Bank Ownership and Margins of Trade: Evidence from a Firm-Bank Matched Dataset*

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Abstract

Does a bank's ownership matter for a firm's performance (to which it is connected)? Especially, in the event of a crisis? I study this question through the effect of 2008-09 crisis on exports of Indian manufacturing firms. I find: (a) firms connected to private and/or foreign banks earn around 7.7–39% less in terms of their export earnings during the crisis as compared to firms' having banking relationships with public-sector banks. This happened as the public-sector banks were differentially treated by the Central Bank of India during the crisis due to a clause in the Indian Banking Act of 1969; (b) effect is concentrated only on the intensive margin of trade; (c) drop in exports is driven by firms' client to big domestic-private banks and banks of US origin; (d) firms not connected to public-sector banks also laid-off workers (both managers and non-managers), employed less capital and imported less raw materials. In addition, I also find that firms with lower average product of capital (than the median) received about 50% more loans from the public-sector sources, suggesting a significant reinforcement of inefficiency in the Indian economy due to misallocation of credit.

JEL classifications: F14, F41, G21, G28

Keywords: Bank Ownership, 2008-09 Financial Crisis, Expansionary Monetary Policy, Public-sector Banks, Private and/or Foreign Banks, Exports

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*This paper has been previously circulated as "Bank Ownership, Monetary Policy and Exports: Evidence from a Matched Firm-Bank Dataset". The Central Bank of India is popularly known as the Reserve Bank of India or RBI. I have used Central Bank of India and RBI interchangeably through the paper; both the names refer to the same institution. This paper has benefited from discussions with Reshad Ahsan, Richard Baldwin, Shantanu Banerjee, Sebastian Franco Bedoya, Ohad Raveh, Raoul Minetti, Vasso Ioannidau, Parantap Basu, Abhiman Das, Kaushalendra Kishore, Simona Mateut, Sanket Mohapatra, Arijit Mukherjee, Nikhil Patel, Magdalena Rola-Janicka, Pranav Singh, Maurizio Zanardi, Yuan Zi as well as conference participants at Ljubljana Empirical Trade Conference (LETC) 2018; Midwest Macro Meetings, Fall 2018; Workshop on Regional Vulnerabilities on South Asia, Central Bank of Sri Lanka, Colombo; Arnoldshain Seminar XVI, Bournemouth University; Research Conference on 'Financial Distress, Bankruptcy and Corporate Finance', Indian Institute of Management, Ahmedabad; 50th Money-Macro-Finance Conference, LSE, 2019; ETSG 2019, University of Bern; Midwest Trade Meetings, Fall 2019; 7th Bordeaux Workshop in International Economics and Finance and seminar participants at Hebrew University of Jerusalem, University of Nottingham, and Lancaster University.

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1 Introduction

Does a bank's ownership matter for a firm's performance (to which it is connected)? Especially, in the event of a crisis? The role of banks on economic activities has long been investigated by policymakers and academics (Friedman and Schwarz, 1963; Bernanke, 1983). And, there is now a sizeable body of evidence suggesting that bank health/credit/funding significantly affects firm activities, such as exports (Amiti and Weinstein, 2011; Manova, 2013; Paravisini et el. 2014; Buono and Formai, 2018), investment (Amiti and Weinstein, 2018), financial performance (Iyer et al., 2014; Ongena et al., 2015), etc. Another set of literature studies how differential exposure to international financial shocks of different types of banks can act as a propagation mechanism during global financial crisis (Peek and Rosengren, 1997, 2000; Cetorelli and Goldberg, 2012; Schnabl, 2012; Acharya et al. 2013; Ivashina et al., 2015; Ongena et al., 2015). However, the effect on firm performance due to variation in banks' ownership pattern, especially during a crisis, has not been studied in detail and the underlying mechanisms behind this effect are still not well understood.[1]

In this article, I show how bank ownership matters for firm performance, in this case exports, using 2008-09 crisis as the pretext. Indian manufacturing firms connected to private (major) or foreign banks earned 7.7–39% less in terms of their export earnings during the crisis as compared to firms' having banking relationships with public-sector banks. This happened as the public-sector banks were differentially treated by the Central Bank of India (popularly known as *Reserve Bank of India* or *RBI*) during the crisis due to a clause in the Indian Banking Act of 1969. And, this led to differential performance of firms connected to these respective banks. To the best of my knowledge, this is the first paper to show how firms got differentially affected (in terms of their exports) due to their banking relationships while using the *Indian Banking Nationalization Act 1969* as the identification strategy.

A key question arises immediately: how does being client to a public-sector bank help a firm to mitigate the partial effects of the crisis? Existing set of research highlights two possible reason: (1) credit-lending by public-sector or Govt.-owned banks tend to be less responsive to macroeconomic shocks than private banks (Micco and Panizza, 2006; Bertray et al., 2012; Cull and Martinez-Peria, 2012; Acharya and Kulkarni, 2016). **Panel A** of **Figure 1** reveals such similar situation in case of India. For public-sector banks, credit expanded during the crisis of 2008-09 by 20.4% as compared to 22.5% in 2007-08, a mere drop of 2 percentage points. On the other hand, for private banks and foreign banks the numbers are 10.9% and 4%, respectively (compared to 19.9% and 28.5% in 2007-08, respectively).

Ivashina and Scharfstein (2010) points out that one of the reasons why public-sector banks cut their

[1] However, there is one recent study which is similar to this article: Coleman and Feler (2015). They utilize data from Brazilian banks to show that bank ownership pattern significantly matters for regional level economic performance, such as GDP, employment, wages. My paper complements and extends the study by Coleman and Feler (2015) in terms of utilizing a matched firm-bank dataset and causally estimating the effect of the bank ownership using a policy change during the 2008-09 crisis on firm level export performance.

credit less is that they may have better access to deposit financing. **Panel B** of **Figure 1** plots the growth in deposits in case of Indian public-sector, private and foreign banks. An average public-sector bank saw an increase in deposits, whereas for the other two types, it declined sharply. Deposits in the public-sector bank increased by 26.9% in 2008-09 as compared to 23.1% in the previous year.[2] On the other hand, private banks' deposit growth decreased from 22.3% to a meagre 9.1% for the same period. Acharya et al. (2019) utilizing branch level data from Indian banks show there has been a reallocation of credit from private to public-sector banks. They argue that this is a result of a 'panic' channel – a depositors run on local branches although the banks that held the deposits had no exposure to the fundamental crisis.

The differential performance (between public-sector and other banks) could also be due to the differences in investor confidence. Eichengreen and Gupta (2013) by analyzing change in bank deposits in India during the crisis of 2008-09 shows that it is the expectation for an implicit and/or explicit guarantee for the public-sector banks that resulted in a significant growth in deposits during the crisis. Acharya and Kulkarni (2016) also came to the same conclusion by comparing the credit default swap (CDS)[3] spreads for India's largest public-sector bank (State Bank of India, SBI) and largest private bank (ICICI). Both the spreads were within the same range in 2007-08, but the difference increased in SBI's favour during 2008-09 indicating that the market possibly views a public-sector bank to be more resilient to a crisis than a private bank.

(2) due to political pressure. Dinc (2005) using cross-country bank level data provides evidence about political influences on these banks – government-owned banks increase their lending in election years relative to private banks. Using plant level data for Brazilian manufacturing firms, Carvalho (2014) provides such similar evidence of political influence over the real decisions of firms. Firms connected with government banks expand employment in politically attractive regions before elections.[4] However, political influences may not be of much relevance in this case given the following reasoning.

An additional reason, which is unique in my case and this helps to causally identify the effect of bank ownership on firm level exports is the presence of the *Indian Bank Nationalization Act 1969*. The Act provides an explicit guarantee that all obligations of the public-sector banks will be fulfilled by the Indian Govt. in the event of a crisis. This *Bank Nationalization Act* was adopted when 14 of Indian commercial banks were nationalized in 1969. The presence of this Act amplifies the intensity of the former reason and paves the way to exploit it in the event of a crisis, like that of 2008-09. Acharya and Kulkarni (2016) shows that it is the explicit and implicit government guarantees for the public-sector banks that helped them to

[2] The Govt. of India also issued a directive to public-sector enterprises (firms, not banks) to deposit their surplus funds in public-sector banks (Economic Times, 2008). Following the fall of Lehman Brothers and subsequent credit crisis, many depositors shifted capital out of private and foreign banks and moved to public-sector banks. Infosys, a software MNC, transferred nearly INR 10 billion of deposits from ICICI (the biggest private bank in India) to SBI just after Lehman's collapse in the 3rd quarter of 2008 (Economic Times, 2009).

[3] A CDS spread represents the cost of purchasing insurance against the default of an underlying activity.

[4] Similar evidences have been found by Cole (2009) in case of India, Khwaja and Mian (2006) for Pakistan, and Sapienza (2004) for Italy.

tackle the financial crisis better than other banks.[5]

Figure 2 plots the normalized average real borrowings by a public-sector, private and foreign bank from the Central Bank of India in a given year from 2004 to 2010. The plot clearly shows that pattern of borrowing from the RBI is very similar before the crisis, but significantly different afterwards. The flow of money from the RBI increases almost exclusively for the public-sector banks.[6]

Another question which may be relevant here (given the focus of the paper): why do I use exports as the outcome of interest? Firstly, linkages between financial sector and firms' performance, especially export activities have attracted significant attention in recent years (Berman and Hericourt, 2010; Chor and Manova, 2011; Amiti and Weinstein, 2011, 2018; Minetti and Zhu, 2011; Bricongne et al., 2012; Caggese and Cunat, 2012; Feenstra et al., 2014; Paravisini et al., 2014; Manova et al., 2015; Muuls, 2015; Bronzini and D'Ignazio, 2017; Buono and Formai, 2018).[7] Secondly, during a crisis, the demand for liquidity by the exporters goes up significantly as there could be (a) payment for their sales gets delayed; (b) fall in demand for their products in crisis-ridden countries; (c) the need to find new destinations for their products; (d) inventories piling up; and (e) a need to continue their production activities even with a drop in their sales. In these situations, firms resort to banks for additional credit supply. If the banks are also simultaneously hit by the crisis and fails to increase the lending, the real economy output falls.

Given this background, I use the financial crisis of 2008-09 to investigate the differential effects of bank ownership on Indian manufacturing firms' export activities. I presume that due to pre-existence of the *Bank Nationalization Act*, the Central Bank of India differentially treated the public-sector and other banks (private and foreign) and this subsequently got reflected in the performance of the firms, especially the exporters. I carry out the analysis at two different levels:

(i) at firm-bank level. I exploit information on banking relationships of firms and banks' balance sheet, specifically borrowing by a bank from the Central Bank, to estimate the causal effect of the banks' ownership on firms' performance. Using this matched firm-bank data helps me to tackle the usual identification challenge that a lot of studies face to isolate changes in firm borrowing that are driven solely by credit supply forces instead of credit demand. But, it still does not solve the problem of selection issue – the matching between firm and bank is endogenous.

For example, a firm may switch to a public-sector bank from its current banker (which could be a

[5] They also highlight that this is the theme worldwide. For example, the growth of the government-sponsored enterprises (Fannie Mae and Freddie Mac) and commercial banks in the US (both set of institutions with explicit government support and ready access to central bank emergency lending). These institutions expanded their holdings of mortgage-backed securities while investment banks and hedge-funds de-leveraged and sold these type of securities (He et al., 2009).

[6] Mihaljek (2010) also provides similar evidence by looking across a range of emerging economies.

[7] To become an exporter, a firm is dependent on financial resources for several reasons, such as identification of export markets, making their products according to foreign demand, setting up distribution networks, etc (Baldwin and Krugman, 1989; Dixit, 1989). Manova (2013) points out that most of these costs are need to paid at the beginning and in addition they need enough liquidity at hand in order to sustain for the relevant expenses after starting an export activity. For example, expanding for a single market to multiple markets or increasing the volume of export flows. All these activities require substantial liquidity (Chaney, 2016).

private and/or foreign bank) during the crisis to avoid the anticipated drop in credit supply or a firm may have multiple banking relationships, or it just stops borrowing from private and/or foreign bank(s) and borrow only from public-sector bank(s), etc. Also, the lending pattern of banks may vary according to their ownership. For example, foreign-owned banks may lend to completely different set of firms. These issues can significantly bias my estimated coefficients.

To control for these, I undertake the following steps: (a) use an indicator variable which takes a value 1 if a firm is a client to a public-sector bank in any random year before the crisis period[8]; (b) use banks' borrowing from the RBI (or total loans and advances) for years which are significantly before the crisis; (c) following Khwaja and Mian (2008) use a full set of firm fixed effects with clustering of standard errors at the bank level to control for firm unobservables and multiple banking relationships.[9]; and (d) interact firm fixed effects with the bank ownership dummy to control for the fact that borrowing from the RBI by the banks might be correlated with unobservable borrower characteristics that might affect their credit demand.

(ii) at firm level. I use direct information on the sources of borrowing by the firms. For example, how much a firm has borrowed from a public-sector bank, other domestic (private), and foreign sources. I do this for the following reasons: first, to create a 'financial fragility' index at the firm level to check whether the demand side of the story matches the supply side. Second, to check whether there is any substitution effect in play (firms can possibly substitute credit across these different types of banks); and finally to investigate for possible capital misallocation that may arise due to the discretionary stimulus provided by the monetary policy.

For doing such kind of exercises, I put together information from a well-known dataset on Indian manufacturing firms known as PROWESS (Goldberg et al., 2010; Chakraborty and Raveh, 2018). The dataset is unique in a sense that (a) it reveals information on the name and type of banks that each individual firm is client along with the information on the balance sheet of the banks, e.g., the amount of borrowing done by the banks from the Central Bank of India or RBI, total amount of loans and advances by them, etc.; and (b) it contains direct measures on borrowing by firms from different types of sources, namely borrowings from domestic banks (public-sector), borrowings from domestic private financial institutions (private banks and Non-Bank Financial Companies, NBFCs), borrowings from foreign banks, external commercial borrowings (ECBs), etc. The dataset also reports trade flows, divided into exports and imports, total sales, compensation to employees, expenditure on technology, capital employed, ownership category and other important firm and industry characteristics. I use all this information for the time period 2000–2010. This enables me to track a firm's banking relationships over time, thereby allowing for a dynamic specification in which

[8] I also restrict the period to certain year(s) and the results remain the same.

[9] One other possible way to control for such issues is to construct a sample of firms with single banking relationship with public-sector banks versus firms which have the same, but with private and/or foreign banks. However, in doing so, the sample becomes very small and restrictive. In particular, a large proportion ($\langle$ 90%) of the firms have to be dropped from the sample and this will lead into some external validity problem. Nonetheless, use of pairwise firm-bank fixed effects along with clustering at the same-level will help me purge out the right coefficients.

changes in credit flows from different kinds of sources may influence firm performance.

I have three different sets of results. First, I exploit banking relationships of the firms and balance sheet of the banks (particularly, borrowing from the Central Bank of India or RBI) to show that firms client to the private (especially, the big banks) and/or foreign banks (especially, the banks of the US origin) earn less from exports as compared to firms connected to state-owned or public-sector banks. My benchmark result is robust to all other possible important controls, such as demand shock, differential trends in bank lending, interactions between firm characteristics/fixed effects and bank dummy, multiple banking relationships, substitutability of credit, matching methods, etc. Interestingly, my conservative estimates show that the percentage drop in export flows for these firms (connected to domestic private and/or foreign) is close to what the macro figures of India's decline in export flows is during the 2008-09 crisis, which is 16–17%. And, it is the small and medium-sized firms exporting intermediate and capital goods who suffered the most.

