globally, the South Asia region is an outlier with the highest share of state-owned commercial bank assets in total banking assets, followed by the Europe and Central Asia region (see Figure 1). In South Asia, the share of SOCB assets is particularly high in India and Sri Lanka when compared with the regional average. Despite a fair share of SOCB assets, Bangladesh and Pakistan fall below the regional average—but still above the average for the lower middle-income country (LMIC) group.

Figure 1: Asset Share of SOBs*
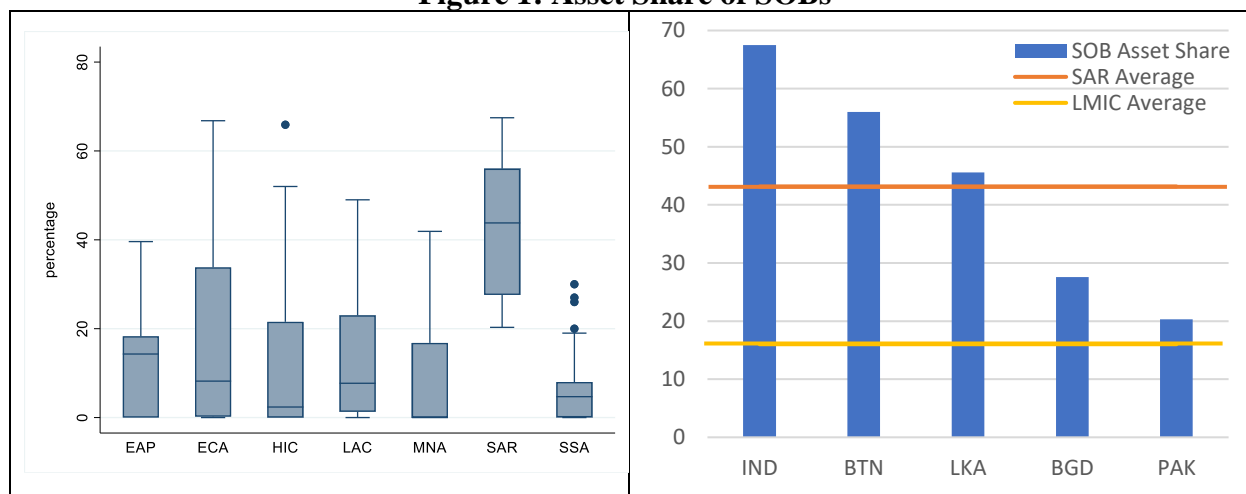
* as of 2016
Source: *World Bank Survey on Banking Supervision*

In general, SOCBs in South Asia appear to be performing poorly when compared with privately owned banks (PVBs). PVBs are better capitalized than SOCBs within the same country. The same goes for asset quality, profitability, and efficiency measures (Table 1). Across countries, Pakistan's SOCB (public sector commercial banks (PSCBs)) are performing better than other SOCBs on average. The average capital adequacy ratio is well above the 10 percent national prudential threshold and the 8 percent Basel minimum threshold. Even though elevated at 12 percent, the average NPL ratio is the lowest compared with the peer groups. Pakistan SOCBs are, on average, the only profitable SOCBs in South Asia. They have the lowest cost to income ratios on par with more operationally efficient private commercial banks in South Asia. Meanwhile, SOCBs in Bangladesh appear to have the weakest performance indicators: capital ratios below the 10 percent national prudential threshold and the Basel minimum; at 28 percent the highest NPL

ratios from the peer groups; the highest cost to income ratios suggesting overemployment and inefficiency, and, also a s a result, negative profitability. India's SOCBs show mixed performance indicators: capital adequacy ratios are well above the 9 percent national prudential minimum and the Basel minimum; NPL ratios hover at worrying 17 percent and, despite the lowest cost to income ratio, profitability is strongly negative—particularly the return to equity.

For illustration, we include analogous statistics for specialized development banks in Bangladesh and Pakistan. We do not include them in the baseline comparison because these are not typical state-owned commercial banks. Although they may conduct retail operations, their financing is much less market-based and lending operations typically confined to narrower mandates. The later include supporting agricultural activity in the regions, helping modernize agriculture and boost tits productivity, or supporting small businesses and setting up of industries. The specialized banks in both countries are inefficient and unprofitable, with large pools of NPLs on their books. Only a much better capital position really distinguishes the Pakistan specialized banks from their Bangladesh counterparts.

Table 1: Comparison of Bank performance by Ownership: India, Bangladesh and Pakistan

State Owned Commercial Banks

	Bangladesh: State-owned Commercial Banks	India: State-owned Commercial Banks	Pakistan: State-owned Commercial Banks	*Bangladesh: Specialized Development Banks*	*Pakistan: Specialized Banks*
Capital to RWA	2.0	11.0	15.5	*-31.9*	*25.5*
Gross NPL Ratio	28.2	17.2	12.7	*21.7*	*32.9*
Return on assets	-0.7	-1.3	1.2	*-1.6*	*-1.3*
Return on equity	-12.3	-22.5	17.9	*-8.4*	*-5.6*
Net Interest Margin	2.1	2.0	2.4	*0.9*	*4.7*
Cost to Income	82.0	53.7	58.5	*150.0*	*92.1*

Privately Owned Commercial Banks

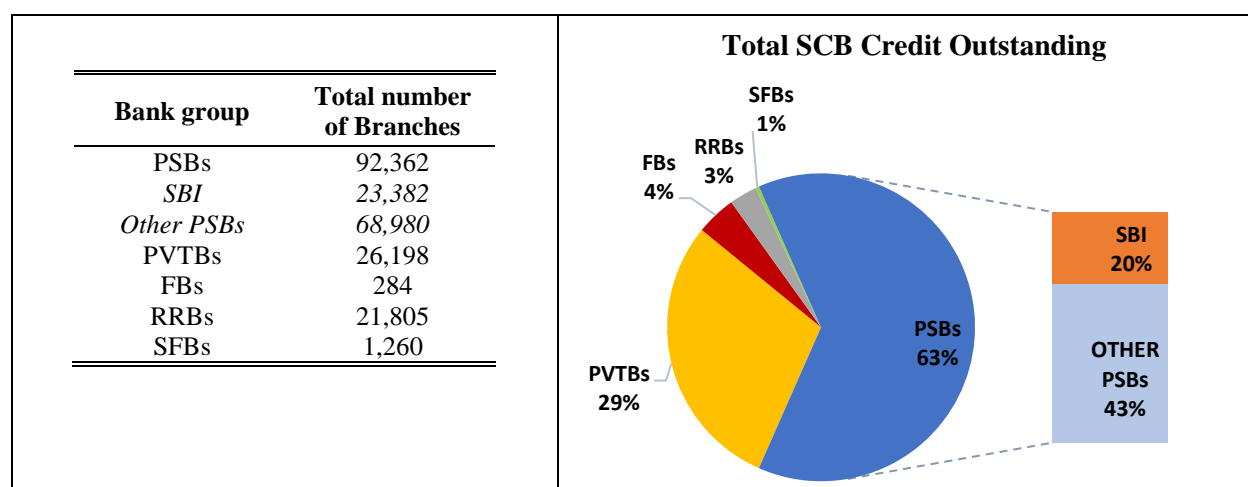|	Bangladesh: Domestic Banks	Bangladesh: Foreign Banks	India: Domestic Banks	India: Foreign Banks	India: Small Finance Banks	Pakistan: Domestic Banks	Pakistan: Foreign Banks
Capital to RWA	12.2	23.0	14.9	28.9	19.7	15.7	25.5
Gross NPL Ratio	6.0	6.7	3.6	2.6	2.4	6.2	3.8
Return on assets	0.6	8.2	0.7	1.1	0.4	1.3	2.6
Return on equity	2.8	13.7	6.7	3.3	1.7	18.1	32.4
Net Interest Margin	3.5	4.6	2.9	2.9	6.7	2.8	3.2
Cost to Income	74.0	46.0	47.3	49.2	70.7	60.8	28.9

Sources: Bangladesh Bank (BB), Reserve Bank of India (RBI), and State Bank of Pakistan

India

Next, we focus on India for which bank data are more readily available and bank characteristics can be linked to firm-level data on lending and investment— at the firm level, our two outcome variables of interest.