Second, firms by virtue of not connected to the public-sector banks laid-off workers (both production and non-production; with the effect for production workers about 40% higher), reduced capital employed and import of intermediate inputs during the crisis. Lastly, I show evidence of capital misallocation among firms as a result of the differential treatment to banks (due to the Indian Banking Act, 1969) during the crisis of 2008-09. Firms with lower (than the median) average product of capital, before the crisis, received about 50% more loans from the public-sector sources than others. And, these firms are on average about 9% less productive than others. This implies that this selective treatment to banks may have reinforced further allocative inefficiency in the economy. And, bank ownership played a crucial role in the process.

The findings contribute to four different kinds of literature. My main/primary contribution is to show that bank ownership matter for a firm's performance, exports, especially in the event of a crisis. In other words, the contribution lies in the identification and measurement of credit supply shocks and their real effects using matched firm-bank level data using the ownership of the banks as the source of variation. My study is closely related to Coleman and Feler (2015) on Brazil. They show that following the collapse of Lehman Brothers in September 2008, Brazil's Govt.-owned banks substantially increased lending. Localities in Brazil with a high share of public-sector banks received more loans and experienced better employment outcomes in comparison to localities with a low share of government banks. The results also indicate this lending was politically targeted and inefficiently allocated which reduced productivity growth.

In contrast, I show that the public-sector banks got more funding/loans from the Central Bank because of a clause in the Banking Act of 1969. As a result of which lending from those banks increased and this helped the firms (connected to those banks) mitigate the partial negative effect of the crisis. I also show that the discretionary nature led to an inefficient allocation of capital – relatively more lending was given to firms which belong to the lower-half of the distribution of average product of capital. To this end, I extend the literature to show that the interaction between bank ownership and crisis help us understand the

composition of the effect on the real economy. To the best of my knowledge, this is the first paper to show that such evidence exists.

Secondly, my article is also closely related to the macro effects of global banking (Klein et al., 2002; Chava and Purananandam, 2011; Clasessens et al., 2011). I add to this literature to show that presence of private and/or foreign banks transmit international financial shocks to an economy and public-sector banks can act as counter-cyclical elements.

Third, the article also contributes to now a seemingly growing literature on trade and finance; namely, the role of credit supply or shocks on export activities. This paper exploits a pre-existing clause in the Banking Act which led to differences in the availability of credit across different types of banks due to their ownership patterns and measure its effect on firms' export performance. The results are closely related to work that analyzes the effects of credit disruptions on trade during the Great Trade Collapse of 2008-09 (Bolton et al., 2011; Chor and Manova, 2012; Levchenko et al., 2010) as well as the general literature on credit shocks or banks' health and performance of firms (Amiti and Weinstein, 2011, 2018; Bronzini and D'Ignazio, 2015; Berton et al., 2018; Buono and Formai, 2018).[10] My results also show that stability or availability of external finance is indeed important for exporters (Rajan and Zingales, 1998).

Lastly, the paper is also related to the recent literature that uses the bank lending channel as an instrument for credit shocks (Kalemli-Ozcan et al., 2010; Jimenez et al., 2012; Chodorow-Reich, 2014). I find similar evidence, but, my results also show that it may depend on bank ownership patterns.

The rest of the paper is organized as follows. Section 2 describes what happened in India during the crisis of 2008-09. The dataset is outlined in Section 3. Section 4 describes the empirical strategies and the corresponding results. Section 5 concludes.

2 Financial Crisis in India during 2008-09

India, like Brazil and China was relatively immune to the slowdown of the international credit flows.[11] However, it still witnessed a heavy sell-off by Foreign Institutional Investors (FIIs) during the crisis to provide the much-needed liquidity to their parents in the US or Europe – a net expulsion of around $13.3 billion in 2008 through equity disinvestment (Joseph, 2009; Kumar et al., 2008). **Table 1** shows a major return flow of capital from India, especially in the second half of the year, with regard to short-term trade finance and bank borrowings to the extent of US$ 9.5 billion and US$ 11.4 billion, respectively.

[10] On the other hand, there is also a sizeable amount of studies showing how global financial crisis of 2008-09 have impacted trade flows (due to drop in demand or credit supply or rise in protectionism, etc.). The literature on Great Trade Collapse (GTC) after the 2008-09 crisis identifies 4 main channels: (i) decline in demand (Behrens et al., 2013; Eaton et al., 2016; Chakraborty, 2018), (ii) drop in credit supply (Bricongne et al., 2012; Chor and Manova, 2012; Aisen et al., 2013, Parasivini et al., 2014), (iii) rise in trade barriers (Kee et al., 2013); and (iv) imported inventories (Alessandria et al., 2010).

[11] Jayati Ghosh and C. P. Chandrasekhar in an article in The Hindu (Oct 21, 2008) argues that the global financial crisis will certainly have some impact in Indian case, but not of the kind that was experienced in the US due to well-regulated banking system and 'strong fundamentals' of the economy. Rajan (2009) and Joseph (2009) also argues that the 2008-09 global financial crisis initially hit India via the financial channel, but, not through the conventional route – the subprime mortgage assets.

This was followed by a massive slowdown in external commercial borrowing by India's companies, trade credit and banking inflows. The drying up of funds in the foreign credit markets led to a virtual cessation of external commercial borrowing for India, including access to short-term trade finance. Indian banks lost access to funds from abroad, as inter-bank borrowing seized up in the US and Europe and banks had to send funds to their branches abroad in those countries. This led to (a) fall in Bombay Stock Exchange (BSE) Index; (b) rapid depreciation of the Indian rupee vis-a-vis the US dollar; (c) call money rate breaching the upper bound of the informal Liquidity Adjustment Facility (LAF); overnight call money rates rose by nearly 20% in October and early November 2008 (**Figure A.1, Appendix A**);[12] and (d) decline in the outstanding amount of certificate of deposit (CD) issued by the commercial banks as the global financial market turmoil intensifies. All these happened despite the facts that majority of the Indian banking system is owned by the public-sector (around 60%), and Indian banks have very limited direct exposure to subprime mortgage assets (Sinha, 2010).[13]

The collapse of the stock market further ruled out the possibility of companies raising funds from the domestic stock market. In addition, banks and corporates that were dependent on global markets for foreign currency suddenly found themselves to be facing a major liquidity crisis as credit dried up (Islam and Rajan, 2011). Thus, while the Indian banking sector remained largely unscathed by the global financial crisis, it still could not escape a liquidity crisis and a credit crunch. However, this crisis affected the banks in India differentially.

Figure 3 plots the normalized total real loans and advances by different types of banks. Lending pattern was similar before the crisis with significant differences arising after the crisis – lending by public-sector banks were significantly higher than that of other types of banks. I presume that this is due to the differential treatment by the Central Bank of India towards the public-sector banks. The RBI also requested the public-sector banks, that accounted for over 70% of loan growth in 2008-09, to reduce the Benchmark Prime Lending Rate (BPLR) and increase the credit flows to the private commercial sector. Sengupta (2009) argues that the expansionary monetary policy which was undertaken by the RBI as a result of the crisis of 2008-09 was specifically targeted to increase the lending to the state-owned banks. **Figure A.2** (**Appendix A**) provides similar evidence in case of Brazil.

Acharya and Kulkarni (2016) investigates the impact of ownership structure on bank vulnerability in India and show that private banks performed worse than public-sector banks during the 2008-09 crisis. Private banks experienced deposit withdrawals, whereas state-owned banks saw the opposite. Eichengreen and Gupta (2013) also shows that Indian private banks experienced a slowdown in deposit growth during and after the crisis; public-sector banks, in contrast, did not experience any such similar situation. Both

[12] Sengupta (2009) points out that between mid-September to end-October 2008, the daily weighted average call rate and the overnight weighted average money market rate (OWAR) exceeded the upper bound of the LAF corridor twice.

[13] Indian banks are allowed to invest only 5% of their capital on sub-prime mortagage activities.

the studies conclude that one of the main reasons behind this differential effect across banks is the explicit and implicit guarantee by the Govt. of India that is attached to the public-sector banks, especially during the crisis. I use this as a pretext to show that firms connected to these banks are differentially affected, in terms of their export performance, using the explicit and implicit guarantee offered by the Central Bank as a identification strategy.

3 Dataset

The sample of firms is drawn from the PROWESS database, constructed by the Centre for Monitoring the Indian Economy (CMIE), a private agency. The database contains information on approximately 27,400 publicly listed companies, all within the organized sector, of which almost 9000+ are in the manufacturing sector. I use data for around 5,500+ firms, for which there is consolidated data on banking relationships. I use data for the years 2000 to 2010, hence covering the crisis period (2008-09). Unlike other sources, the PROWESS data is in effect a panel of firms, enabling me to study their behaviour and banking relationships over time.

The dataset is classified according to 5-digit 2008 National Industrial Classification (NIC) level. I re-classify it to 4-digit NIC 2004 to facilitate matching with other important industry-level variables; hence, all the categorization made throughout the paper are based on the 2004 NIC classification. The dataset spans across 108 (4-digit 2004 NIC) disaggregated manufacturing industries that belong to 22 (2-digit 2004 NIC) larger ones. It presents several features that makes it particularly appealing for the purposes of this study. Below, I outline two of the most important features that are primarily needed for the paper.

(i) information on the banks of each firm. The dataset provides with the names and the types of banks (domestic public-sector, domestic private, foreign) for each and every firm.[14] The dataset provides information on 52 public-sector banks (including state-sponsored financial institutions), 88 private banks (including cooperatives), and 53 foreign banks.[15] This is according to the list of major banks (excluding the state-sponsored financial institutions, cooperatives)[16] provided by the RBI. The dataset also rolls out all the important information from the balance sheet of the banks. In particular, there is information on borrowing done by these respective banks from the Central Bank of India. This could possibly a direct result of the *Bank Nationalization Act*.[17] This gives me the unique advantage of utilizing this information for a bank,

[14] **Table 15** (**Appendix C**) provide the descriptives of the number and type of banking relationship(s) for an average Indian manufacturing firm. A listed Indian manufacturing firm on average has credit relationships with 5 banks. A public-sector firm is client to about 7 banks, whereas a private and foreign firm is client to 5. Bigger firms on average have more banking relationships than smaller ones. Same goes for exporters; an average exporter is client to twice the number of banks in comparison to a non-exporter.

[15] Additionally, it gives information on about 9000 private NBFCs, 250 public-sector NBFCs, 173 foreign NBFCs, and 80 other small co-operative banks.

[16] My analysis includes the state-sponsored financial institutions and co-operatives from the PROWESS dataset. Excluding them also produces the same result.

[17] **Figure 2** show such is the case; public-sector banks were able to borrow more money as compared to other banks.

and see its impact on a firm's performance to which it is connected.

The balance sheet also gives information on the total amount of loans and advances given by the banks. I use this variable as a robustness check to show that the effects are similar. Lastly, the dataset also provides information on the usual indicators which measure the health of a bank, such as return on assets, operating profit to working fund ratio, etc. I use operating profits to working funds ratio as a placebo to show that the bank ownership does not affect firms' performance through health of banks. This is because: the primary purpose of the Act is to increase the lending to the public-sector banks in the short-run and not *per se* to improve the health of a bank. **Table 2** lists summary statistics for these variables at the aggregate and by the ownership of the banks. A public-sector bank on average borrows more from the RBI and lends out more than a private and/or a foreign bank. On other hand, foreign banks are more healthy than that of a public-sector and/or private bank.

However, inspite of all these advantages there are a couple of potential limitations of the dataset (in terms of the banking information) that is worthy of mention: (a) there is no way to understand which bank is the main 'reference bank' for a firm. Therefore, I treat all the banks with equal importance; and (b) the dataset does not give the exact amount of loan that has been received by a firm from a particular bank. I believe this is not of such a great concern in my case, as I plan to utilize banks' borrowing from the RBI (and total loans and advances by a bank) in order to test for the mechanism through which ownership affects exports.

(ii) details about a firm's sources of borrowing. It gives detailed information on different types of borrowings (from banks and/or private financial institutions) by sources (domestic or foreign) done by firms. For example, borrowing from public-sector banks (domestic), borrowings from domestic private financial institutions. However, it does not differentiate between a private bank or NBFC.[18] It also gives information on the amount of loan taken in a currency other than Indian rupees, termed as foreign currency borrowing. The foreign currency borrowing is further divided into whether it is borrowed from banks (examples of such borrowings would be like loans taken from foreign banks, foreign currency loans taken from foreign branches of Indian banks, foreign currency loans from Indian banks, etc.) or other types of financial institutions (includes credit from official export credit agencies and commercial borrowings from the private sector window of multilateral financial institutions such as International Finance Corporation (Washington), ADB, CDC, etc.). **Table 3** calculates the average real credit borrowing (deflated by wholesale price index) by all firms (across the manufacturing sector) from different sources, public-sector banks, domestic private financial institutions (banks and NBFCs) and foreign borrowing for the years 2006-2009. It clearly shows that it is only in case of the public-sector banks that borrowing increased after the crisis, while for others it dropped.

[18] The borrowings from the domestic sources are further divided into secured and non-secured borrowing. When a firm borrows money from a bank (public-sector or private) and provides them security in form of some claim over assets in the event of a default, then such borrowings are termed as secured bank borrowings. A company may borrow loans from a single bank or a number of banks or from a syndication of banks; all of these are a part of secured bank borrowings. I use secured borrowings for the analysis. Putting both secured and unsecured borrowings also yields same result.

Figure 4 plots the average borrowing done by a Indian manufacturing firm (for all firms and further dividing it onto exporters and non-exporters) from four different sources - public-sector banks, domestic private banks, foreign banks, and foreign NBFCs.[19] **Panel A** of **Figure 4** plots the total borrowings for an average Indian manufacturing firm from a public-sector bank as opposed to all other types of financial institutions and banks (domestic private banks, foreign banks, and foreign non-banking financial corporations). The figure clearly highlights the differential pattern in borrowing – firm borrowings from all but public-sector banks dropped significantly in the post-2008 period. And, this is particularly true in case of exporters as shown by **Panel B** of **Figure 4**. On the other hand, **Panel C** of **Figure 4** which documents the borrowing pattern of an average non-exporting firm do not show any such pattern like that of an exporter.

Lastly, one more concern which should be addressed here before proceeding to my main estimations in the next section: how representative is the sample of firms of the total manufacturing sector export margins? To understand, I calculate a simple proportion of total exports of all the manufacturing firms in PROWESS to all Indian merchandise exports; the ratio ranges from around 55-60% (depending on the year). In terms of the number of exporters in my sample, it is about one-third of the sample of manufacturing firms analyzed. This seems to be a fairly reasonably picture in terms of the coverage of the exporting manufacturing firms by PROWESS. In terms of export flows, coke, refined petroleum and nuclear fuel sector have the highest exports followed by tobacco products, food products, textiles and beverages.[20]

In addition to this, the dataset rolls out information on a vast array of firm level characteristics regarding to the total sales, imports, cost, compensation (wages plus incentives), production factors employed, other kinds of expenditures, gross value added, assets and other important firm and industry characteristics. Majority of the firms in the data set are either private Indian firms or affiliated to some private business groups, whereas a small percentage of firms are either government or foreign-owned. The database covers large companies, firms listed on the major stock exchanges and many small enterprises. Data for big companies are worked out from balance sheets while CMIE periodically surveys smaller companies for their data. The variables are measured in Indian Rupees (INR) million, deflated to 2005 using the industry-specific Wholesale Price Index. The dataset accounts for more than 70% of the economic activity in the organized industrial

[19] Unlike the data on bank level borrowings, where I could differentiate between a public-sector and domestic private bank, the firm level borrowing data does not allow me to seggregate the private sources into private banks and other NBFCs. Nonetheless, it still gives a clear idea on the differential aspects of firm borrowing between public-sector, private-sector and foreign sources.