The banking system assets of scheduled commercial banks (SCBs) were about 80 percent of GDP in 2018. State-owned commercial banks (public sector banks (PSBs)) dominate the Indian banking sector in terms of assets, credit, and branches. PSBs hold 66 percent of total SCB assets while private sector banks (privately-owned domestic banks (PVTBs)) have about 28 percent, foreign banks (FBs) comprise about 6 percent, and small finance banks (SFCs) control a minimal 0.3 percent. In terms of credit, PSBs control about 63 percent of total SCB credit, PVTBs have about 29 percent, and other SCBs represent about 8 percent of total SCB credit. By end-2018, PSBs operated 92,362 branches across India, three times more than the domestic and foreign private banks combined—domestic private banks operate 26,198 and foreign private banks operate 284 branches. Controlling 23 percent of total SCB assets and 20 percent of total SCB credit, the State Bank of India (SBI) is the largest commercial bank by a large margin and operates the largest branch network with over 23,382 branches with a dominant rural presence. (see Figure 2)

Figure 2: Branch Networks and Total Credit, 2018

Bank group	Total number of Branches
PSBs	92,362
SBI	*23,382*
Other PSBs	*68,980*
PVTBs	26,198
FBs	284
RRBs	21,805
SFBs	1,260

Source: RBI

Given the large branch network, PSBs can mobilize large amounts of retail deposits which comprise the largest component of PSB funding at over 60 percent of total liabilities. Compared with other PSBs, SBI can raise funds outside of India by borrowing from international global markets so total SBI borrowings (10 percent of total liabilities) are higher than the borrowings of other PSBs (7 percent of total liabilities). The tier 1 capital to total assets ratio (the leverage ratio) is above the prudential minimum of 4 percent for systemically important banks and 3.5 percent for other banks—limits stricter than the Basel minimum of 3 percent. The leverage is less than 6 percent for PSBs (at 5.6 percent for SBI and 5.1 for other PSBs) and above 10 percent for other banks, indicating that PSBs are more leveraged than other banks. Loan to deposit ratios are higher in other banks compared with PSBs, reflecting PSBs' ability to mobilize greater amounts of

deposits than other banks. Other banks must rely more on costlier modes of fund raising. For instance, SFBs rely largely on lines of credit to fund their lending activities (Figure 3).

As noted earlier, SOCBs do not tend to have explicit mandates to address market failures or create positive externalities. Data on the sectoral allocation of credit and lending to typically under-served segments (such as small borrowers) and priority sectors (identified by the RBI) show that PSBs do not focus on lending to these groups or sectors more than the private banks. In fact, most of PSB credit goes to the large borrowers and to the industry sector, a non-priority sector. However, given their size, the largest absolute volume of lending to small borrowers comes from PSBs. PSBs tend to lend much more to public sector entities compared with other banks, even though this lending comprises less than 10 percent of total loans (see Figure 3). Smaller banks, namely SFBs and regional rural banks (RRBs), do target priority sectors and small borrowers because more than 40 percent of their total credit is devoted to these segments.

Overall, banks earn most of their income from their lending activities. FBs tend to earn more through investments as well as fee-based and foreign exchange services. PSB business models tend to be more traditional, focusing on earning income through government securities and similar investments (30 percent of total income) and lending (over 50 percent of total income). Unlike most PSBs, SBI earns almost 10 percent of its income from fee-based services—compared with an average of 3 percent earned by other PSBs. Also because of its cheap source of borrowing, SBI may show a higher net interest margin (2.4 percent) compared with other PSBs (2.0 percent). Meanwhile, all other banks have higher net interest margin indicators that are above 2.5 percent (6.7 percent for SFBs). Other efficiency indicators show that PSBs tend to be less efficient with higher shares of their wage bill to intermediation costs (see Figure 4). This could imply overcompensation of the management or overemployment. The literature hints the latter (Kumbhakar and Sarkar, 2003).

In recent years, declining profitability has resulted in negative returns on capital and assets. Although some PSBs still have positive profit indicators (ROA and ROE), the general trend has been a declining profitability. This is partially explained by lower levels of efficiency, rising costs and expenses (including staff costs and expenses), as well as rising non-performing loans (Figure 4).
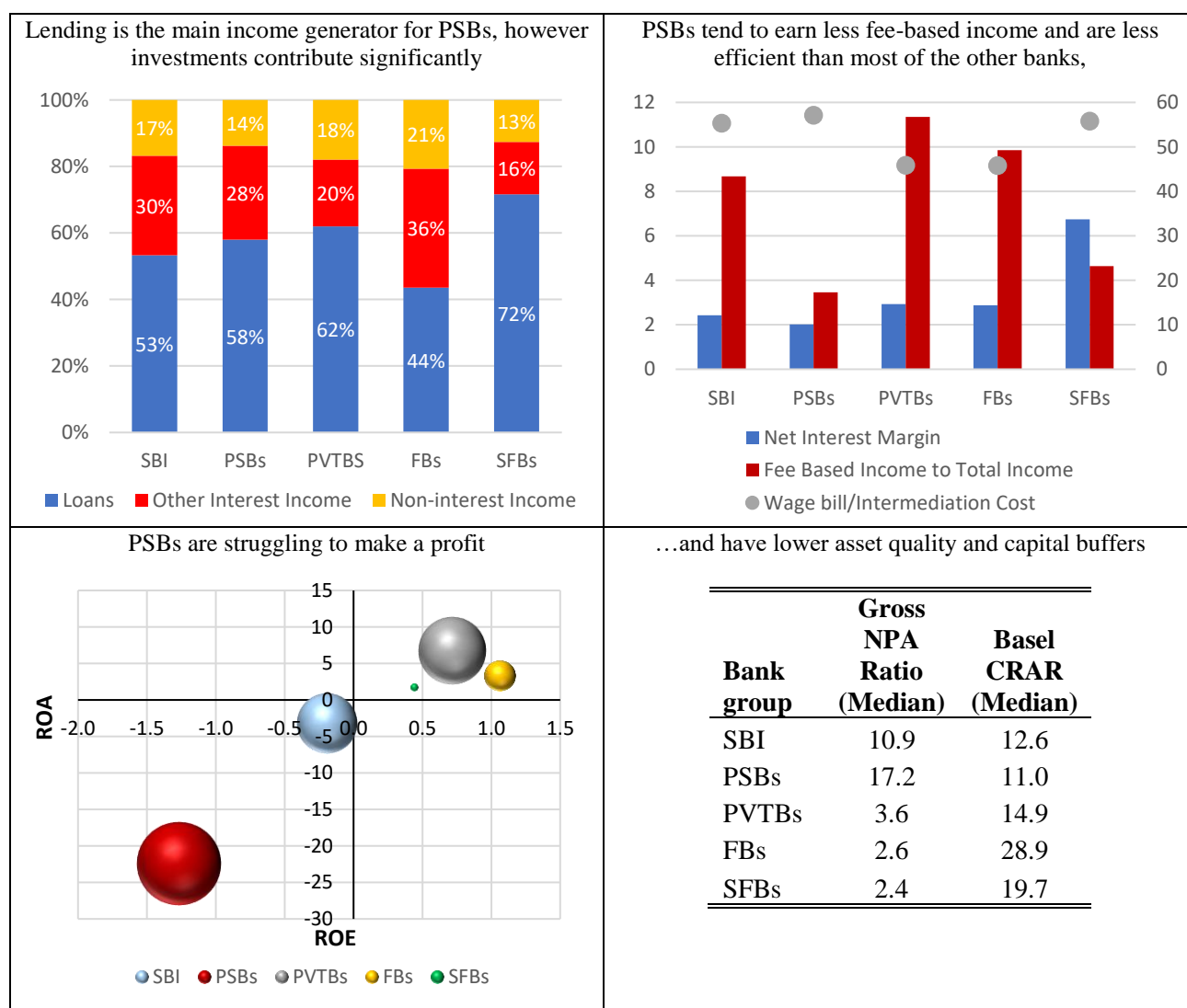
In 2015, following the RBI's accelerated efforts to ensure that losses expected from distressed debt were adequately recognized and provisioned, a sector-wide increase in recognized NPLs occurred. Many of these NPLs were attributed to infrastructure projects that turned sour in the preceding years. At present, NPLs in PSBs remain the highest—at 10 percent in SBI and over 17 percent in other PSBs—while the ratio is on average below 4 percent for other banks. Since the recognition of higher NPLs, many banks have worked hard to write off and resolve the outstanding problem assets. However, legal delays, inadequate infrastructure and a large pipeline of insolvency cases have stretched and will continue to lengthen resolution timelines. In response to these legal bottlenecks, the government increased the resolution timeframe to 330 days in July 2019—from the previously stipulated 270 days.