[20] **Figure A.3** compares average real exports, divided into four different size quartiles, across all manufacturing sectors. The decline in export earnings was 23.8% for 1st quartile, 24.3% for 2nd quartile, 17% for 3rd quartile and 1.1% for 4th quartile of firms, respectively. On average, the drop in manufacturing export flows is 16.55% at the firm level (same as the overall economy). Overall, these diagrams indicate that the export growth computed from our sample of firms follows the macro-level Indian exports quite closely. **Figure A.4** shows India's total merchandise export flows along with other major destinations, E.U., U.S. and Asia, for the years 2006-2009. In this figure, I plot the aggregate export data from the UN-COMTRADE. As the figure shows, the growth rate of total manufacturing exports of India declined by around 17% for the year 2009, which is almost the same as the drop in global trade during the crisis period. Exports towards major destinations–such as E.U., U.S. and Asia–also declined during 2009, with the drop for Asia being the least. The drop in exports in 2009 is highest for the U.S. (10.65%), followed by the E.U. (7.39%) and Asia (1.31%). The RBI's report (2009) on trade balance also suggests that the export sector is hit quite badly, since a large proportion (nearly 40%) of Indian merchandise exports goes to the OECD countries.

sector, and 75% (95%) of corporate (excise duty) taxes collected by the Indian Government (Goldberg et al., 2010).

CMIE uses an internal product classification that is based on the HS (Harmonized System) and NIC schedules. There are total of 1,886 products linked to 108 four-digit NIC industries spanning the industrial composition of the Indian economy. The US manufacturing data contain approximately 1,500 products as defined by the Standard Industrial Classification (SIC) codes; therefore, the definition of product in this case is slightly more detailed. Around 20% of the firms in the data set belong to the chemical industries followed by food products and beverages (12.81%), textiles (10.81%) and basic metals (10.46%). **Table 16** (**Appendix C**) presents summary statistics at the firm level according to their banking relationships. The numbers show that the largest exporter is connected to all the three types of banks. On the other hand, firms with highest domestic sales are connected to only domestic banks (public-sector and private). Firms connected to foreign banks have significantly higher median sales, exports, domestic sales and assets.

4 Bank Ownership and Firms' Export

4.1 Firm-Bank level Regressions: Utilizing Banking Relationships

Empirical Strategy This section investigates the direct role of bank ownership on a firm's performance. In particular, I study this effect through the use of the crisis of 2008-09 to estimate the differential effect of the banking ownership on firms' export flows. I start by exploiting the firm-bank relations. I follow Coleman and Feler (2015) and use a simple interaction term between a crisis dummy (D_{crisis}) and a dummy indicating whether a firm is a client to a public-sector bank or not as my variable of interest. I use the following simple OLS reduced form equation:

$$x_{ijt} = \gamma_1(D_{crisis} \times PSB_{fb,<2008}) + bankcontrols_{t-1} + \alpha_{jt} + \delta_i + \epsilon_{it} \tag{1}$$

x_{ijt} is either the intensive or extensive margin of trade for an Indian manufacturing firm i belonging to industry j at time t. D_{crisis} is an indicator of the financial crisis. It takes value 1 if the year $\geq$ 2008. Now, given the *Bank Nationalization Act 1969,* which would explicity take care of the public-sector banks, lending from the Central Bank can be assumed to be disproportionately higher for the public-sector banks as shown in **Figure 2**. And, firms connected to those banks may be differentially affected than others.

$PSB_{fb,<2008}$ takes a value 1 if a firm (f) is a client to a public-sector bank (b). However, banking relationships are endogenous. Firms can switch to a public-sector bank, especially during the crisis to avoid the risk associated with a private and/or foreign bank. So, $PSB_{fb,<2008}$ takes a value 1 if a firm is client to

a public-sector bank in any year before the crisis.[21] Therefore, the interaction term, $D_{crisis} \times PSB_{fb,<2008}$, measures the impact of bank ownership given that there is a differential treatment during the crisis as a result of the specific explicit guarantee clause in the Indian Banking Act. In other words, γ_1 measures the relative difference between firms' export performance when it is connected to a public-sector bank vs. a private and/or foreign bank. A key assumption for my identification strategy to be valid is that the cross-sectional differences in aggregate lending by the Central Bank of India (to the banks) are driven by differential guarantee provided by the Banking Act due to their ownership patterns, but uncorrelated with unobserved firm characteristics that can affect credit demand and exports during the same period. My coefficient of interest is γ_1; I expect $\gamma_1 > 0$. Firms having relationship with public-sector bank(s) are expected to have higher gains from trade than firms connected with private and/or foreign firms. A negative γ_1 would say the opposite.

It is true that the relationship between a firm and a bank even before the years of the crisis is not random. There are several reasons why a bank(s) choose a firm(s) to provide credit. For example, size of a firm. But, my goal here is to control for the fact that the relationship (between a firm and a bank) is not influenced due to the crisis. The matching can happen for any other reason(s) than the crisis. However, I control for all the other possible reasons of the matching and the benchmark result remains the same. I explain this in detail later.

Another important issue which can possibly bias my estimates from above equation is the issue of multiple banking relationships of firms. As the summary statistics show, the mean and median number of banking relationships of an Indian manufacturing firm is 5 and 4, respectively. Therefore, restricting the dataset to firms only having single banking relationship forces me to drop around 95% of the observations leading to a potential loss in external validity. Therefore, to control for the multiple banking relationships of the firms, I use firm fixed effects, δ_i, along with clustering of standard errors at the bank level. Ongena et al. (2015) argues that firm level fixed effects can only be used when firms have multiple banking relationships. Presence of firm fixed effects will also control for unobservable firm characteristics that might influence a bank to choose a firm as its client. Khwaja and Mian (2008) and Jimenez et al. (2014) point out that once the firm level fixed effects are controlled for, the key firm level characteristics that influence the loan demand has only a minor impact on the estimated coefficients. I also explicitly interact firm fixed effects with bank level characteristics to control for such issues.

Additionally, I use interaction of industry fixed effects at the most disaggregated level (4-digit) and year fixed effects, α_{jt}, to control for other simultaneous factors that may affect the export flows of a firm, such

[21] I check for the robustness of the results by fixing the year of the relationship of a firm with the bank; the results turn out to the same. Specifically, I choose if a firm is client to a public-sector bank in 1999-00. In this case, $PSB_{fb,<2008}$ takes a value 1 if the year is only 1999-00. Since I use only the year 1999-00 as the representative year, I loose a lot of observations, but the results are still the same. I also experimented with years before 2006, but the results continue to be the same.

as any fiscal policy considerations, drop in demand for products due to the crisis[22], industry exposure of banks, etc. For example, some banks can choose to give credit only to certain set of industries. *bankcontrols* contain age, age squared and size of a bank. I use total assets of a bank in real terms at $(t-1)$ period as its size indicator.

However, one should still be careful in interpreting the basic estimates as conclusive evidence of the causal effect of the banking ownership on the export patterns between firms connected to public-sector banks and not because of the following couple of reasons: (a) omitted variable bias; and (b) differential time trends. We address the former by sequentially adding various other observable and unobservable characteristics and its interaction with the $PSB_{fb,<2008}$ dummy to my baseline specification. As for the latter one, I show that the two groups of firms (firms connected to public-sector banks and which are not) are not on different time trends in the pre-crisis period through some checks explicitly in the following section.

Were the Firms with Different Banking Relationships (Public-sector and No Public-sector) on Different Pre-Crisis Time Trends? Before proceeding to the main estimations, one needs to address an important issue which is crucial for understanding the results: whether firms connected to public-sector banks and not were on different trends before the crisis? In other words, are there any significant differences in export patterns for these two sets of firms (according to their banking relationships) which just got amplified as a result of the crisis? In order to understand whether such is the case or not, we use pre-crisis data from 2000 to 2007 to estimate differential time trends in outcomes (both intensive and extensive margin of exports) for firms connected to public-sector banks and not. Results are reported in **Table 4**. First, I estimate a constant linear time trend model while allowing for an interaction of the constant linear trend with the $PSB_{fb,<2008}$ dummy. Second, we estimate a model where we replace the linear time trend with a series of year dummies (for the pre-crisis period) and include in the regression of each of these time dummies with the $PSB_{fb,<2008}$.

Columns (1) – (3) use natural logarithm of export earnings by a firm, whereas columns (4) – (6) use exporter (a dummy variable) as the dependent variable, respectively. The estimates from columns (1) – (2) and (4) – (5) suggest that there is a time trend in the export pattern, but this trend is identical for firms connected to public-sector firms and not. The estimated coefficient on the interaction of the time trend and year dummies with the $PSB_{fb,<2008}$ dummy is practically zero in all the cases. It should also be noted that some of the interaction terms in columns (2) and (4) are positive and others are negative, thereby lacking any consistent pattern. I, therefore cannot reject the hypothesis that all the interaction terms are jointly equal to zero. I conclude that both groups of firms were on a similar time trend in terms of their export patterns in the years prior to the crisis.

[22] I also explicitly control for demand shocks.

Next, in columns (3) and (6), I run a placebo test with detailed estimates of the timing of changes in both margins of trade. I follow Branstetter et al. (2006) and adopt the following methodology. I use an ex-ante ex-post approach to prove that there were no anticipatory effects in terms of the utilization of this specific clause in the Banking Act for firms connected to public-sector banks. It could be possible that some of the firms connected to public-sector banks were getting more loans as compared to firms connected to other banks prior to the crisis and this could have created a difference in the export earnings before the crisis and post-2008 difference was just a mere continuation. I argue that this is not the case.

The $D_{crisis-2}$ dummy is equal to one for all years that predate the crisis of 2008 by two or more years and is equal to zero in other years. $D_{crisis-1}$ is a dummy which is equal to one for the year preceding the crisis. On the other hand, '$D_{crisis+1}$' and '$D_{crisis+2}$' are two dummies which are equal to 1 for the years 2009 and 2010, respectively. There is no dummy for the year for the year of the crisis, i.e., 2008. All the other coefficients provide estimates relative to that year. The result indicates that the coefficients on the dummies for the years prior to the crisis fails to show any evidence of a significant differential pattern in exports prior to the crisis for firms connected to the Govt.-owned banks and not. For example, the coefficient on the $D_{crisis-2}$ show that the export earnings of a firm connected to a public-sector bank is no different than a firm not connected to a public-sector bank relative to the year of the crisis. On the other hand, the coefficients of the interaction terms of $D_{crisis+1}$, $D_{crisis+2}$ and $PSB_{fb,<2008}$ are positive and significant. This implies that there is a difference in the export earnings between the firms connected to public-sector banks and not after the crisis. In other words, firms connected to public-sector banks earn more from their exports in comparison to firms connected to other types of banks.

Results Having established that I am not comparing two completely different set of firms, I now turn to the results of my benchmark estimations. Estimates are reported in **Table 5**. Columns (1) – (4) regress firm level export flows or the intensive margin of trade on the interaction term $D_{crisis} \times PSB_{fb,<2008}$ controlling for firm fixed effects, interaction between bank fixed effects and year trends[23] with interactions between industry fixed effects (5-digit) and year trend in column (1), interactions between industry fixed effects (2-digit) and year fixed effects in column (2), interactions between industry fixed effects (3-digit) and year fixed effects in column (3), and interactions between industry fixed effects (4-digit) and year fixed effects in column (4). My diff-in-diff estimates show that the differences between export sales of a firm connected to a public-sector bank as compared to other types of banks is positive and significant. A firm connected to a public-sector bank earned about 8% more from export sales as compared to a firm connected to private and/or foreign bank.

One important issue which needs to be addressed immediately is the fact that the borrowing pattern of

[23] The interactions between bank fixed effects and year trends will additionally control for any unobservable characteristics which may drive the export patterns of the firms.

different types of banks might be different in the pre-crisis period. In other words, there might be pre-trends which can possibly influence the results. In order to control for such an issue, I interact the year fixed effects with the public-sector bank dummy, $PSB_{fb,<2008}$ in column (6). My estimate remains significant and stable. **Figure 5** plot the coefficients (γ_1 s) for the years 2004-2010.[24]

The plotted coefficients illustrate that the difference between the firms connected to public-sector banks and not in terms of export earnings is not significantly different from zero before the crisis of 2008. In other words, the export earnings rises differentially for firms connected to public-sector banks on and after 2008. In particular, it took a sharp rise in the year following the year of the crisis and continued to be significantly different from zero. However, one might argue that there is a 'bump' in the year preceding the crisis i.e., 2007, but the estimate still remains indistinguishable from zero; it only starts to significantly different from zero from the year 2008. This is also shown in my exercises in **Table 4** – the interactions between the year trends before 2008 with $PSB_{fb,<2008}$ does not produce any significant estimates suggesting that there is no categorical difference between the firms connected to public-sector banks and not in terms of export earnings.

Column (6) focuses only on sectors which are highly dependent on external finance. I use total borrowing by a firm as an indicator for dependent on external finance. An industrial sector which borrows more than the median borrowing of the entire manufacturing sector is classified as sectors which are highly dependent on external finance. However, I do not find any significantly different effect for firms belonging to high-financially dependent sectors.

Next, I use extensive margin of trade as the outcome of interest in columns (7) and (8). I do not find any effect of the interaction between bank ownership and crisis dummy on the extensive margin of trade. Current research on 2008–09 crisis show us that changes in trade margins due to the crisis of 2008-09 is explained by intensive margin rather than extensive margin (Levchenko et al., 2010). I also happen to find the same.

Table 6 presents a series of robustness checks of my benchmark findings. I start by using matching methods in Column (1). I compare firms using the characteristics (size, age) of their respective banks and their corresponding industry and report the differences in their export earnings. Altering the estimation method does very little to my benchmark estimate; it continues to be positive and significant. Even though I control for firm fixed effects, my estimates could still be affected due to the following problem: foreign banks or private banks that rely on international funding may lend to different types of firms in which case measuring the true impact of the shock on the real economy may require accounting for firm fundamentals. In other words, the variation in credit lending across these three types of banks can be driven by demand. To control

[24] I have used 2008 as the reference period when plotting the coefficients. The results or the figure is unaltered with the change in the reference period. For example, if I set the coefficient to 0 just before the crisis (in 2007), the result does not change qualitatively.

for such issues, I interact one key firm characteristic (measured through firm sales) with $PSB_{fb,<2008}$, and firm fixed effects with $PSB_{fb,<2008}$ in columns (2) and (3), respectively. The coefficient of interest continues to remain positive and significant.

The Khwaja-Mian (2008) approach that my estimates rely on is based on the assumption that credit from different banks are perfectly substitutable. And, as a result of demand shocks, in expectation, credit taken from all banks are affected proportionally. Now, one might possibly argue that demand shocks no longer affect banks proportionally. Suppose firms use private banks to fund for export activity and the public-sector banks to fund working capital. If the demand for exports drops, then will so the demand for credit from private banks. In order to control for such issues, I use firm-bank fixed effects interacted with year trends with clustering at firm-bank level in column (4). My estimate continues to be stable and close to my benchmark finding.

As highlighted before, the Khwaja-Mian (2008) approach also controls for the multiple banking relationships by clustering at the bank level and dropping firms with multiple banking relationships from my dataset will lead to violation of external validity theorem as I need to give away around 95% of my observations. However, to somehow get around this issue I use firms which have banking relationships with one type of bank in column (5). For example, in my restricted sample firms have multiple banking relationships, but all the banks are of the public-sector type or domestic private or foreign. Using this sample helps me to overcome the external validity problem by a significant margin; my restricted sample is now about 25% of my total observations. The $RR_t \times PSB_{fb,<2008}$ term remains qualitatively the same, but different quantitatively; the point estimate drops a little.

Lastly, I control for export demand in column (6). The global financial crisis led to a huge drop in the demand for trade. According to the estimates of WTO (2010) and the World Bank (2010) the real global output declined by 2.2%, whereas the real global trade had the same fate, but by more than five times of the global output. The collapse in global trade by over 17% between the second quarter of 2008 and the second quarter of 2009 is one of the most dramatic features of the recent "Great Recession." And, it could be possible that firms connected to public-sector banks were less exposed to trade before the crisis than the borrowers of the domestic private and foreign banks. This would mean that the results then will only reflect the differences in the unobservable demand for exports across firms, rather than the causal effect of the differences in bank behaviour.

Unfortunately, my current firm level dataset does not provide firm-specific trade destinations. To overcome this limitation, I complement my firm level dataset with destination-specific product-level trade flows from INDIA TRADES in order to utilize the variation across destinations. INDIA TRADES provides data for trade flows at the most disaggregated level, HS six digit level. I match the product level data, belonging to respective industries, using a National Industrial Classification (NIC) concordance code with the firms of

those sectors at 4-digit level (which is my firm level dataset). For example, the export flows of "shirt" are matched with a firm belonging to textile sector (2004 NIC 17). The main purpose of matching these two data sets is to create a measure of demand shock, which varies according to industry–time–country.

It is defined as the share of exports of an industrial sector or product category directed towards countries affected by the crisis (the US and/or the EU) to the total exports of that sector. For example, let's consider the *Textiles* sector. The 'demand shock' index for the *Textiles* sector, say for the U.S., would be total amount of textile exports to the U.S., relative to the total exports of *Textiles.* To elaborate, I write my measure of 'demand shock' in the following way:

$$demandshock^{d}_{jt} = \frac{exports^{d}_{jt}}{exports^{total}_{jt}} = \frac{exports\ to\ destination\ d(=US\ orEU)\ at\ time\ t\ for\ product\ j}{exports\ to\ the\ world\ at\ time\ t\ for\ product\ j}$$

This proportion would give us an idea about the extent of demand prevailing for any product categories in a crisis-affected zone. In other words, this measure would tell me how much a certain product is exposed to a crisis-affected zone relative to the total demand for that product. A primary concern with this 'demand shock' index is the potential endogeneity or problem of reverse causality. There is a certain probability that the contemporaneous drop in total exports of a firm (for a certain product category) due to some other reasons—say, increase in transportation cost at the same time (which is nothing to do with the crisis)—may also influence the drop in the export flows rather than an actual drop in demand for that product in the crisis-affected zone. To avoid that such factors do not play a role in the estimations, I compute an average of the 'demand shock' index using data for the pre-crisis years, 2000 and 2001 to create a potentially more clear and exogenous measure of the 'demand shock'. . So, in effect, the 'demand shock' measure that I use in my estimations goes as follows:

$$demandshock^{d}_{j,1999-2000} = Avg(\frac{exports^{d}_{j,1999-2000}}{exports^{total}_{j,1999-2000}})$$

$$= Avg(\frac{exports\ to\ destination\ d(=US\ orEU)\ at\ 1999\ and\ 2000\ for\ product\ j}{exports\ to\ the\ world\ at\ 1999\ and\ 2000\ for\ product\ j})$$

This is arguably a more exogenous measure and will potentially subvert some of the problems relating to the issue of reverse causality and produce clear and true estimates of the effect of the demand shock related to the 2008–09 crisis. The 'demand shock' index now varies across industry j and destination d (not time t) and is interacted with the 'crisis dummy' or D_{crisis} (takes a value 1 for the years $\geq$ 2008) – $D_{crisis} \times demandshock^{d}_{j}$. Finally, it should be worth mentioning here that I assume changes in the 'demand shock' ($demandshock^{d}_{j,1999-2000}$) reflect average change in aggregate demand conditions in the US and the EU. I

report the results for 'demand shock' in case of the US; the results are qualitatively the same if I use EU instead or put US and EU together. Demand shock has a negative and significant effect on the export flows of the Indian manufacturing firms. But, the effect on exports due to differences in bank ownership continues to be unaffected; it remains positive and significant. This result highlights that overall effect of the crisis on export earnings is negative, and it is driven by the 'demand shock'. But, the firms which were connected to the public-sector banks were not adversely affected due to the fall in the supply of finance. This implies that the firms who were connected to other types of banks got adversely affected both from the 'demand shock' and supply of finance (due to the ownership pattern of banks to which they were connected).

4.2 Firm-Bank level Regressions: Utilizing Balance Sheets of Banks – Testing for the Mechanisms

Empirical Strategy Utilizing banking relationships is important to establish a causal effect of the bank ownership on firm level export flows, but it may not clearly address the following concern: channel through which bank ownership affects the real economy. In other words, whether it is the differential treatment by the RBI as a result of their ownership or is it the health of the banks that led to this difference in exports between types of firms (categorized according to their banking relationships)?. The uniqueness of the dataset allows me to test for the channel by using direct information on the amount of borrowings done by a bank from the RBI and health indicators for a bank.[25]

Commercial banks, as a result of the crisis, will resort to the Central Bank. However, as a result of the *Bank Nationalization Act 1969,* some banks, the public-sector ones will be able to borrow more than the others. And, the firms attached to these banks may be differentially affected. I use information on borrowing from the Central Bank (by the commercial banks) as a possible indicator of this differential treatment (by the Central Bank) during the crisis. To clearly understand whether differential borrowing by the banks affected firms' performance differentially, I use the following fixed effects type of OLS estimation to establish a cleaner causal effect of the bank ownership:

$$\begin{aligned} x_{ijt} &= \gamma_1(D_{crisis} \times B^{CB}_{b,<2008}) + \gamma_2(D_{crisis} \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}) + \\ & \quad bankcontrols_{t-1} + \alpha_{jt} + \delta_i + \epsilon_{it} \end{aligned} \tag{2}$$

$B^{CB}_{b,<2008}$ is the amount of borrowing done by a commercial bank b before 2008 from the Central Bank of India (CB). **Figure 2** suggests that there has been a differential trend in the borrowing from the Central

[25] As indicated previously, the dataset also provides information on the total amount of loans and advances done by a bank. This is also a direct result of the kind of advances or help the commercial banks got from the Central Bank of India. I have also used this for robustness check and results remain the same. More on this later.

Bank after the crisis for the public-sector banks, while the pre-trends was similar. This is due to the implicit and explicit guarantee by the Govt. of India that it will especially take care of the public-sector banks in the event of any crisis (Acharya and Kulkarni, 2016). However, this type of guarantee can make the borrowing by the commercial banks from the Central Bank during the crisis endogenous and therefore could overestimate the effect of bank ownership on firm level exports. In order to potentially subvert this problem, I use average of the borrowings by a bank from the Central Bank of India during the years 2000 and 2001 as a proxy for the borrowing of the years 2008, 2009 and 2010.

My main variable of interest is the double-interaction term, $D_{crisis} \times B^{CB}_{b,<2008}$. It estimates the effect of borrowing by a bank (from the Central Bank) during the crisis on a firm's exports given that the firm is not connected to a public-sector bank(s), i.e., connected to other types of banks, such as the private and/or foreign banks. In other words, it estimate the impact of bank ownership on a firm's exports when the bank is not publicly-owned. Therefore, I expect $\gamma_1 < 0$.

My other variable of interest is the triple interaction term $D_{crisis} \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$. It estimates the effect of the crisis of 2008-09 on a firm's export flows when a firm banks with a public-sector bank. Therefore, my other coefficient of interest is γ_2 and I expect γ_2 to be non-significant. In addition to the interaction between industry and year fixed effects, α_{jt}, I also use interaction between bank fixed effects and year trends to control for any bank unobservables that may influence firm level export margins.

Results Results are reported in **Table 7**. Column (1) estimates the effect of the bank ownership through the bank borrowing channel (from the Central Bank) controlling for firm fixed effects, year fixed effects, interaction of bank fixed effects and industry fixed effects (5-digit) with a year trend. My estimates show that the firms not connected to public-sector banks experience a drop of about 16.6% in their exports sales as a result of crisis. Columns (2), (3) and (4) substitute interaction of industry fixed effects with year trend with interaction of year fixed effects and industry fixed effects at 2-digit, 3-digit and 4-digit level, respectively. The coefficient on $D_{crisis} \times B^{CB}_{b,<2008}$ is negative, robust and significant. Column (5) replaces $B^{CB}_{b,<2008}$ with $B^{CB}_{b,00-07}$. In particular, I use the average of the bank borrowings from the Central Bank for the years 2000 to 2007 to check whether there is anything specific for the years 2000 and 2001 that is driving the result. I do not find any support for such conjecture.

Column (6) focuses on firms belonging to the high-financially dependent sectors. The negative effect on the firms not connected to public-sector banks continues to be significant, but not significantly different from the aggregate estimates. On average, a firm not connected to a public-sector bank saw a reduction in its export flows or intensive margin of trade of about 8.2–16.7%. Interestingly, the firm level estimates are very close to the overall drop in India's export flows during the crisis, which is around 16-17%. On the other hand, I find no effect on the firms connected to the public-sector banks. I attribute this finding as an effect

of the disproportionate increase in the flow of money to the public-sector banks from the Central Bank due to the explicit guarantee provided during the crisis. This led to an increase in the credit supply to the firms which are connected to those and it mitigated the effect of the crisis through supply of finance channel. In other words, the public-sector banks played a counter-cyclical role.

Columns (7) and (8) use the extensive margin of a firm as the dependent variable. Like before, I find no effect on the exit probabilities of the exporters. Lastly, I use domestic sales in columns (9) and (10) as the dependent variable to check any differential effect of bank ownership; column (9) runs it for the exporting firms, whereas column (10) does it for non-exporters. The negative effect continues to be significant only in case of exporters. But, the magnitude of the effect is significantly less, 3.8%, when compared with exports.[26]

Next, in **Table 9** I control for other possible effects and issues that may affect my estimates – differential trends of borrowing by the commercial banks from the Central Bank, different banks lending to different types of firms, lending pattern of banks correlated with firm characteristics. $D_{crisis} \times B^{CB}_{b,<2008}$ continues to be significant and negative suggesting stronger evidence that public-sector banks can act as a counter-cyclical mechanism. My conservative estimates suggest that the firms connected to a foreign and/or private banks register a drop of about 6.8–8.7% drop in export sales as a result of the drop in credit supply during the crisis of 2008-09. And, the drop in credit supply happened because of the ownership of the banks to which these firms are connected. Columns (5) and (6) control for other bank health characteristics, such as operating profits to working funds ratio and return to assets. My benchmark result does not change. I repeat the specifications of columns (2) – (4) in columns (7) – (9) but by replacing the dependent variable to extensive margin of trade. I continue to find no effect of bank ownership on the extensive margin of trade.[27]

Lastly, I use the profitability ratio of the banks as a placebo to show that this effect on export flows is mainly due to this increase in short-term lending by the Central Bank (to the banks), which was the primary purpose of this clause in the Banking Act and per se not to improve the financial health of the banks (which is more of a long run objective). I use operating profits to working funds ratio as the indicator for health of banks. Results are reported in **Table 9**. I find no effect of the financial health of the banks on either of the export margins of trade and domestic sales.

Overall, by comparing credit received and/or provided by different banks with differential exposure to financial shocks (where foreign banks have the most exposure and public-sector banks the least), my estimates provide evidence that possible international exposure of the domestic private banks may have acted as a propagation mechanism during the global financial crisis (Cetorelli and Goldberg, 2012) and foreign banks transmitted shocks across borders through their local affiliates (Ongena et al., 2015). This exposure to

[26] I also use total loans and advances by the banks ($LA_{b,<2008}$) in place of borrowings from the Central Bank in **Table 17** (**Appendix C**) as a robustness check. I find similar negative effects of not having a banking relationship with a public-sector bank. A firm when not connected to a public-sector bank suffers a drop of around 14–16% drop in their export flows. I continue to find no effect on the extensive margin of a firm with similar effect in case of domestic sales, i.e., the effect is concentrated only for exporters.

[27] My results are same if I substitute Central Bank borrowing by banks with total loans and advances.

foreign funding interacted with the discretionary approach undertaken by the Central Bank of India during the crisis has had a significant negative effect on the export flows of the firms connected to these type of banks. In other words, it is the disproportionate transfer from the Central Bank to the public-sector banks, after the crisis hit the Indian capital market, which resulted in no adverse effect for firms connected to those public-sector banks (possibly due to drop in credit supply).

I now utilize further heterogeneity within these three types of banks to understand which firms are more affected than others according to more finer categories of banking relationships? For example, does a firm's export flows dropped more when a firm is connected to a US based bank (such as, Bank of America) rather than a EU based bank (such as, Barclays)? or when a firm is connected to the biggest private domestic bank, ICICI, as opposed to other small private banks?

4.2.1 Heterogeneity Across Banks

Foreign Banks I start by looking at firms which are connected solely to foreign banks. Results are reported in **Table 10**. In other words, my treatment group is now all the domestic banks (putting together public-sector banks and domestic private banks into one group) and the control group is only the foreign banks in columns (1) and (2). My triple interaction term is now $D_{crisis} \times B^{CB}_{b,<2008} \times DB_{fb,<2008}$. $DB_{fb,<2008}$ takes a value 1 if a firm is a client to a domestic private bank and/or public-sector bank before the crisis years. These estimations will help understand whether foreign banks are one of the primary sources of the negative effect on the export flows of the firms. My estimate show that firms connected to the foreign banks suffered about 15.7% drop in export earnings as compared to firms connected to domestic banks. On the other hand, I do not find any effect on the firms connected to public-sector and/or private banks. This could be due to the following reasons: (a) either the positive effect of relationships with public-sector banks dominates over the negative effect of the private banks, or (b) the effect of the crisis on the private banks is limited to only a few, or (c) private banks did not suffer the liquidity crisis. I still do not find any effect on the extensive margin of trade.

Columns (3) – (7) compare the foreign banks by dividing them according to their origin of the parent bank. For example, 'Barclays Bank' is categorized as a European bank, whereas 'Bank of America' is classified as a US based bank. Additionally, I also classify banks into Japan based banks and Other banks (which combine banks from Canada, Middle East, Bangladesh, South Africa, etc.). In these columns, I only compare firms connected to foreign banks (as the control group) and public-sector banks (treated group), thereby leaving out the private banks from the estimations.

The results show that the negative effect on firms' export flows due to relationship with the foreign banks comes from the US based banks and banks from other regions and not the EU and Japan based banks. Firms connected with the former types of banks register a 17–21% drop in their exports. The financial crisis of

2008-09 originated in the US, therefore it is highly likely that the effect of the crisis on the US banks would be much higher than other foreign banks. Chakraborty (2018) also shows that during the crisis the exports of the Indian manufacturing firms are most affected (as a result of the drop in demand) when their trade destination is the US compared to EU.