Figure 3: Selected Funding and Credit Indicators, 2018
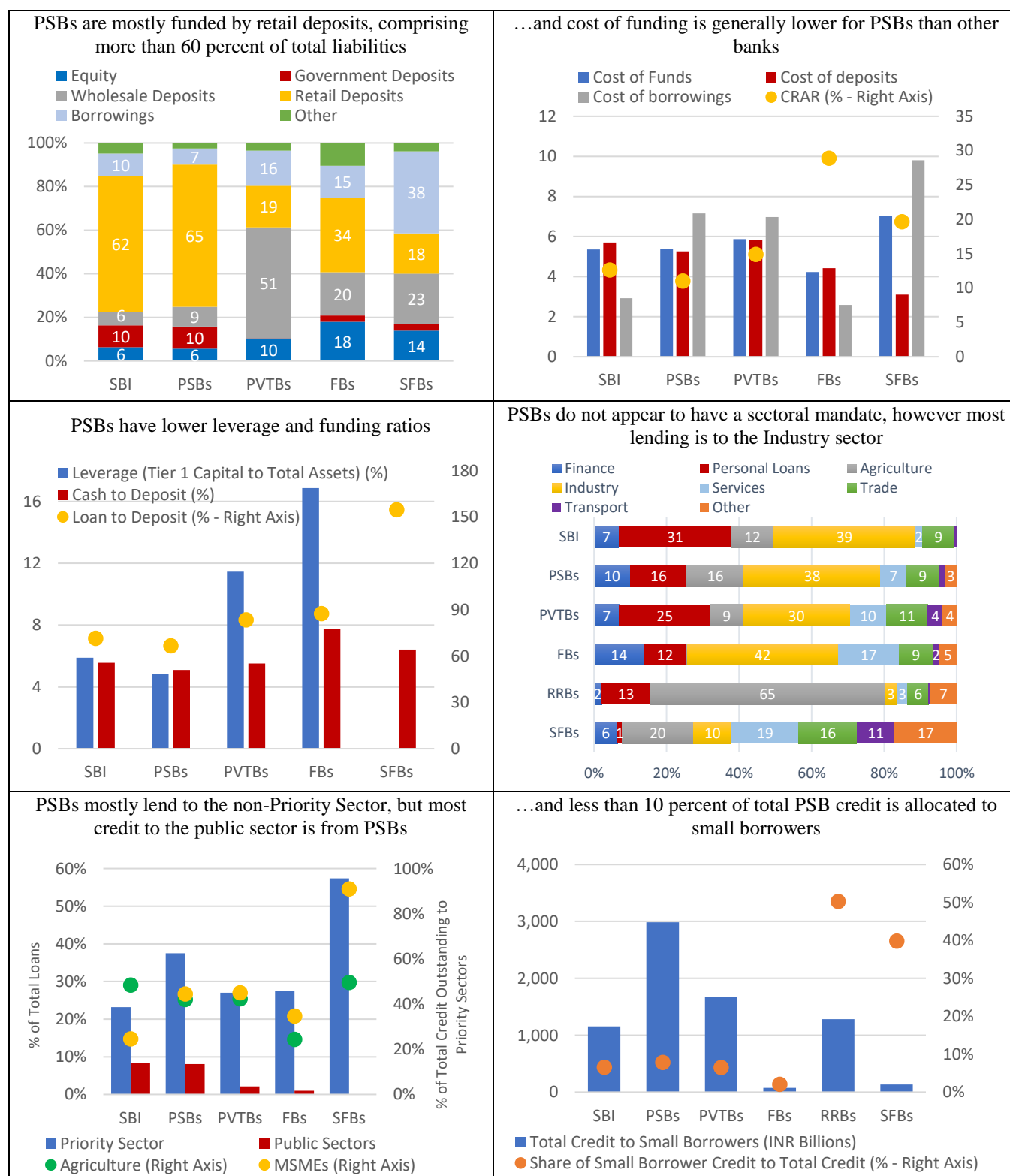
Source: RBI

In addition to declining asset quality, capital positions have been weak within PSBs and have affected their lending capacity. Even prior to the NPL recognition, capital buffers were low and the government developed a public-private recapitalization plan—the Indradhanush plan— announced in August 2015. Given limited private participation in this plan, Government ownership in PSBs has increased because of the state capital injections to prop up these banks. However, following the NPL recognition, PSBs' capital positions deteriorated again as provisioning increased substantially with the need to adequately cover higher NPLs. Making matters worse, the introduction of Basel III starting in 2019 (the phase-in of implementation of Basel III is already underway) has led to higher prudential capital requirements. For the 2020 financial year, the government has budgeted for US$ 10 billion in PSB capital injections (Figure 4).

Figure 4: Selected business model, performance and soundness Indicators, 2018

Bank group	Gross NPA Ratio (Median)	Basel CRAR (Median)
SBI	10.9	12.6
PSBs	17.2	11.0
PVTBs	3.6	14.9
FBs	2.6	28.9
SFBs	2.4	19.7

Source: RBI

3. Framework

Conceptually, our econometric framework builds on the value at risk (VaR) methodology. It examines two types of losses. One, the financial loss that could be passed to the central government in parts or entirely depending on the budget constraints SOCBs face—that is, softer versus harder budget constraints. Gauging this loss involves estimating probability of SOCB distress (PD) and financial loss given SOCB distress (LGD). Two, we assess the economic loss from SOCB distresses owing to forced adjustments by distressed SOBs—which serve firms, consumers, and the government. Here, we focus on the loss of private firms' investment due to SOCB distress—that is, unrealized investments compared with the counterfactual of private firms dealing with non-distressed banks, be they private or state-owned.

Identifying distress using financial soundness indicators

We define a distress event as the breach of a quantitative threshold. In principle, the threshold could be determined by an economic identity, predicted/expected value, or even a practical rule of thumb. The threshold value $\bar{I}$ together with an actual value of an indicator I then help determine distance to distress and generate a dummy variable, $D_{i,n,t}$, identifying observed distress.

We identify distress at Indian PSBs using selected financial soundness indicators. The main indicator of distress is the interest coverage ratio (ICR) below 1. As robustness checks, we use the return on assets (ROA) dropping below zero percent, the bank capital adequacy ratio (CAR) against a threshold related to the minimum prudential requirement banks want to keep, as well as non-zero emergency liquidity assistance (ELA) provided by the central bank to a commercial bank. (Note: For the latter variable, we are still missing data because it is difficult to distinguish between regular and emergency liquidity transactions from banks public financial accounts.)[3]

The PD—the average annual probability of distress—could be estimated as the average probability of distress using historical data on identified distress events:

$$PD_i = \frac{1}{T*N}\sum_{n=1}^{N}\sum_{t=1}^{T}D_{i,n,t} = \left\{1|I_{i,n,t} \geq \bar{I_i}; 0\right\} \tag{1}$$

where $D_{i,n,t}$ is the distress 0/1 dummy variable and *i=[private sector banks; public sector banks]*.

Examining the distress factors

To assess whether certain bank characteristics could drive bank vulnerability to distress, we run a logit regression for $D_{n,t}$ on bank characteristics (size, age, type: PSB, PVTB), funding

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[3] We have also tried using the ratio of non-performing loans to total loans (NPLs) above the 10 and 15 percent levels. But the results for distress and its drivers are not qualitatively different. The NPLs are much less transparent and periodically comparable across banks. Also the right threshold could be more debatable because of different riskiness of lending portfolios across banks.

model of the bank (the loan-to-deposit ratio, net foreign exchange exposure), and macro-financial shocks (commodity price shocks, portfolio capital flows)—all included in vector $X_{i,n,t}$:

$$\frac{p(D_{i,n,t})}{1-p(D_{i,n,t})} = \alpha X_{i,n,t} + \varepsilon_{i,n,t} \tag{2}$$

where $X_{i,n,t}$ is the vector of control variables including year fixed effects. We avoid including the indicators, $I_{n,t}$ or their transformations, that are used to identify distress—that is, $D_{i,n,t}$. Including those would result in estimating a tautological relationship. By adding year fixed effects, we capture common time factors and any other relevant macroeconomic shocks. This approach also reduces the need to cluster errors.

By running the logit regression, we are interested most in uncovering whether state-owned commercial banks (SOCBs) are on average more prone to distress than privately owned banks—conditional on other factors, such as size, funding models, and governance indicators. Here, private banks (PVTBs) serve as the control group.

Adjustments in Distress and Loss Given Distress

Let us define here the LGD as the monetary loss due to all forced adjustments that the PSB in distress must perform to survive, restructure, or close its existence. Therefore, compared with the traditional expected loss formula, our LGD is equal to the loss given distress times the exposure in distress. The LGD is estimated relative to the control group of similar private banks.

The LGD could be estimated based on the monetary value of all the adjustments that happen when a distress occurs ($D_{n,t} = 1$). For PSBs, we focus on the following adjustment, $ADJ|D_{n,t} = 1$, categories j:

1. % change in capital
2. % change in provisioning
3. % change in debt,
4. % change in lending
5. % change in fixed assets (incl. sale of fixed assets)
6. % change in dividend payouts

The LGD for an individual PSB could be estimated as:

$$LGD_{i,n,t} = \sum_{j=1}^{J} w_j ADJ_{i,j,n,t} |D_{i,n,t} = 1 \tag{3}$$

where $ADJ_{i,j,n,t}$ is the monetary loss due to adjustment j of bank n of type i in distress at time t. Setting $w_j = 1$ assumes that all adjustments in distress are equally important.

To estimate the adjustment size for each category j for distressed SOCBs relative to private banks, we run the following regression:

$$ADJ_{j,n,t} = \theta^{PSB}[PSB_n * D_{n,t-l}] + \theta D_{n,t-l} + FE_n + CE_t + \epsilon_{n,t}$$

$$(4)$$

where θ^{PSB} is the parameter of interest. FE_B are bank fixed effects and CE_t are common time effects. We interact the distress dummy with the PSB dummy to estimate the difference in adjustment between distressed PSBs and PVTBs. The lag l takes values 0 and 1.

Estimating the impact of SOCB distress on investments by private firms

The SOCB distress can have vital economic impacts on firm financing and private investments—our outcome variables of interest. The impact could vary by the type of dominant adjustment that SOCBs undertake in distress—and the size of the adjustment. For instance, if SOCBs are more prone to distress and, in distress, predominantly adjust by reducing longer-term lending to SMEs, small private firms doing business primarily with SOCBs will show a greater loss of access to financing or unrealized investments over time. In contrast, if SOCBs are as equally prone to distress as private banks and, thanks to softer budget constraints, can issue debt or get equity injection and continue lending even in distress, private firms doing business primarily with SOCBs will show a smaller loss access to financing and unrealized investments over time.

We examine these hypotheses in a reduced-form framework for SOCB distress relative to private bank distress. We run the following regression:

$$\text{FIN}_{n,t} = \beta_i \, D_{i,n,t} + \gamma X_{n,t} + \epsilon_{n,t} \qquad (6)$$

where $\text{FIN}_{n,t}$ is firm lending (log-log growth in debt) and investment (log-log growth in fix assets) respectively, and X are controls including sector, year, and firm fixed effects. β_i is our coefficient of interest that is expected to be negative. That is, a firm linked to a bank that experiences distress will have greater problems to undertake investment, other things equal. If $|\beta_{SOCB}| > |\beta_{Private}|$ distresses of SOCBs are more harmful than distresses of private banks. For instance, compared with private banks, SOCBs could be adjusting in distress by mostly reducing lending while serving firms that do not have other banking options—links to private banks. If $|\beta_{SOB}| \cong |\beta_{Private}|$ and β is significantly negative overall, distresses of private and public banks are equally harmful. Note that here SOCBs could be still more problematic if they experience distress more frequently than private banks. If $|\beta_{SOCB}| < |\beta_{Private}|$, distress of SOCBs could be less harmful, for example, because SOBs can sustain lending and avoid closing branches even if in distress—including because of soft budget constraints they could enjoy. Then, especially during systematic stresses—such as during economic recessions, near-financial crisis, or financial crisis episodes—SOCB presence in the banking system could support the resilience of lending through the cycle and private investments. But the cost of this resilient lending could be born by the fiscal.

4. Data

For in-depth bank-level analysis, we used an Indian firm-level database called Prowess, which is gathered by the Center for Monitoring the Indian Economy. It is based on data reported

by firms registered with the Registrar General of Companies. It is an unbalanced panel that covers the 1989 to 2018 period and contains detailed annual financial statement data as well as performance information on firms in India—both financial and non-financial ones. In addition, specifically for banks, Prowess provides an expanded set of financial soundness indicators. Regarding coverage of the banking sector, Prowess covers about 80 to 90 percent of SCBs in India, which account for most banking sector assets.

Using Prowess data, we constructed a balanced, bank-level panel including key financial soundness indicators and bank characteristics. As many of the key variables, particularly financial soundness indicators, were missing prior to 2009, the dataset covers the 2009 to 2018 period. For each year, there are 74 banks. However, not all banks have data for each of the key variables.[4] Table 2 presents the summary statistics of key variables in this dataset for PSBs (Panel A) and PVTBs (Panel B).

Table 2: Summary Statistics for SCBs in 2018

PANEL A: PSBs

	Number of Banks	Mean	Standard Deviation	25th Percentile	50th Percentile	75th Percentile
Interest Coverage Ratio (ICR)	21	0.58	0.26	0.39	0.49	0.77
Capital Adequacy Ratio (%)	21	11.21	1.52	10.41	11.09	12.55
NPL ratio (%)	21	18.38	6.93	12.2	18.51	23.55
Return on Assets %	21	-0.79	1.23	-1.61	-1.04	-0.34
Age (years)	21	91.67	29.18	75	95	111
Loan to Deposit Ratio %	21	67.68	7.27	62.96	67.95	72.62
FX Liabilities to Total Liabilities	21	7.66	7.26	0.81	6.64	11.72
Total Loans (INR Billions)	21	2,744.97	4,019.27	1,177.67	1,539.58	2,887.61
Total Assets (INR Billions)	21	4,785.03	7,096.17	2,162.56	2,527.16	4,901.04