Private Banks My control group is now only the domestic private banks (I leave out foreign banks from these estimations). That is, the double interaction term $D_{crisis} \times B^{CB}_{b,<2008}$ now estimates the effect of the bank ownership only when a firm is connected to private bank(s) in columns (8) and (9).

Ongena et al. (2015) show that firms in Eastern Europe are negatively affected when they are connected to domestic banks which rely on international funding. And, these are usually the major private banks. I follow Ongena et al. (2015) and compare the effects on exports when a firm in a client to a public-sector bank versus all other private banks and major private banks in India. On the other hand, Acharya and Kulkarni (2016) points out that three of the major private banks in India (HDFC, ICICI and AXIS) suffered heavily during the crisis as they were dependent on foreign sources of finance. In addition to these banks, I also include three other major private banks which have a share of more than 5% of all relationships with firms in the sample – IndusInd Bank, Kotak Mahindra Bank, and Yes Bank.

The estimates show that while there is no effect of the drop in credit supply on a firm's export flows when I use all private banks, but $D_{crisis} \times B^{CB}_{b,<2008}$ is significantly negative when firms are connected to the major private banks. Firms connected to the major private banks saw a drop of about 10% in their export earnings.

4.3 Firm Borrowing and Exports: Firm level regressions

As credit is an equilibrium outcome, outcomes from the supply side should match that of demand side. To check whether such is the case, I now utilize another unique feature of the dataset to exploit information on firm level credit borrowing from different sources. This particular aspect of the dataset has previously been used by Kapoor et al. (2017). PROWESS records detailed information on borrowing by firms across different sources - bank (public-sector) borrowings, borrowings from domestic private sources (banks and Non-banking Financial Institutions), borrowings from foreign sources, etc. For my purpose, I only use data on borrowings from public-sector banks and foreign sources and use the following reduced form using OLS fixed effects type of estimation:

$$x_{ijt} = \beta_1(D_{crisis} \times Borr_{i,PSB,00-01}) + firmcontrols_{t-1} + \theta_i + \alpha_{jt} + \epsilon_{it} \quad (3)$$

x_{ijt} is either extensive or intensive margin of export activity for firm i belonging to industry j at time t. D_{crisis} continues to be the indicator for financial crisis; takes a value 1 for the years $\geq$ 2008.

One of the crucial determinants of export performance of a manufacturing firm is the amount of credit received by that firm (Minetti and Zhu, 2011). However, in this particular case the source of finance matters as banks were differentially affected during the crisis due to their ownership. While estimating the above equation, I keep this in mind and compare the estimates of the effect of borrowings done by firms from the public-sector banks as opposed to foreign sources in order to test for the effect of bank ownership.

Borrowing is endogenous to the performance of a firm. For example, a firm experiencing a sudden decrease in demand for its goods (as it may happen during the crisis) may want to borrow more in order to keep the production going since the payment from the sale of goods are either low or would be late. And, this may possibly increase the demand for credit. On the other hand, a sudden decrease in the demand for its goods may as well decrease its demand for credit. Since there has been an increase in the flow of credit for public-sector banks due to the promise of explicit guarantee to be provided by the Central Bank of India, a firm would inadvertently go to a public-sector bank to borrow more. Borrowing from foreign bank(s) can therefore intensify the effect of the decline in credit supply on firms' export values. This type of events can establish a positive correlation between borrowing from domestic sources and exports, but not a causal one.

To potentially suppress these problems, I construct a 'Financial Fragility' index using borrowing pattern of the firms in the pre-crisis period. In particular, I use average borrowing by a firm i for the years 2000 and 2001 by calculating the following index: $Borr_{i,PSB,00-01} = Avg(Borr_{i,PSB,2000} + Borr_{i,PSB,2001})$. These years are significantly before the crisis, so borrowing patterns in those years should not be influenced by factors related to the 2008-09 financial crisis.[28] I use the average borrowings from the public-sector banks for the years 2000 and 2001 as a proxy for borrowings during the crisis period. Finally, $Borr_{i,PSB,00-01}$ takes a value 1 if the average borrowings by a firm i for the years 2000 and 2001 from public-sector banks is greater than zero.

The main variable of interest is the interaction term, $D_{crisis} \times Borr_{i,PSB,00-01}$. It estimates the difference in the effect on a firm's export flows when a firm is borrowing is from public-sector banks as opposed to foreign banks.[29] Therefore, β_1 establishes the effect on exports when a firm is borrowing from domestic sources or public-sector banks during the crisis compared to foreign banks. I expect that for an average Indian manufacturing firm, the effect of borrowing from public-sector sources is significantly higher for a firm than borrowing from foreign sources, therefore $\beta_1 > 0$. This is because the transmission mechanism of the increased lending from Central Bank during the crisis to the real economy only works when a firm is connected to a public-sector bank(s). I note that β_1 could have been more precisely estimated if I have

[28] I have also used borrowings at period $(t-1)$; the results are the same.

[29] I exclude domestic private for this analysis as the data does not allow to seggregate the borrowings from private banks and NBFCs.

used monthly/quarterly data of repo rates. Although, the Central Bank rolls out monthly/quarterly data for repo rates, the export data is given only on a yearly basis.

α_{jt} are interaction of industry-year FEs. These interaction terms control for all other possible industry-level effects that can influence the export flows of a firm. For example, the demand conditions in the export destinations of India. Chakraborty (2018) shows that drop in demand, especially in the US and the EU, led to a significant decline in exports of Indian manufacturing firms. The industry-year fixed effects will also control for import competition effects from other countries, such as China[30], any another special stimulus awarded for industry-level bodies/associations to help them during the crisis, any fiscal stimulus announced by the Govt. of India towards any sector, other kinds of financial dependence an industry has, etc. θ_i are firm level fixed effects and I cluster standard errors at firm level.

Table 11 reports the required result. Columns (1) – (2) use natural logarithm of exports as the dependent variable. Column (1) considers the case when a firm is borrowing from public-sector banks, whereas column (2) does the same but only in case of firms belonging to industries of high financial dependence. Again, I find significant evidence on firms' having higher export earnings when borrowing from public-sector banks than foreign sources. Columns (3) and (4) repeat the same exercise, but changing the dependent variable to extensive margin of trade. I continue to find no evidence even when looking at the demand side of the credit information for firms.

4.4 Other Effects

Given the consistent evidence on significant reduction in export flows for firms not connected to public-sector banks, it is also imperative to investigate about what happened to the other key characteristics of firms, namely the production factors and imports. Results are reported in **Table 12**. Following Chodorow-Reich (2014) and Cong et al. (2019), I start by looking at labour compensation. PROWESS is not suitable to understand the employment effects, as the number of employees data is not consistently reported both across firms and over time. But, the dataset routinely reports data on the total price of labour and can further be divided into managerial and non-managerial compensation. Therefore, I concentrate only on the intensive margin of employment effects. Columns (1) – (3) look at the effects on total labour, managerial, and non-managerial compensation. Firms which experience a drop in their exports either laid-off workers or paid less wages as a result of the crisis; both managerial and non-managerial workers suffered. But, the negative effect of the crisis on the non-managerial or unskilled or production workers is about 40% higher than that of managerial or skilled or production workers.

Column (4) substitutes labour by capital. I look at the amount of capital employed by a firm. Firms connected to domestic private and/or foreign banks reduces the amount of capital employed by firms by

[30] India and China are close competitors in certain products in the international markets, such as textile. Increase in demand for Chinese products could result in drop in demand for Indian products and this may adversely affect export flows.

15.5%. Next, in column (5) I use another important factor of production, raw material expenditure. I do not find any negative effect on use of raw materials by firms not connected to public-sector banks. Columns (6) – (9) explore the effects on different types of imports - capital goods, raw materials, stores and spares, and finished goods. I find significant negative effects only in case of raw materials or intermediate inputs; firms reduced their import of raw materials by around 16%.

These results portray two important implications: (a) banking relationships during the crisis not only matter in case of exports, but imports and use of productive factors as well; and (b) credit shortage may have reduced exports through drop in labour, capital, imported inputs.

4.5 Firm Characteristics

This section explores one important additional question: which type of firms were affected? **Table 13** slices the data according to different firm characteristics to investigate this question. I start by dividing the firms by size. I categorize firms into four different quartiles. based on the average assets before the crisis. A firm is classified in 1st quartile if the average assets of a firm for the years 2000-2007 is less than 25th percentile of the assets of the corresponding industry; a firm is in 2nd quartile if the average assets falls between 26th and 50th percentile of the assets of the industry to which the firm belongs, and so on. Columns (1) – (4) run the regressions for all the four quartiles. Like Chodorow-Reich (2014) and Ongena et al. (2015), I also find that it is the small and medium firms, which are most affected due to the crisis; in my case, as a result of not having banking relationships with public-sector banks.

Next, I classify firms according to its end use product: consumer durable, intermediate, basic, capital and consumer non-durable in columns (5) – (9) to check for the compositional effect. My estimates show it is the firms exporting intermediate and capital goods, which have had the highest drop in export flows; by 30% and 39%, respectively. My results are aligned with Levchenko et al. (2010) and Bems et al. (2010) who find that large changes in demand for intermediates significantly explain the reductions in both imports and exports. Columns (10) and (11) divide the firms according to their ownership: domestic and foreign. Both types of firms which are connected to private and/or foreign banks during the crisis suffered a drop in their exports with the foreign firms having the higher effect; average drop in exports during the crisis for a domestic firm was 12.3% against 21.5% for a foreign firm. The negative effect for a foreign firm was about 75% higher.

4.6 Credit Allocation

The objective of this section is to study how credit allocation was done across firms as a result of the specific clause in the Banking Act of 1969. In other words, what kind/type of firms got more loans from the public-sector banks? This is important to know, because if the firms that were not affected by the crisis due to

their connection with the public-sector banks are on average inefficient than the rest, then this may reinforce additional inefficiency in the economy through capital misallocation. To investigate such a question, the ideal is to have a firm-specific loan level data from their respective banks. As highlighted before PROWESS only gives information on total loans and advances by a bank and not firm-specific loans.

However, we know that PROWESS gives data on firm borrowing from different sources as utilized in Section 4.3. I exploit this particular dimension of the dataset to investigate credit allocation across firms during the crisis years. To this end, I estimate the following equation:

$$\ln(y_{it}) \quad = \quad \beta_1(D_{crisis} \times HighAPK_{i,00-07}) + firmcontrols_{t-1} + \theta_i + \alpha_{jt} + \epsilon_{it} \tag{4}$$

y is either total borrowing by firms or borrowing from public-sector sources or borrowing from other (domestic private and foreign) sources. $HighAPK_{i,00-07}$ takes a value 1 for firms which has average product of capital (APK) greater than the median average product of capital for the corresponding industry, but before the years of the crisis, i.e., between 2000 and 2007. APK is defined as the log of value added divided by fixed assets, and it is used as a proxy for marginal product of capital.[31] So, the estimated coefficient will be a relative effect. It will tell us how much amount of credit was given to firms who are above the median as opposed to those below the median based on firm level APK in the pre-crisis period. $\beta_1 > 0$ would imply firms with higher average product of capital got more loans, whereas $\beta_1 < 0$ would signify credit misallocation.

Results are reported in **Table 14**. Columns (1) and (2) use total borrowing by firms as the outcome variable. The estimated coefficient on the interaction between credit supply increase and initial average product of capital is negative and statistically significant. This indicates that during the crisis firms with lower pre-crisis average product of capital got more loans than the rest. Columns (3) and (4) substitute total borrowing by borrowing from public-sector sources and columns (5) and (6) use borrowing from other sources as the dependent variable. My point estimates show that the entire negative effect on total borrowing is driven by borrowing from public-sector banks and not any other sources. The estimated coefficients remain negative but increases significantly. The magnitude of the estimated coefficient indicates that firms with a one-standard deviation larger APK experienced a 50% lower increase in bank loans from public-sector sources during the crisis period.

Figure 6 confirms this fact by comparing the productivity distributions of firms having banking relationships with public-sector banks and no relationships with public-sector banks. I estimate productivity

[31] I have also used capital employed divided by total assets of a firm, and the results remain the same.

using Levinshon and Petrin (2003) methodology. A representative firm having relationship with public-sector bank(s) is on average 9% less productive than a firm which is a client to private and/or foreign banks. The productivity distribution of firms connected with public-sector banks has a long right tail and higher spread than the other type of firms. Combining both these results, I can possibly argue that because of the clause in the Banking Act it may have lead to significant reallocation of resources towards inefficient firms and this can create some sort misallocation within the economy in the future.

Raghuram Rajan in his 2013 Annual Andrew Crockett Memorial Lecture in Bank of International Settlements (BIS) points out that the types of unconventional monetary policies undertaken by the Central Bankers after the crisis of 2008-09 "has truly been a step in the dark". This is because these type of policies raise more questions than answers. The fundamental hope behind these policies are that as the price of risk is reduced, firms faced with lower cost of capital will have higher incentives to make real investments, thereby creating jobs and enhancing growth. He points out that there are two reasons for which these calculations can possibly go wrong: (a) absence of a well capitalized banking system or policy certainty, and (b) large reduction in the cost of capital for firms such that they prefer labour-saving capital investment to hiring labour. And, in case of India, the former applies aptly.

5 Conclusion

Using a matched firm-bank dataset I show that ownership of banks matters significantly for a firm's performance, especially an exporter. The effect of the ownership of banks also appear to be economically important both at the level of the firm and at the aggregate, but supposedly in opposite directions. A firm not connected to a public-sector bank during the crisis suffers about 7.7–39% drop in their export flows than firms connected to public-sector banks. This drop in export earnings is only significant for small and medium firms or firms belong to the lower-half of the size distribution who export intermediate and capital goods. Both domestic and foreign firms are affected during the crisis with the effect being 75% higher in case of the later. Second, the negative effect of the drop in credit supply on firms' exports is driven by firms which are connected to the major domestic-private banks and banks of US origin.

Third, the crisis of 2008-09 also led firms which are not connected to public-sector banks purge excess labour (more for production workers), employed less capital and imported intermediate inputs in their production. These results may also provide a partial explanation for job losses, if the lack of credit caused firms to purge excess labour more than they otherwise would. Lastly, I show that firms with lower average product of capital less than the median got more loans due to the selective nature of the monetary policy. This may infuse a certain level of inefficiency in the economy through misallocation of credit. This can result in low aggregate output per worker and TFP in the future.

My findings provide direct evidence for a new complementary channel which is bank ownership that

highlights the role of financial frictions in restricting the availability of credit to firms (Chavaa and Purnanandam, 2011; Coleman and Feler, 2015). Overall, my results suggest that the global integration of the financial sector can contribute to the propagation of financial shocks from one economy to another through the banking channel.

Interpreting the export performance of firms connected to public-sector banks a success is questionable as the relative stability and efficiency of public-sector banks relative to private and/or foreign banks appears doubtful. This is because there is no sign of superior stability or returns for public-sector banks in the period following the crisis. In addition, the perception that public-sector banks enjoy an implicit guarantee is a moral hazard that may limit the incentive to enhance efficiency and encourage excessive risk taking. This points to the desirability of scaling back implicit guarantees to the public-sector banks and in general whether by preventing them from becoming too large and connected to fail or by setting up more effective mechanisms for the orderly resolution of insolvent institutions.

References

Acharya, V., N. Kulkarni (2016). Government Guarantees and Bank Vulnerability During the Financial Crisis of 2007–09: Evidence from an Emerging Market. *Mimeo*

Acharya, V., G. Afonso, A. Kovner (2013). How Do Global Banks Scramble for Liquidity? Evidence from the Asset-Backed Commercial Paper Freeze of 2007. *Staff Report 623*, Federal Reserve Bank of New York, NY

Acharya, V., A. Das, N. Kulkarni, P. Mishra, N. R. Prabhala (2019). Anatomy of a Banking Panic. *Mimeo*

Aisen, A., R. Álvarez, A. Sagner, J. Turén (2013). Credit Contraction and International Trade: Evidence from Chilean Exporters. *World Development* 44 (April): 212–224

Alessandria, G., J. Kaboski, V. Midrigan (2010). The Great Trade Collapse of 2008-09: An inventory adjustment? *IMF Economic Review* 58 (2): 254–294

Amiti, M., D. Weinstein (2011). Exports and Financial Shocks. *The Quarterly Journal of Economics* 126 (4): 1841-1877

Amiti, M., D. Weinstein (2018). How Much Do Idiosyncratic Bank Shocks Affect Investment? Evidence from Matched Bank-Firm Loan Data. *Journal of Political Economy* 126 (2): 525-87

Baldwin, R., P. Krugman (1989). Persistent Trade Effects of Large Exchange Rate Shocks. *The Quarterly Journal of Economics* 104 (4): 635–654

Behrens, K., G. Corcos, G. Mion (2013). Trade Crisis? What Trade Crisis? *The Review of Economics and Statistics* 95 (2): 702–709

Bems, R., R., Johnson, K. Yi (2010). Demand Spillovers and the Collapse of Trade in the Global Recession. *IMF Economic Review* 58 (2): 295–326

Berman, N., J. Héricourt (2010). Financial Factors and the Margins of Trade: Evidence from Cross-country Firm-level Data. *Journal of Development Economics* 93 (2): 206–217

Bernanke, B., (1983). Non-Monetary Effects of the Financial Crisis in the Propagation of the Great Depression, *The American Economic Review* 73 (3): 257–276

Bertay, A.C., A. Demirgüç-Kunt, H. Huizinga (2012). Bank Ownership and Credit over the Business Cycle: Is Lending by State Banks Less Procyclical? *World Bank Policy Research Working Paper 6110*, World Bank

Berton, F., S. Mocetti, A. F. Presbitero, M. Richiardi (2018). Banks, Firms, and Jobs. *The Review of Financial Studies* 31 (6): 2113–2156

Blinder, A., M. Ehrmann, J. de Haan, D-J. Jansen (2017). Necessity as the Mother of Invention: Monetary Policy after the Crisis, *Economic Policy* 32 (92): 707–755

Bolton, P., H. Chen, N. Wang (2011). A Unified Theory of Tobin's q, Corporate Investment, Financing, and Risk Management. *The Journal of Finance* 66 (5): 1545–1578

Branstetter, L., R. Fisman, C. Fritz Foley, (2006). Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence from U.S. Firm-level Patent Data. *The Quarterly Journal of Economics* 121 (1): 321–349

Bricongne, J., L. Fontagné, G. Gaulier, D. Taglioni, V. Vicard (2012). Firms and the Global Crisis: French Exports in the Turmoil. *Journal of International Economics* 87 (1): 134–146

Bronzini, R., A., D'Ignazio (2017). Bank Internationalisation and Firm Exports: Evidence from Matched Firm-Bank Data. *Review of International Economics* 25 (3): 476–499

Buono, I., S. Formai (2018). The Heterogeneous Response of Domestic Sales and Exports to Bank Credit Shocks. *Journal of International Economics* 113: 55–73

Caggese, A., V. Cunat (2012). Financing Constraints, Firm Dynamics, Export Decisions, and Aggregate Productivity. *Review of Economic Dynamics* 16 (1): 177–193

Carvalho, D., (2014). The Real Effects of Government-Owned Banks: Evidence from an Emerging Market. *The Journal of Finance* 69 (2): 577–609

Cetorelli, N., L. S. Goldberg (2011). Liquidity Management of U.S. Global Banks: Internal Capital Markets in the Great Recession. *Journal of International Economics* 88 (2): 299–311

Chakraborty, P. (2018). The Great Trade Collapse and Indian Firms. *The World Economy* 41 (1): 100–125

Chakraborty, P., O. Raveh (2018). Input-Trade Liberalization, and the Demand for Managers: Evidence from India. *Journal of International Economics* 111: 159–176

Chaney, T. (2016). Liquidity Constrained Exporters. *Journal of Economic Dynamics and Control* 72: 141–154

Chava, S., A. Purnanandam (2011). The Effect of Banking Crisis on Bank-Dependent Borrowers. *Journal of Financial Economics* 99 (1): 116–35

Chodorow-Reich, G., (2014). The Employment Effects of Credit Market Disruptions: Firm-Level Evidence from the 2008-09 Financial Crisis, *The Quarterly Journal of Economics* 129 (1): 1–59

Chor, D., K. Manova (2012). Off the Cliff and Back? Credit Conditions and International Trade during the Global Financial Crisis. *Journal of International Economics* 87 (1): 117–133

Claessens, S., H. Tong, S.-J. Wei (2011). From the Financial Crisis to the Real Economy: Using Firm-Level Data to Identify Transmission Channels. *Journal of International Economics* 88 (2): 375–87

Cole, S., (2009). Fixing Market Failures or Fixing Elections? Elections, Banks and Agricultural Lending in India. *American Economic Journal: Applied Economics* 1: 219–250

Coleman, N., L. Feler (2015). Bank Ownership, Lending, and Local Economic Performance during the

2008–2009 Financial Crisis. *Journal of Monetary Economics* 71: 50–66

Cong, L. W., H. Gao, J. Ponticelli, X. Yang (2019). Credit Allocation Under Economic Stimulus: Evidence from China. *The Review of Financial Studies* 32 (9): 3412–3460

Crowley, M., X. Luo (2011). Understanding the Great Trade Collapse of 2008–09 and the Subsequent Trade Recovery. *Economic Perspectives* 35 (2): 44–70

Cull, R., M. S. Martinez-Peria (2013). Bank Ownership and Lending Patterns during the 2008–2009 Financial Crisis: Evidence from Eastern Europe and Latin America. *Journal of Banking and Finance* 37 (12): 4861–4878

Dinc, I. S., (2005). Politicians and Banks: Political influences on Government-owned Banks in Emerging Markets. *Journal of Financial Economics* 77: 453–479

Dixit, A. (1989). Entry and Exit Decisions Under Uncertainty. *Journal of Political Economy* 97 (3): 620–638

Eaton, J., S. Kortum, B. Neiman, J. Romalis (2016). Trade and the Global Recession. *The American Economic Review* 106 (11): 3401–3438

Eichengreen, B., P. Gupta (2013). The Financial Crisis and Indian banks: Survival of the fittest? *Journal of International Money and Finance* 39: 138–152

Feenstra, R., Z. Li, M. Yu (2014). Exports and Credit Constraint under Incomplete Information: Theory and Evidence from China. *The Review of Economics and Statistics* 96 (4): 729–744

Friedman, M., A. Schwarz (1963). *Monetary History of the United States,1867-1960.* Princeton University Press

Goldberg, P., A. Khandelwal, N. Pavcnik, P. Topalova (2010). Multiproduct Firms and Product Turnover in the Developing World: Evidence from India. *The Review of Economics and Statistics* 92 (4): 1042–1049

He, Z., I. G. Khang, A. Krishnamurthy (2009). Balance Sheet Adjustments in the 2008 Crisis. *IMF Economic Review* 58 (1): 118–156

Islam, S., R. Rajan (2011). Bank Lending and Monetary Policy Transmission in India. *International Journal of Economics & Business Research* 3 (5): 557–575

Ivashina,V., D. Scharfstein (2010). Bank Lending during the Financial Crisis of 2008. *Journal of Financial Economics* 97 (3): 319–338

Ivashina, V., D. Scharfstein, J. C. Stein (2015). Dollar Funding and the Lending Behavior of Global Banks. *The Quarterly Journal of Economics* 13 (3): 1241–81

Iyer, R., S. Lopes, J-L. Peydro, A. Schoar (2014). Interbank Liquidity Crunch and the Firm Credit Crunch: Evidence from the 2007-2009 Crisis. *The Review of Financial Studies* 27 (1): 347–372

Jiménez, G., S. Ongena, J-L. Peydró J. Saurina (2012). Credit Supply and Monetary Policy: Identifying the Bank Balance-Sheet Channel with Loan Applications. *The American Economic Review* 102 (5): 2301–26

Jiménez, G., A. Mian, J-L. Peydro, J. Saurina (2014). Local versus Aggregate Lending Channels: The Effects of Securitization on Corporate Credit Supply in Spain. Available at http://ssrn.com/abstract=1674828

Joseph, M., (2009). Global Financial Crisis: How was India Impacted? Prepared for presentation to *InInt-DIE Conference on Global Financial Governance – Challenges and Regional Responses*, September 3-4, 2009 in Berlin, Germany

Kalemli-Ozcan, S., H. Kamil, C. Villegas-Sanchez (2010). What Hinders Investment in the Aftermath of Financial Crises? Insolvent Firms or Illiquid Banks. *NBER Working Paper. 16528*, NBER

Kapoor, M., P., Ranjan, J. Raychaudhuri (2017). The Impact of Credit Constraints on Exporting Firms: Evidence from the Provision and Subsequent Removal of Subsidized Credit. *The World Economy* 40 (12): 2854–2874

Kee, H. L., C. Neagu, A. Nicita (2013). Is Protectionism on the Rise? Assessing National Trade Policies during the Crisis of 2008. *The Review of Economics and Statistics* 95 (1): 342–346

Khwaja, A., A. Mian (2006). Do Lenders Favor Politically Connected Firms? Rent Provision in an Emerging Financial Market. *The Quarterly Journal of Economics* 120: 1371–1411

—- (2008) Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market. *The American Economic Review* 98 (4): 1413–42

Klein, M. W., J. Peek, E. S. Rosengren (2002). Troubled Banks, Impaired Foreign Direct Investment: The Role of Relative Access to Credit. *The American Economic Review* 92 (3): 664–82

Kumar, R., M. Joseph, D. Alex, P. Vashisht, D. Banerjee (2009). Indian Economic Outlook: 2008-09 and 2009-10. *ICRIER Working Paper No. 234*, ICRIER, New Delhi

Levchenko, A., L. Lewis, L. Tesar (2010). The Collapse of International Trade during the 2008-2009 Crisis: In Search of the Smoking Gun. *IMF Economic Review* 58 (2): 214–253

Levinshon, J., A. Petrin (2003). Estimating Production Functions Using Inputs to Control for Unobservables. *The Review of Economic Studies* 70 (2): 317–341

Manova, K. (2013). Credit Constraints, Heterogeneous Firms, and International Trade. *The Review of Economic Studies* 80 (2): 711–744

Manova, K., S.-J. Wei, Z. Zhang (2015). Firm Exports and Multinational Activity under Credit Constraints. *The Review of Economics and Statistics* 97 (3): 574–588

Micco, A., U. Panizza (2006). Bank Ownership and Lending Behavior. *Economic Letters* 93 (2): 248–254

Mihaljek, D., (2010). Domestic Bank Intermediation in Emerging Market Economies during the Crisis: Locally-owned versus Foreign-owned Banks. *Contributed Papers for 'The Global Crisis and Financial Intermediation in Emerging Market Economies', BIS Papers No 54*

Minetti, R., S. C. Zhu (2011). Credit Constraints and Firm Export: Microeconomic Evidence from Italy. *Journal of International Economics* 83 (2): 109–125

Mohan, R., (2008). Global Financial Crisis and Key Risks: Impact on India and Asia. *Speech Delivered for IMF-FSF High-Level Meeting on the Recent Financial Turmoil and Policy Responses, Washington DC, USA*

Moreno, R., (2010). Central Bank Instruments to Deal with the Effects of the Crisis on Emerging Market Economies. *Contributed Papers for 'The Global Crisis and Financial Intermediation in Emerging Market Economies', BIS Papers No 54*

Muûls, M., (2015). Exporters, Importers, and Credit Constraints. *Journal of International Economics* 95: 333–343

Ongena, S., J.-L. Peydro, N. van Horen (2015). Shocks Abroad, Pain at Home? Bank-Firm-Level Evidence on the International Transmission of Financial Shocks. *IMF Economic Review* 63 (4): 698–750

Pandit, B. L., P. Vashisht (2011). Monetary Policy and Credit Demand in India and Some EMEs. *ICRIER Working Number 256*, ICRIER, New Delhi

Paravisini, D., V. Rappoport, P. Schnabl, D. Wolfenzon (2014). Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data. *The Review of Economic Studies* 82 (1): 333–359

Peek, J., E. S. Rosengren (1997). The International Transmission of Financial Shocks: The Case of Japan. *American Economic Review* 87 (4): 495–505

—- (2000). Collateral Damage: Effects of the Japanese Bank Crisis on Real Activity in the United States. *American Economic Review* 90 (1): 30–45

Rajan, R., (2009). Asia and the Global Financial Crisis: A Broad Overview. *ISAS Insights 76*, Institute of South Asian Studies, Singapore

Rajan, R., L. Zingales (1998). Financial Dependence and Growth. *The American Economic Review* 88 (3): 559–586

Rajan, R., (2013). A Step in the Dark: Unconventional Monetary Policy After the Crisis. *Andrew Crockett Memorial Lecture*, BIS, Basel, 23 June

Reserve Bank of India (2009). Macroeconomic and Monetary Developments, First Quarter Review 2008-09, July 27, 2009, Mumbai

Sapienza, P., (2004). The Effects of Government Ownership on Bank Lending. *Journal of Financial Economics* 72: 357–384

Schnable, P., (2012). The International Transmission of Bank Liquidity Shocks: Evidence from an Emerging Market. *The Journal of Finance* 67 (3): 897–932

Sengupta, A., (2009). India's Tryst with the Global Financial Crisis. *Review of Market Integration* 1 (2): 171–197

Sinha, A., (2010). Impact of the International Banking Crisis on the Indian Financial System. *Contributed Papers for 'The Global Crisis and Financial Intermediation in Emerging Market Economies', BIS Papers*

No 54

Subbarao, D., (2009a). Impact of the Global Financial Crisis on India Collateral Damage and Response. *Speech delivered at the Symposium on the Global Economic Crisis and Challenges for the Asian Economy in a Changing World*, Organised by the Institute for International Monetary Affairs, Tokyo on 18 February, available at <http://www.rbi.org.in/ scripts/BS_SpeechesView.aspx?Id=410>

—-, (2009b). Third Quarter Review of Monetary Policy 2008-09. available at <http://www.business-standard.com/general/pdf/rbi_270109_01.pdf>

Viswanathan, K. G., (2010). The Global Financial Crisis and its Impact on India. *Journal of International Business and Law* 9 (1):1–22

World Bank (2010). Global Economic Prospects 2010: Crisis, Finance and Growth. Washington DC: World Bank

World Trade Organization (2010). Trade Value Growth Slows in the Third Quarter of 2010. WTO Press Release December 1. Geneva: Switzerland