PANEL B: PVTBs

	Number of Banks	Mean	Standard Deviation	25th Percentile	50th Percentile	75th Percentile
Interest Coverage Ratio (ICR)	52	1.82	2.18	1.12	1.26	1.68
Capital Adequacy Ratio (%)	42	19.09	7.29	14.83	16.78	19.42
NPL ratio (%)	47	706.39	4815.4	1.3	3.01	6.68
Return on Assets %	51	1.49	3.7	0.57	0.93	1.73
Age (years)	51	59.22	38.13	24	41	96
Loan to Deposit Ratio %	53	95.41	51.1	70.13	81.69	101.05
FX Liablities to Total Liabilities	39	13.57	13.9	4.53	9.51	16.67
Total Loans (INR Billions)	53	581.96	1,317.57	40.76	126.62	448.00
Total Assets (INR Billions)	53	962.69	2,082.64	79.61	221.75	704.83

To assess the impact of PSB distress on firm investment, we link the banks to the firms in the Prowess dataset. With these links, we can merge an unbalanced version of the panel bank-level

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[4] While most banks have the key variables resulting in about 700 observations in each regression, data on foreign exposures and dividends has a number of missing variables resulting in regressions with about 300 and 500 observations respectively.

data set mentioned above with the firm-level dataset constructed in Melecky and Sharma (2019), which also uses the Prowess data. As a result, we can build an unbalanced firm-level panel with key firm characteristics, such as total firm assets, firm age, sector, etc., as well as key indicators of bank distress and bank ownership. Table 3 presents the summary statistics of this dataset.

Table 3: Summary Statistics for Firms in 2018

PANEL A: LARGE FIRMS

	Number of Firms	Mean	Standard Deviation	25th Percentile	50th Percentile	75th Percentile
Total Assets	3520	22,315	158,786	624	2,295	8,247
Sales	3528	7,254	13,890	398	1,739	5,972
Profit After Tax	3528	285.5	889.7	-0.1	32.9	253.9
Interest Expense	3528	217.3	474.2	5.1	33.7	144.3
Debt	3203	3,325	7,349	135	551	2,286
Gross Fixed Assets	3212	4,655	9,311	336	1,077	3,758
PSB share of Total Bank Links %	3484	0.4	0.5	0.0	0.0	1.0

PANEL B: SMEs

	Number of Firms	Mean	Standard Deviation	25th Percentile	50th Percentile	75th Percentile
Total Assets	2105	489.72	3151.4	30.7	91.5	260.2
Sales	2105	324.32	1131.82	11.4	62.2	234.3
Profit After Tax	2105	0.41	87.9	-0.2	0.8	5.8
Interest Expense	2105	13.36	96.4	0	0.7	3.8
Debt	1779	204.77	1372.34	6.4	22	72
Gross Fixed Assets	2105	26.65	28.1	3.5	15.3	44.1
PSB share of Total Bank Links %	2064	0.5	0.5	0.0	0.0	1.0

5. Estimation results

Distress Factors

Table 4 below shows the results from the baseline logit regression for the likelihood of bank distress and for distress of PSBs in particular. The results suggest that, on average, state-owned commercial banks in India (PSBs) are significantly more likely to experience distress compared with private banks (PVTBs). Table 4 column (2) shows that the result is not driven by SBI and that SBI is not significantly more/less prone to distress. SBI is by far the largest bank in the Indian banking system. Its failure or perception of its failing would significantly impact confidence in the system. As such this bank is very likely to receive rapid State attention in the event of any signs of distress. Indeed, high propensity for extraordinary state support underpins this bank's rating by, for instance, Fitch ([reference]). The coefficient on the SBI dummy is positive suggesting that, on average, SBI could be more prone to distress compared with PVTBs—however, the result is not statistically significant. This finding is likely driven by the overall weakening financial soundness indicators particularly in recent years, with the non-performing assets ratio breaching the 10 percent threshold and a return on assets turning negative in 2018. Table 4 column (3) suggests that the likelihood of distress increases with Government

shareholding. We estimate that PSBs with government share of at least 50 percent but less than 70 could be less prone to distress than PSB in which government has more than 70 percent share of ownership.

Table 4: Baseline Regression Results

Dependent Variable - Probability of Distress for Banks: ICR < 1
Logit Regressions with Robust Standard Errors

	(1)	(2)	(3)
PSB - dummy	2.103***	2.107***	
	(5.25)	(5.27)	
SBI - dummy		1.620	
		(1.57)	
Govt Shareholding >=50% and <70%			1.678***
			(3.73)
Govt Shareholding >70%			2.184***
			(5.37)
Bank Size (Log Total Assets)	-0.333***	-0.324***	-0.302***
	(-3.98)	(-3.77)	(-3.62)
Age (Years)	-0.00253	-0.00279	-0.00141
	(-0.60)	(-0.65)	(-0.33)
Loan to Deposit ratio (Log)	0.515*	0.515*	0.521*
	(2.16)	(2.14)	(2.15)
FX Exposures (Log ratio: FX Liabilities to Total Liabilities)	-0.129	-0.124	-0.114
	(-1.37)	(-1.30)	(-1.19)
Constant	-0.308	-0.375	-0.578
	(-0.26)	(-0.31)	(-0.48)
Observations	554	554	554
R-squared	0.251	0.252	0.250
Year Time Dummies	Yes	Yes	Yes

t statistics in parentheses
* $p<0.05$, ** $p<0.01$, *** $p<0.001$

These findings suggest that PSBs could be more fragile by design (Calomiris and Haber, 2014). That is, the overall governance around and at PSBs could expose them to more or greater shocks such as directed lending, directed support of government programs, political interference

in management, forced overemployment or unqualified employment, etc (Cole, 2009; Ashraf, 2018; Richmond et al. 2019).[5]

The estimations also indicate that the likelihood of distress increases as bank size decreases. Namely, smaller banks are relatively more prone to distress. This is not surprising given the characteristics and business models of these banks. Notably smaller banks, such as small finance banks (SFBs), rely more on borrowings to fund their activities, are proportionately more exposed to riskier segments of the market such as priority sectors and small borrowers, have limited diversification to help mitigate shocks—that is, rely heavily (from more than 70 percent) on lending to earn their income—and appear overall less efficient compared with other private sector banks.

The results further suggest that banks with a greater loan-to-deposit ratio are more prone to distress. The ratio could also be a proxy for the bank's funding structure and risk—that is, how much of its loan book is funded by own deposits relative to other sources of funding. Higher loan-to-deposit ratios can thus indicate less diverse sources of funding, which can increase the likelihood of distress. Particularly, banks with loan-to-deposit ratios above 100 percent are more exposed to liquidity shocks—for instance, because of their borrowing exposures to the money market and private market credit lines. This finding dovetails with that of the GFSR (2013) that higher loan to deposit ratios (higher reliance on wholesale funding) were, across the board, linked to higher levels of distress in advanced and emerging economies. The result on the loan to deposit ratios is relatively more important for private sector banks because PSBs in India have, on average, a loan to deposit ratio significantly below 100 percent.

The age of bank and its foreign currency exposure do not appear to significantly affect the likelihood of distress. The estimated negative coefficient on foreign currency exposure may be affected by low levels of foreign currency lending within the domestic banking system and firm access to foreign currency via other forms of financing, for instance, international capital markets. Therefore, a bank that has access to sizeable foreign currency liabilities would need to be sound and capable of competing with international financiers.

The estimation results in Table 1 in Annex 1 show that the likelihood of distress using a variety of other distress indicators such as return on assets below zero (ROA < 0), the regulatory capital adequacy ratio below 11 (or 10.5) percent (CRAR < 11%; CRAR < 10.5%) and non-performing assets ratio above 15 (or 10) percent (NPA > 15%; NPA > 10%). Overall, these robustness checks confirm that PSBs are more likely to suffer from distress, and more so the higher their government ownership share.