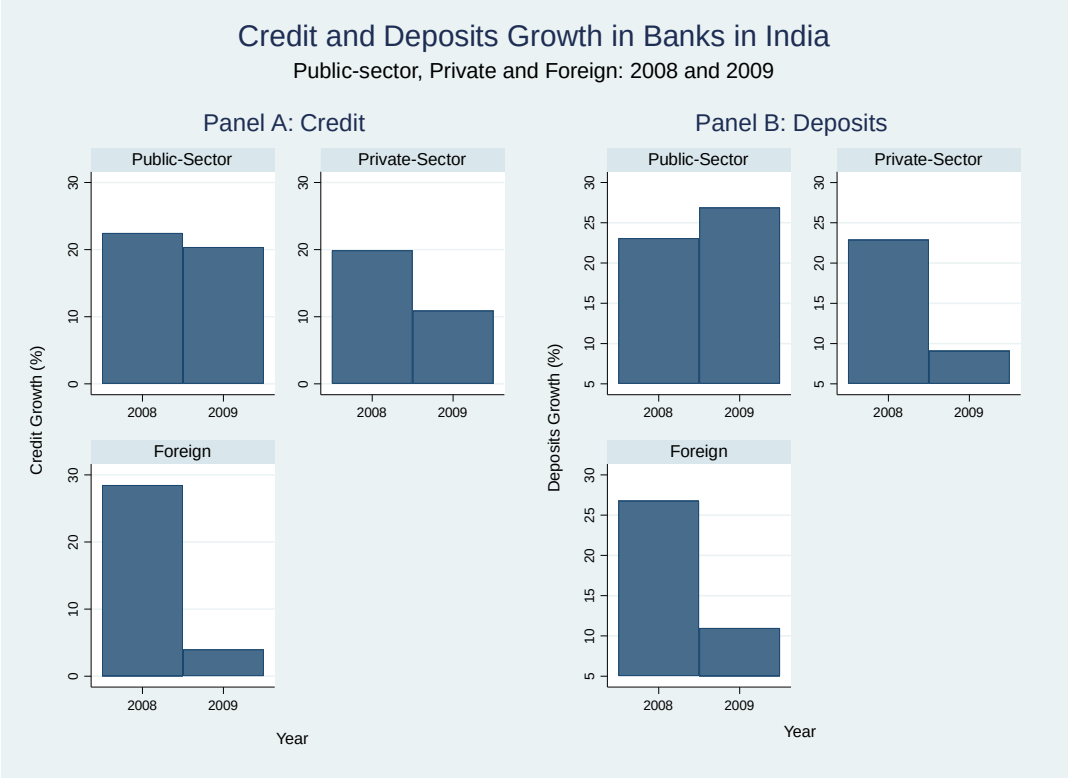

Figure 1: Credit and Deposits Growth in different types of banks in India, 2008 and 2009
Notes: Figure presents the yearly growth rates in different types of banks in India, 2008-2009

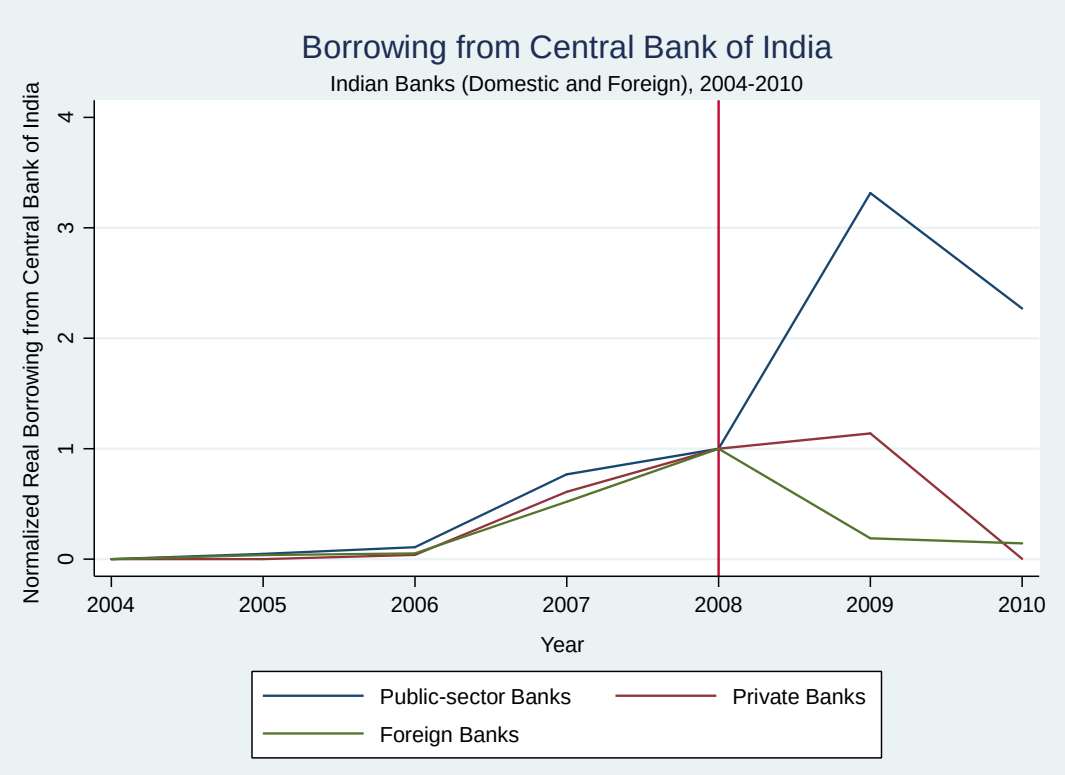

Figure 2: Banks' Borrowing from Central Bank of India, 2004-2010

Notes: Figure represents average real borrowing from Central Bank of India by different types of banks in India (as listed by the RBI). "Public-sector Banks" include all the state-owned banks. "Private Banks" are the domestic private banks. It does not include private NBFCs and co-operative banks. "Foreign Banks" are banks of foreign origin. The borrowings are deflated to Indian Rupees of April 2004 and normalized to the value of 1 for all bank types at 2008.

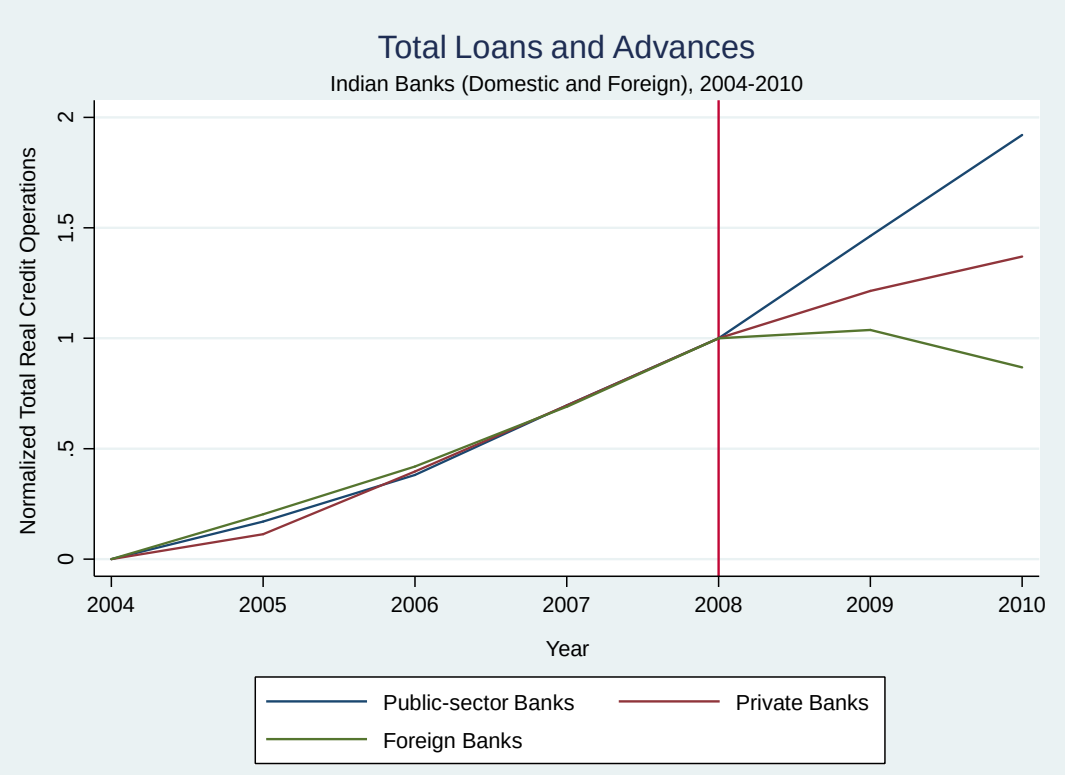

Figure 3: Total Loans and Advances by Different Types of Banks, 2004-2010

Notes: Figure represents total real loans and advances by different types of banks in India (as listed by the RBI). "Public-sector Banks" include all the state-owned banks. "Private Banks" are the domestic private banks. It does not include private NBFCs and co-operative banks. "Foreign Banks" are banks of foreign origin. The loans and advances are deflated to Indian Rupees of April 2004 and normalized to the value of 1 for all bank types at 2008.

Figure 4: Firm level Borrowing, Indian Manufacturing Firms, 2006-2010

Notes: Figures represent borrowing by an average manufacturing firm in India. "Public-sector Banks" represents all the public-sector banks in India. "Private-sector Banks" includes borrowing from both private-sector and domestic non-banking financial institutions like SIDBI, HUDCO, NABARD, IFCI, SFCs, etc. "Foreign Banks" is borrowing from foreign banks, foreign branches of Indian banks, Indian branches of foreign banks, foreign financial institutions (including foreign EXIM banks) and international development institutions, such as World Bank. "Foreign NBFCs" represents the kind of borrowing, which is used in India to facilitate access to foreign money by Indian firms. It includes commercial bank loans, suppliers' credit, securitised instruments such as Floating Rate Notes and fixed rate bonds such as euro bonds or FCCBs or FCEBs etc. It also includes credit from official export credit agencies and commercial borrowings from the private-sector window of multilateral financial institutions such as International Finance Corporation (IFC), ADB, AFIC, CDC, etc.

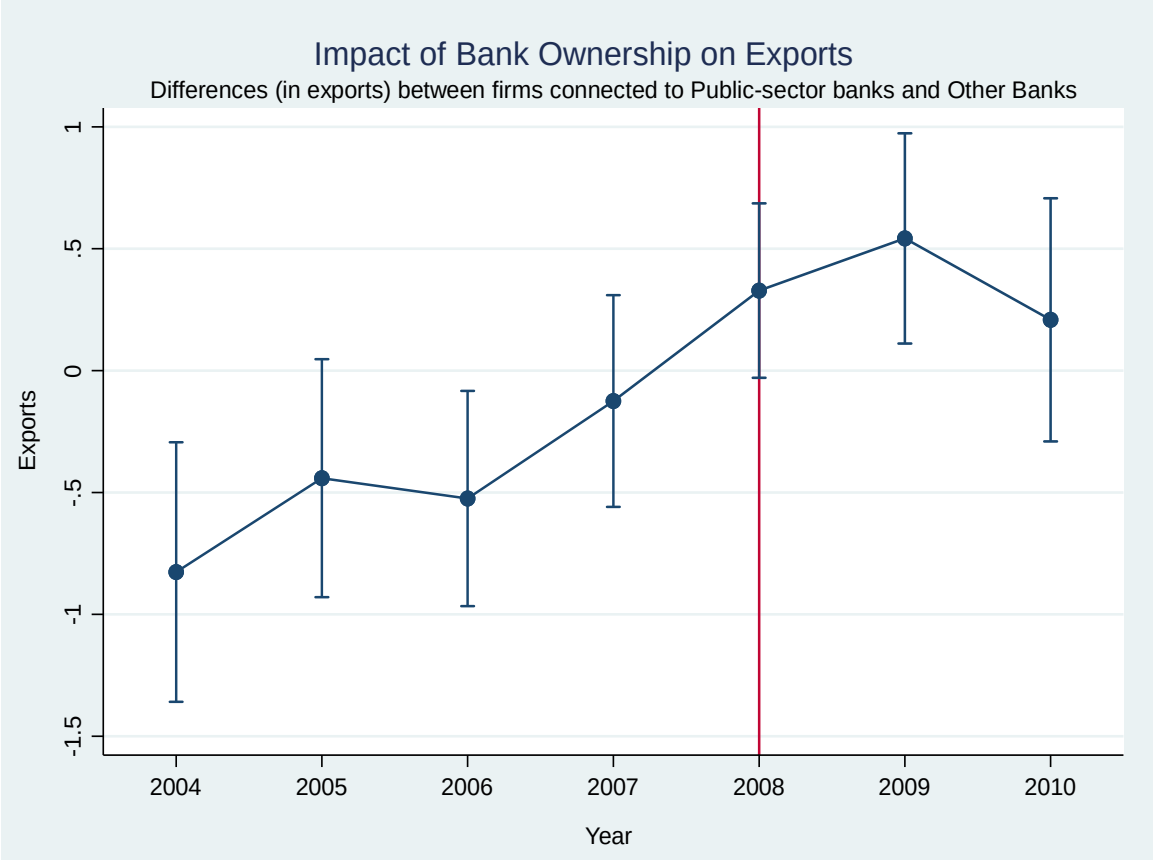

Figure 5: Impact of Bank Ownership on Exports, 2004-2010

Notes: Figure presents the response of the difference in the export earnings for firms connected to public-sector banks and other types of banks (domestic private and foreign) for the period 2004-2010. 95% confidence intervals are shown.

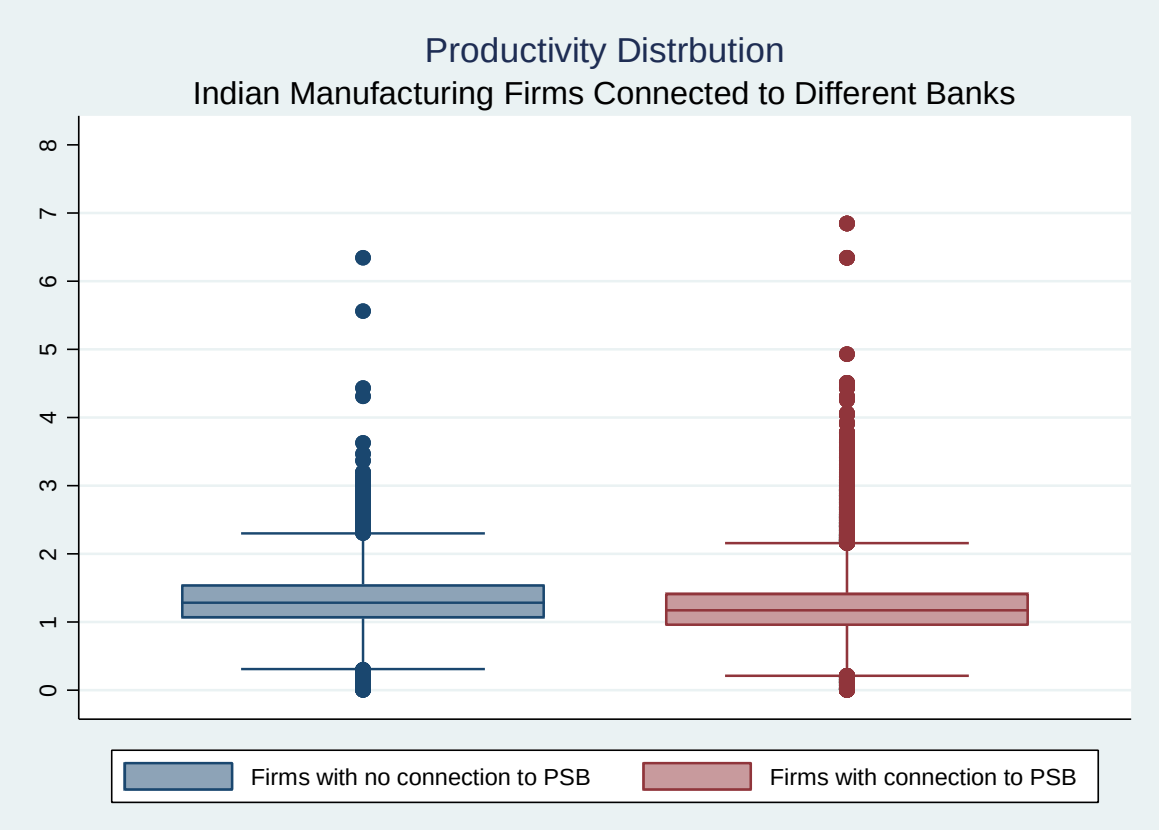

Figure 6: Productivity Distributions

Notes: Figure represents the productivity distribution of Indian manufacturing firms. Total Factor Productivity is calculated using Levinshon and Petrin (2003).