These estimations reiterate that broader public governance issues could drive the inherent weaknesses in PSBs. However, weak banks with poor governance structures that have suffered reoccurring distress have been the main recipients of government capital injections—which have in turn increased their government ownership share. In addition, once these banks receive additional capital, they are expected to increase lending to support mainly priority sectors or not-always-viable government programs which further increases their risk of distress. Therefore, the

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[5] For instance, Ashraf et al (2018) find that the political pressure is prevalent only in the countries with weak political institutions. Strong political institutions in the form of higher constraints on policy change decisions of incumbent government and higher democratic accountability are helpful in eliminating political pressure on state-owned banks in developing countries. Also, Richmond et al. (2019) report one consistency across the state-owned real and financial sector firms and that is a finding of overemployment relative to their private sector counterparts.

results could simply reflect the reoccurring higher probability of weak banks being regularly in distress, receiving reoccurring government support, increasing their directed lending, and lacking decisive intervention to resolve their underlying problems. If additional capital injections are not coupled with meaningful reforms, then these PSBs may continue to exhibit reoccurring or even intensifying distresses.

This government bailout dynamics introduces a possible selection bias that can result in overestimates of the coefficient on the PSB dummy. In future, we will try to adjust for this possible bias using instruments/selection bias correction.

Adjustments in Distress

Estimation results in columns 1 and 2 of Table 5 show that, relative to other PSBs (the control group), distressed PSBs tend to adjust in distress by increasing capital and provisioning, while reducing lending in the year of distress. During the year following distress, distressed PSBs are likely to continue adjusting by further reducing lending and by reducing debt levels. There is some indication that distress PSBs could be reversing the increased provision during the year following distress—but this estimation result is not significant at common levels.

The estimation results in columns 3 and 4 show that, compared with distressed PVTBs, the distressed PSBs tend to adjust to distress by increasing capital relatively more than distressed PVTBs. This could reflect the prompt recapitalization effort of the government in case of, at least, systemically important public banks—most notably SBI.

To a lesser extent, during the year of distress, the distressed PSBs tend to increase fix assets (invest) or at least their plans to accumulate fixed assets are not negatively affected. This result could be linked to government capital injections that often come with the conditionality to continue supporting priority lending sectors, government programs, and stimulate economic growth. If PSBs are unable to stimulate growth through lending—for instance, because breaching prudential requirements can trigger regulations that prohibit increasing the lending portfolio—the PSB can use their investments to help stimulate growth and meet government conditions of recapitalization.

Table 5: Baseline regressions - Adjustments given Distress

	Total Capital				Provisions				Lending			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Distress: ICR < 1	0.108*	0.104*	-0.0210	-0.0290	0.215*	0.227*	-0.0486	-0.0783	-0.0868***	-0.0839**	-0.0661	-0.123***
	(2.35)	(2.22)	(-0.64)	(-0.82)	(2.77)	(3.24)	(-0.26)	(-0.40)	(-4.19)	(-3.82)	(-1.03)	(-3.93)
Distress: ICR < 1 -		0.0690		0.0427		-0.207		0.105		-0.0518*		0.00796
		(0.84)		(0.72)		(-1.39)		(0.53)		(-2.83)		(0.21)
Distress*PSB			0.255**	0.251**			0.206	0.330			-0.0175	0.0446
			(4.77)	(5.13)			(0.90)	(1.40)			(-0.27)	(1.19)
Distress*PSB - Lagged				-0.00198				-0.443				-0.0345
				(-0.02)				(-1.95)				(-0.83)
Constant	-	-	0.0648*	0.0645*	0.180*	0.180*	-0.199	-0.199	0.191***	0.191***	0.197**	0.199***
	(-0.13)	(-0.13)	(2.36)	(2.36)	(3.29)	(3.31)	(-1.76)	(-1.78)	(15.28)	(15.26)	(6.91)	(7.11)
Observations	189	189	643	642	189	189	616	616	189	189	662	661
R-squared	0.379	0.386	0.0384	0.0394	0.124	0.143	0.0628	0.0647	0.668	0.688	0.133	0.138
Year Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	PSBs	PSBs	All	All	PSBs	PSBs	All	All	PSBs	PSBs	All	All Banks

t statistics in

* p<0.05, ** p<0.01, *** p<0.001

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Table 5: Baseline regressions - Adjustments given Distress continued

	Fixed Assets				Debt			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Distress: ICR < 1	0.0282	0.0325	-0.0236	-0.0215	0.0405	0.0632	-0.231	-0.247
	(0.69)	(0.80)	(-0.57)	(-0.54)	(0.31)	(0.50)	(-1.92)	(-1.70)
Distress: ICR < 1 - Lagged		-0.0743		-0.0435		-0.397**		0.0492
		(-1.33)		(-1.14)		(-2.92)		(0.24)
Distress*PSB			0.0929	0.119*			0.182	0.256
			(1.91)	(2.43)			(1.30)	(1.53)
Distress*PSB – Lagged				-0.0547				-0.255
				(-1.14)				(-1.11)
Constant	0.0590***	0.0590***	0.133***	0.135***	0.338***	0.338***	0.470***	0.470***
	(8.76)	(9.35)	(4.90)	(4.94)	(5.21)	(5.35)	(4.64)	(4.63)
Observations	189	189	662	661	189	189	604	604
R-squared	0.227	0.244	0.0204	0.0327	0.144	0.220	0.114	0.120
Year Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	PSBs	PSBs	All	All	PSBs	PSBs	All	All

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Moreover, the estimation results in column 4 of Table 5 show that distressed PVTBs tend to reduce lending significantly in the year of distress. Compared with distressed PVTBs, distressed PSBs do not decrease their lending significantly in the year of distress. PVTBs do not appear to use other adjustment channels significantly. It may be more difficult and expensive for them to raise additional equity or borrow in times of distress—and the estimation results for debt in columns 3 and 4 somewhat support this conjecture. Namely, PVTBs could be somewhat reducing lending in distress compared with PSBs the borrowing of which could be relatively less affected (note the offsetting results for distressed PSBs across the contemporaneous and lagged PSB dummy). With this pressure in mind, PVTBs could be keeping larger buffers to draw on and provide cushion in distress events—and which mitigate the likelihood of distress in the first place. (for instance, the CAR and net interest margins of PVTBs are higher than those PSBs—see Table 1). Also for this reason, reduced lending can be PVTBs preferred adjustment channel both by prior choice and necessity.

Estimation results in Annex 1 Table 2 show how distressed PSBs adjust to different types of distress compared to distressed PVTBs. During the year of distress, distressed PSBs tend to increase capital when the ICR falls below 1, or profitability turns negative, or when the NPL ratio breaches 15 percent. When the capital adequacy ratio (CRAR) falls below 11 percent, the distressed PSBs may also increase total capital but this estimation result is not statistically significant. Perhaps, because around 11 percent the CRAR levels still exceed prudential requirements of 9 percent, PSBs may opt to adjust in other ways than increasing capital. In the period following distress, distressed PSBs tend to increase capital only when the NPL ratio exceeds 15 percent as weak asset quality can continually erode capital unless it is resolved.

Regarding debt dynamics, the robustness checks broadly concur the baseline results—although they are not as statistically significant (CRAR) or their timing is slightly different (ROA). Namely, distressed PVTBs reduce their debt borrowing in distress while distress PSB enjoy softer borrowing conditions than distressed PVTBs. The difference between PSBs and PVTBs debt borrowings in distress could also relate to the prevailing type of debt instruments the banks use. PSBs tend to borrow from the RBI and other public institutions/agencies while PVTBs tend to access and are more exposed to foreign capital markets.

Distressed PVTBs tend to increase provisions during the year of distress as well as the subsequent period as profitability turns negative. In contrast, distressed PSBs do not seem to significantly increase these buffers during similar distress events as they appear to rely on capital infusions to address these issues. This difference in adjustment channels in the face of similar distress events could reflect the difference in governance in these banks - PVTBs rely on their own resources to address the issue while PSBs rely on government resources to address these issues.

Other significant results indicate that PVTBs reduce lending during the year of distress when their CRAR falls below 11 percent. As these banks tend to maintain higher CRARs, may prioritize building capital buffers over increasing lending when these ratios fall below 11 percent. In addition, as their income sources are more diversified relative to PSBs, they can reduce lending without significantly impacting their income. Perhaps because PVTBs find adjusting investment plans in the near term difficult, distressed PVTBs with a CRAR below 11 percent or negative

profitability tend to reduce investment in fixed assets in the year following distress—compared with distressed PSBs who can sustain it. The differences in adjustment by PVTBs and PSBs when faced with a CRAR below 11 percent and negative profitability further illustrates PVTBs' focus on self-reliance compared with PSBs that are subject to soft budget constraints and backed up by government capital to support their operations and survival. This self-reliance of PVTBs and moral hazard of PSBs can severely undermine market discipline and efficient functioning of the financial market.

In sum, sound PSBs can help sustain lending to firms throughout the cycle and in face of financial shocks. However, weaker PSBs could get in distress more often than private banks and reduce lending in times of distress compared with sound PSBs. However, if PVTBs get into distress—including because of common macro shocks—they reduce lending much more than distressed PSBs and, even more so, sound PSBs. Significantly reducing lending is the adjustment PVTBs opt for in times of their less frequent distress. PSBs have softer budget constraints regarding both equity injections and additional debt borrowings. Compared with PVTBs, the softer budget constraint and conditions of government recapitalization (to help stimulate growth) could encourage PSBs to sustain their investments (fixed asset accumulation) event in distress. However, the soft budget constraints bear substantial fiscal costs and erode discipline and competition in the financial market.

Firm Links to State-Owned versus Private Banks: Impacts on Firm Financing and Investment *[PRELIMINARY]*

Impact of PSB distress on firms

This section analyses the impact of bank distress on firm performance using matched firm-bank level data from the Prowess dataset. While it relates distress of banks to all firms, it focuses on private sector firms and further SMEs to somewhat mitigate issues of possible endogeneity. That is, that distress of banks could be originally caused by underperformance of its key borrowers such as Tata Motors. We control for firm-specific effects and common shocks using firm-level fixed effects and year dummies. We focus on two outcome measures relating to firms: (i) access to financing and the ability to borrow, measured as log-log change in debt, and (ii) the ability to sustain investments, measured as log-log change in fixed assets. Because firms can use multiple banks, we use two types of dummy variables in our estimations. One, if any bank to which the firm is linked is distressed in given period (YES=1, otherwise 0) and if any of the banks to which the firm is linked is a SOCB (YES=1, otherwise 0). Two, if majority of the banks to which the firm is linked are distressed (YES=1, otherwise 0) or if majority of the linked banks are SOCBs (YES=1, otherwise 0). We report here the estimation results using the former type of dummies because the results are not materially different. Table 6 shows the result of regression estimating the effect of bank distress and bank ownership on firms' access to financing.

Table 6: Effect of Bank Distress on Firm Access to Financing

Explanatory Variables	Growth Rate of Debt		
	(1)	(2)	(3)
Bank distress=1	-0.0405	-0.0368	-0.152
	(-0.88)	(-0.80)	(-1.36)
Avg govt shareholding in PSB 51-70%=1	-0.0120	-0.0153	-0.000321
	(-0.57)	(-0.73)	(-0.01)
Bank distress=1 # Avg govt shareholding in PSB 51-70%=1	0.0311	0.0295	0.179
	(0.65)	(0.62)	(1.47)
Avg govt shareholding in PSB >70%=1	0.00286	-0.000953	0.0286
	(0.11)	(-0.04)	(0.42)
Bank distress=1 # Avg govt shareholding in PSB >70%=1	0.0216	0.0185	0.152
	(0.42)	(0.36)	(1.20)
Firm Size (Log Total Assets)	0.145***	0.146***	0.171***
	(10.94)	(11.20)	(6.20)
Firm Fixed Effects	Yes	Yes	Yes
Sector-Year Fixed Effects	Yes	Yes	Yes
Firm Ownership	**All**	**Private**	**SME**
Observations	36440	35594	10037
R-squared	0.300	0.302	0.406

t statistics in parentheses

* p<0.05 ** p<0.01 *** p<0.001

The results in Table 6 suggest that bank distress does not significantly affect firm borrowing from banks (column 1). This could be because loans and credit line commitments are generally of longer maturity and loan disbursements continue. Or, that, on average, firms keep links with several banks and redirect their borrowing demand if needed—provided that systemic banking crises do not occur. While this result broadly holds for state-owned and large private enterprises (column 2), it may not hold for SMEs. For SMEs, the distresses at banks with which they do business can impair the SME access to financing and lower SME borrowing (column 3). Links to SOCBs with a smaller or greater state ownership share do not seem to matter for firms' access to finance, on average—not even for SMEs. However, if the distress bank that an SME does business with happens to be a state-owned bank, the negative effect on the SME access to finance is neutralized. Whether the SOCB is more or less owned by the state does not diminish the positive effect the public ownership and backup deliver in times of bank distress. In addition,

we find that larger firms can borrow more—including perhaps because of their greater diversification and presumed resilience to idiosyncratic business shocks ([reference]).

Table 7 shows the result of regression estimating the effect of bank distress and ownership on firms' investment.

Table 7: Effect of Bank Distress on Firm Investment

Explanatory Variables	Growth Rate of Gross Fixed Assets		
	(1)	(2)	(3)
Bank distress=1	-0.0305	-0.0286	-0.0268
	(-1.85)	(-1.72)	(-0.73)
Avg govt shareholding in PSB 51-70%=1	-0.0117	-0.0119	-0.0118
	(-1.35)	(-1.36)	(-0.64)
Bank distress=1 # Avg govt shareholding in PSB 51-70%=1	0.0260	0.0236	0.0520
	(1.48)	(1.34)	(1.28)
Avg govt shareholding in PSB >70%=1	-0.0107	-0.00987	0.0176
	(-0.94)	(-0.86)	(0.72)
Bank distress=1 # Avg govt shareholding in PSB >70%=1	0.0278	0.0231	0.0294
	(1.45)	(1.19)	(0.68)
Firm Size(Log Total Assets)	0.0734***	0.0740***	0.0371***
	(11.75)	(11.68)	(3.32)
Firm Fixed Effects	Yes	Yes	Yes
Sector-Year Fixed Effects	Yes	Yes	Yes
Firm Ownership	**All**	**Private**	**SMEs**
Observations	40842	39694	13162
R-squared	0.385	0.388	0.500

t statistics in parentheses

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

The results in Table 7 suggest that distress at banks decreases firm investment. The effect could be the most significant for state-owned enterprises—but large private firms are almost equally negatively affected. The estimate is the least significant for SMEs—this could be due to a much smaller sample and statistical power of the regression or because SMEs finance their investments mostly from retained earnings. The external bank financing may SMEs rather use to fund working capital. Interestingly, firm links with SOCBs decrease firm investment, on average. This could be because SOCBs do not exercise the same level of project screening and monitoring to boost firm productivity and, in turn, investability—along the SOCB inefficiency hypothesis. Or, because of the SOCB focus on meeting lending quotas rather than the quality of lending

(Panagariya, 2008), SOCBs could attract, on average, firms with less viable investment projects and opportunities to grow—which would introduce a selection bias problem.[6] This negative effect of SOCB links is more pronounced for banks with state ownership share between 51 and 70 percent.

Also for firm investment, state ownership of bank delivers positive sustaining effect in times of bank distress. This effect could be most beneficial for SOEs that do business with SOCBs—but large private firms can benefit almost equally. The effect is least statistically significant for SMEs. Again, this could be due to the smaller sample available for estimation. Or, it can indicate that SMEs invest more from own resources and use bank borrowing mostly for working capital financing. The latter conjecture is supported by the results for firm access to financing in Table 6. This sustaining effect is smaller for firm linked to SOCBs with greater state ownership (more than 70 percent). A greater state ownership could be associated with greater SOCB inefficiency that somewhat offsets the positive sustaining effect in times of bank distress.

6. Conclusion

Using bank level data for India, this paper studied which factors could be associated with bank vulnerability to distress, how banks adjust in distress, and how bank distress affects the access to financing and investment of firms that do business with distressed banks. It did so by contrasting the role of private versus public ownership of banks.

The paper identified distress at banks using a rule of thumb threshold for a financial soundness indicator—the interest rate coverage ratio. Using alterative financial soundness indicators such as the return on assets and capital adequacy ratio as robustness check produced similar results. The paper found that state-owned banks, smaller banks, and banks financing their loans less from own deposits are more prone to distress. The higher average vulnerability of state-owned banks to distress increases with the share of state ownership.

The adjustment of state banks in distress differs from that of private banks. Weaker state banks get in distress more often than private banks and reduce lending in times of distress compared with healthy state banks. However, if private banks get into distress, they reduce lending much more than state banks in distress and, much more so, than healthy state banks. State banks enjoy softer budget constraints—readily obtaining state equity and debt support. The softer budget constraint as well as conditions of government recapitalization enable state banks sustain investments in distress. However, the soft budget constraints impose substantial fiscal costs and erode market discipline.

Bank distress and ownership affect their client firms—namely, the access to finance and investment of client firms. Although bank distress may not affect firm borrowing from banks in general, for SMEs, the distresses at banks with which they do business can impair SME access to financing. SMEs may have fewer financing alternatives to turn to compared with larger firms— such as access to capital markets. If the distressed bank with which an SME does business is a state bank, the negative effect of bank distress on the SME access to finance becomes insignificant.

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[6] We do not attempt to correct for this possible problem of adverse selection bias in this version of the paper.

Distress at banks decreases firm investment. SMEs could be less affected because most of their investments are financed from internal resources (retained earnings) and rely on external resources to finance working capital ([reference; GFDR on long-term finance]). Interestingly, firm links with state banks decrease, on average, firm investment. This negative effect of firm links with state banks grows with the state ownership share in the bank. This finding is in line with the inefficiency hypothesis for state owned banks. However, state ownership can help sustain firm investment in times of bank distress. Consistent with earlier results, the mitigating effect is least statistically significant for SMEs. This positive mitigating effect fades as state ownership of the distress bank increases beyond 70 percent. Here, the greater average SOCB inefficiency offsets the sustaining effect on firm investment in times of bank distress.

Overall, state-owned commercial banks have a large footprint in South Asia and, even more so, in India. Their ability to reach out and mobilize deposits is not matched by their ability to efficiently credit the economy. However, state ownership in banks can help shield firms— including SMEs—from shocks that the negative effects of occasional distress at banks. Historically, this positive role of state ownership came at the cost of more frequent distresses at weaker state-owned banks and substantial—over time increasing—fiscal outlays on bank recapitalization (Figure A1). The effort to consolidate state owned banking in India is a welcome step—especially for smaller state banks with weak governance and the ability to mobilize and efficiently intermediate deposits. But, even with substantial consolidation, further reforms of state banks may be needed. One question is whether state-owned banks shall remain retail lenders or intermediate the deposits they mobilize through wholesale funding of private banks and adequately regulated and supervised nonbank credit institutions.

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Annex:

Table A1: Probability of Distress

Logit Regressions with Robust Standard Errors

	ICR < 1	ROA < 0	CRAR < 11%
Govt Shareholding >=50% and <70%	1.678***	1.583***	1.309*
	(3.73)	(3.36)	(2.14)
Govt Shareholding >70%	2.184***	2.274***	2.045***
	(5.37)	(5.15)	(3.55)
Bank Size (Log Total Assets)	-0.302***	-0.208*	-0.103
	(-3.62)	(-2.51)	(-0.58)
Age (Years)	-0.00141	0.00284	0.0119*
	(-0.33)	(0.64)	(2.37)
Loan to Deposit ratio (Log)	0.521*	1.099**	-0.101
	(2.15)	(2.64)	(-0.25)
FX Exposures (Log ratio: FX Liabilities to Total Liabilities)	-0.114	-0.129	-0.333**
	(-1.19)	(-1.29)	(-2.75)
Constant	-0.578	-1.633	-5.889*
	(-0.48)	(-1.42)	(-2.41)
Observations	554	553	377
R-squared	0.250	0.249	0.240
Year Time Dummies	Yes	Yes	Yes

t statistics in parentheses

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table A2: Adjustments given distress – various indicators of distress

OLS Regressions with Robust Standard Errors

	Capital			Provisions			Debt		
	ICR < 1	**ROA < 0**	**CRAR < 11%**	**ICR < 1**	**ROA < 0**	**CRAR < 11%**	**ICR < 1**	**ROA < 0**	**CRAR < 11%**
Distress	-0.0290	0.0233	-0.110	-0.0783	0.340*	-0.213	-0.247	-0.159	-0.105
	(-0.82)	(1.15)	(-1.34)	(-0.40)	(2.31)	(-0.97)	(-1.70)	(-0.86)	(-0.35)
Distress Lagged	0.0427	-0.00977	0.0465	0.105	-0.454*	0.0539	0.0492	-0.315	0.0676
	(0.72)	(-0.55)	(1.30)	(0.53)	(-2.33)	(0.32)	(0.24)	(-1.65)	(0.18)
Distress*PSB	0.251***	0.173***	0.111	0.330	-0.0693	0.149	0.256	0.117	0.144
	(5.13)	(4.94)	(1.05)	(1.40)	(-0.40)	(0.68)	(1.53)	(0.60)	(0.47)
Distress*PSB - Lagged	-0.00198	0.0387	-0.0674	-0.443	0.0878	-0.0233	-0.255	0.109	-0.110
	(-0.02)	(0.47)	(-1.17)	(-1.95)	(0.42)	(-0.12)	(-1.11)	(0.50)	(-0.29)
Constant	0.0645*	0.0456	0.0644*	-0.199	-0.184	0.0119	0.470***	0.458***	0.359***
	(2.36)	(1.87)	(2.54)	(-1.78)	(-1.92)	(0.19)	(4.63)	(4.74)	(3.76)
Observations	642	633	499	616	613	496	604	590	472
R-squared	0.0394	0.0344	0.0293	0.0647	0.0835	0.0396	0.120	0.121	0.134
Year Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	All Banks	All Banks	All Banks	All Banks	All Banks	All Banks	All	All Banks	All Banks

Table A2 Continued

OLS Regressions with Robust Standard Errors

	Lending			Fixed Assets		
	ICR < 1	**ROA < 0**	**CRAR < 11%**	**ICR < 1**	**ROA < 0**	**CRAR < 11%**
Distress	-0.123***	0.117	-0.0924*	-0.0215	0.0499	-0.0354
	(-3.93)	(0.51)	(-2.24)	(-0.54)	(0.79)	(-0.93)
Distress Lagged	0.00796	-0.228	-0.0782	-0.0435	-0.0790*	-0.117*
	(0.21)	(-1.70)	(-1.17)	(-1.14)	(-2.64)	(-2.50)
Distress*PSB	0.0446	-0.142	0.0657	0.119*	0.0271	0.106
	(1.19)	(-0.75)	(1.39)	(2.43)	(0.36)	(1.98)
Distress*PSB - Lagged	-0.0345	0.195	0.0540	-0.0547	0.0159	0.136*
	(-0.83)	(1.23)	(0.78)	(-1.14)	(0.41)	(2.06)
Constant	0.199***	0.176***	0.190***	0.135***	0.117***	0.0747***
	(7.11)	(6.43)	(5.09)	(4.94)	(4.66)	(5.05)
Observations	661	652	510	661	652	510
R-squared	0.138	0.0952	0.144	0.0327	0.0487	0.0476
Year Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Sample	All Banks	All Banks	All Banks	All	All Banks	All Banks

Figure A1: Government Capital Injections

Source: Government Data