Table 1: India's Capital Account, 2008-2009

	2007-08	2008-09	H1 2008-09	H2 2008-09
Foreign Direct Investment	15401	17496	13867	3629
Portfolio Investment	29556	-14034	-5521	-8513
External Commercial Borrowings	22633	8158	3157	5001
Short-term Trade Credit	17183	-5795	3689	-9484
Other Banking Capital	11578	-7687	3747	-11434
Other Flows	10554	4671	-1849	6520

Notes: Figures are in INR million. Source: Reserve Bank of India.

Table 2: Summary Statistics: Bank Characteristics

	Mean	Median	Std. Dev.	Min	Max
Panel A: Aggregate					
Borrowings from RBI	6508.55	2900	9295.16	0	62690
Total Loans and Advances	813982.2	366267.8	1193674	2.8	6363053
Operating Profit/Working Funds	2.37	2.22	8.98	-1247	2089
Return on Assets	1.05	0.99	0.74	-21.45	9.64
Assets	1533651	729801.5	2101786	111	1.05e+07
Age	67.43	69	35.85	2	156
Panel B: Public-Sector Banks					
Borrowings from RBI	8156.37	5045	10106.37	6.3	47200
Total Loans and Advances	1064770	530462.9	1372475	2.8	6363053
Operating Profit/Working Funds	2.04	2.05	6.15	-1247	17.08
Return on Assets	0.91	0.9	0.38	-6.5	3.67
Assets	2008089	946642.4	2401504	111	1.05e+07
Age	76.07	85	29.27	5	145
Panel C: Private Banks					
Borrowings from RBI	2279.10	1000	3946.33	0	62690
Total Loans and Advances	487448.9	206576	612875.8	33.6	2324429
Operating Profit/Working Funds	2.46	2.42	15.80	-33	2089
Return on Assets	1.06	1.13	0.60	-3.57	3.16
Assets	880194.9	377997.5	1061077	403.6	4004171
Age	38.32	16	31.68	2	106
Panel C: Foreign Banks					
Borrowings from RBI	4915.3	1380.9	8424.03	7.5	34200
Total Loans and Advances	140171.4	98118.1	128542.8	12.6	416271.5
Operating Profit/Working Funds	3.79	3.92	1.60	-21.45	17.36
Return on Assets	1.74	1.73	1.50	-21.45	9.64
Assets	319746.9	209097.4	310714.7	459.6	1052997
Age	76.62	76	45.47	4	156

Notes: 'Borrowings from RBI' is the total amount of borrowings done by a bank from the Reserve or Central Bank of India. 'Total Loans and Advances' is the total amount of loans and advances by a bank. 'Operating Profit/Working Funds' is the ratio of operating profits to working funds of a bank. 'Return on Assets' is the return on assets of a bank. It is a ratio. 'Assets' is the total assets of a bank. 'Age' is the age of a bank. Values are expressed in INR Million.

Table 3: Credit Situation of Firms, 2006-2009

	Sources of Borrowing		
	Public-sector Banks	Private-sector Banks	Foreign Banks
2006	0.3966	0.0520	0.0668
2007	0.4414	0.0457	0.0776
2008	0.5340	0.0469	0.0772
2009	0.6248	0.0326	0.0754

Notes: Values represent the average real credit (deflated by the wholesale price index) by all firms (in the manufacturing sector) from different sources in a particular year.

Table 4: Differences in Pre Monetary Policy Time Trends in Exports, 2001-2007: Firms Connected to Public-sector Banks and Not Connected to Public-sector Banks

	Ln(Exports)			Exporter = 1		
	(1)	(2)	(3)	(4)	(5)	(6)
$PSB_{fb,<2008} \times Time\ Trend$	−0.137			−0.007		
	(0.115)			(0.008)		
$Time\ Trend$	−0.0002			−0.0006		
	(0.012)			(0.021)		
$PSB_{fb,<2008} \times Year2001$		−0.177			−0.026	
		(0.224)			(0.017)	
$PSB_{fb,<2008} \times Year2002$		−0.363			−0.025	
		(0.317)			(0.017)	
$PSB_{fb,<2008} \times Year2003$		−0.143			−0.005	
		(0.147)			(0.014)	
$PSB_{fb,<2008} \times Year2004$		−0.097			−0.015	
		(0.143)			(0.013)	
$PSB_{fb,<2008} \times Year2005$		−0.040			0.003	
		(0.163)			(0.011)	
$PSB_{fb,<2008} \times Year2006$		−0.113			−0.013	
		(0.127)			(0.009)	
$PSB_{fb,<2008} \times Year2007$		−0.126			−0.002	
		(0.134)			(0.007)	
$D_{crisis-2} \times PSB_{fb,<2008}$			−0.116			−0.014
			(0.096)			(0.012)
$D_{crisis-1} \times PSB_{fb,<2008}$			−0.196			−0.011
			(0.156)			(0.008)
$D_{crisis+1} \times PSB_{fb,<2008}$			0.080**			0.003
			(0.041)			(0.007)
$D_{crisis+2} \times PSB_{fb,<2008}$			0.143**			−0.007
			(0.072)			(0.007)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.92	0.92	0.92	0.82	0.82	0.82
N	51,195	51,195	51,195	51,195	51,195	51,195
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE (4-digit)*Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) - (3) use natural logarithm of exports of a firm as the dependent variable. Columns (4) – (6) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $\rangle$ 0. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to public-sector bank before the crisis. '$Time\ Trend$' is a linear time trend. '$Year$20011' , '$Year$2002', '$Year$2003', '$Year$2004', '$Year$2005', '$Year$2006', '$Year$2007' are year dummies. These dummies equal to 1 for the respective years. 'RR' is a dummy variable, which indicates monetary policy. '$D_{crisis-2}$' is a dummy which is equal to 1 for all years that predate the monetary policy by 2 or more years and is equal to 0 in all other years. '$D_{crisis-1}$' is a dummy is equal to 1 for the year 2007. '$D_{crisis+1}$' and '$D_{crisis+2}$' are two dummies which are equal to 1 for the years 2009 and 2010, respectively. There is no dummy for the year when monetary policy was undertaken, i.e., 2008. All the other coefficients provide estimates relative to that year. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. Robust standard errors corrected for clustering at the bank are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 5: Bank Ownership, Monetary Policy, and Firm-level Exports: Utilizing the Banking Relationships

	Ln(Exports)						Exporter = 1	
					Year FE× PSB	High Fin Dependence		High Fin Dependence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$D_{crisis}\times\ PSB_{fb,<2008}$	0.080** (0.041)	0.078* (0.040)	0.077* (0.040)	0.078** (0.039)	0.078** (0.039)	0.080* (0.049)	0.004 (0.007)	0.007 (0.009)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.91	0.91	0.91	0.92	0.92	0.92	0.82	0.81
N	51,224	51,224	51,210	51,195	51,195	31,968	51,195	31,968
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	No	No	No	No	No
Industry FE(5-digit)*Year Trend	Yes	No	No	No	No	No	No	No
Industry FE(2-digit)*Year FE	No	Yes	No	No	No	No	No	No
Industry FE(3-digit)*Year FE	No	No	Yes	No	No	No	No	No
Industry FE(4-digit)*Year FE	No	No	No	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (6) use natural logarithm of exports of a firm as the dependent variable. Columns (7) – (8) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $\rangle$ 0. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to public-sector bank before the crisis. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. Robust standard errors corrected for clustering at the bank are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 6: Bank Ownership, Monetary Policy, and Firm-level Exports: Utilizing the Banking Relationships

	Ln(Exports)					
	ATT	Firm Charac× PSB	Firm FE× PSB	Substitutability of Credit	Only 1 Type of Bank	Demand Shock
	(1)	(2)	(3)	(4)	(5)	(6)
$D_{crisis}\times\ PSB_{fb,<2008}$	0.469^{***} (0.129)	0.094^{**} (0.037)	0.078^{*} (0.040)	0.078^{**} (0.039)	0.057^{**} (0.029)	0.083^{**} (0.039)
$D_{crisis}\times\ DemandShock_j^{US}$						-0.741^{***} (0.238)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	n/a	0.93	0.92	0.92	0.78	0.81
N	78,648	49,215	51,195	51,195	12,924	51,195
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No	Yes
Firm-Bank FE*Year Trends	No	No	No	Yes	No	No
Industry FE(5-digit)*Year Trend	No	No	No	No	No	Yes
Industry FE(4-digit)*Year FE	Yes	Yes	Yes	Yes	Yes	No

Notes: Columns (1) – (6) use natural logarithm of exports of a firm as the dependent variable. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to public-sector bank before the crisis. '$exposure_{jt-1}^{US}$' is an indicator for demand shocks or 'exposure index'. It is defined as the share of exports (by India) of an industrial sector or product category directed towards countries affected by the crisis (the USA) to the total exports of that sector. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. Robust standard errors corrected for clustering at the bank are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 7: Bank Ownership, Monetary Policy, and Firm-level Exports: Benchmark Results - Utilizing Balance Sheets of the Banks

	Ln(Exports)						Exporter = 1		Ln(Domestic Sales)	
						High Fin Dependence		High Fin Dependence	Exporters	Non-Exporters
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$D_{crisis} \times B^{CB}_{b,<2008}$	−0.166**	−0.153**	−0.167**	−0.163**	−0.082*	−0.158**	−0.005	−0.008	−0.038*	0.057
	(0.070)	(0.069)	(0.069)	(0.066)	(0.045)	(0.073)	(0.012)	(0.013)	(0.022)	(0.130)
$D_{crisis} \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$	0.107	0.086	0.047	0.010	0.101	0.088	−0.030	−0.030	0.001	0.152
	(0.143)	(0.139)	(0.138)	(0.136)	(0.086)	(0.143)	(0.029)	(0.030)	(0.068)	(0.283)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.91	0.92	0.92	0.92	0.92	0.92	0.82	0.83	0.94	0.94
N	43,984	43,984	43,984	43,984	51,910	41,134	43,984	41,134	32,090	11,831
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	No	No	No	No	No	No	No
Bank FE*Year Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE(5-digit)*Year Trend	Yes	No	No	No	No	No	No	No	No	No
Industry FE(2-digit)*Year FE	No	Yes	No	No	No	No	No	No	No	No
Industry FE(3-digit)*Year FE	No	No	Yes	No	No	No	No	No	No	No
Industry FE(4-digit)*Year FE	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (6) use natural logarithm of exports of a firm as the dependent variable. Columns (7) – (8) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $\rangle$ 0. Columns (9) – (10) use natural logarithm of domestic sales as the dependent variable. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to a public-sector bank before the crisis. '$B^{CB}_{b,<2008}$' is the average borrowing by a bank from the Central Bank of India. It is the average for the years 1999-00 and 2000-01 in columns (1) – (4) and (6) – (10); for column (5), it is average for the years 1999-00 to 2006-07. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Robust standard errors corrected for clustering at the bank level are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 8: Bank Ownership, Monetary Policy, and Firm-level Exports: Benchmark Results - Controlling for Other Possible Effects

	Ln(Exports)						Exporter = 1		
	Year FE× *PSB*	Firm Charac× *PSB*	Firm FE× *PSB*	Firm FE× *LA*			Firm Charac× PSB	Firm FE× PSB	Firm FE× *LA*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$D_{crisis} \times B^{CB}_{b,<2008}$	−0.087**	−0.068*	−0.076*	−0.081**	−0.079**	−0.075*	−0.007	−0.006	−0.006
	(0.039)	(0.039)	(0.041)	(0.041)	(0.040)	(0.040)	(0.007)	(0.008)	(0.008)
$D_{crisis} \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$	0.049	0.031	0.024	0.046	0.020	0.021	−0.010	−0.013	−0.011
	(0.080)	(0.079)	(0.082)	(0.080)	(0.082)	(0.082)	(0.016)	(0.017)	(0.016)
$OPWF_{b,t-1}$					−0.008				
					(0.015)				
$ROA_{b,t-1}$						−0.006			
						(0.020)			
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.92	0.91	0.93	0.92	0.92	0.92	0.81	0.82	0.82
N	48,224	46,359	48,043	47,970	47,548	46,659	46,359	48,043	47,970
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE*Year Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE(4-digit)*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (6) use natural logarithm of exports of a firm as the dependent variable. Columns (7) – (9) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $\rangle$ 0. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to a public-sector bank before the crisis. '$B^{CB}_{b,<2008}$' is the average borrowing by a bank from the Central Bank of India. It is the average for the years 1999-00 and 2000-01. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Robust standard errors corrected for clustering at the bank level are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 9: Bank Ownership, Monetary Policy, and Firm-level Exports: Utilizing the Financial Health of the Banks

	Ln(Exports)		Exporter = 1		Ln(Domestic Sales)	
		High Fin Dependence		High Fin Dependence	Exporters	Non-Exporters
	(1)	(2)	(3)	(4)	(5)	(6)
$D_{crisis} \times OPWF_{b,<2008}$	−0.061	−0.061	0.011	0.012	−0.014	−0.036
	(0.090)	(0.093)	(0.018)	(0.019)	(0.032)	(0.124)
$D_{crisis} \times OPWF_{b,<2008} \times PSB_{fb,<2008}$	−0.227	−0.323	0.038	0.002	−0.050	0.111
	(0.313)	(0.320)	(0.069)	(0.070)	(0.134)	(0.498)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.92	092	0.82	0.82	0.98	0.93
N	52,340	49,092	52,340	49,092	35,527	12,360
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE*Year Trend	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE(4-digit)*Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (2) use natural logarithm of exports of a firm as the dependent variable. Columns (3) – (4) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $\rangle$ 0. Columns (5) – (6) use natural logarithm of domestic sales of a firm as the dependent variable. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to public-sector bank before the crisis. '$OPWF_{b,<2008}$' is the ratio of operating profit to working funds af a bank. I use ratio of operating profits to working funds as an indicator for health of a bank. I use average values for the years 1999-00 and 2000-01. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Robust standard errors corrected for clustering at the bank level are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 10: Bank Ownership, Monetary Policy, and Firm-level Exports: Foreign and Domestic Private Banks

	Ln(Exports)	Exporter = 1	Ln(Exports)						
			Foreign Banks					Domestic Private Banks	
			All	US Banks	EU Banks	Japan Banks	Other Banks	All	Major Private Banks
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$D_{crisis} \times B^{CB}_{b,<2008}$	−0.157**	−0.001	−0.118*	−0.172*	−0.116	0.012	−0.208*	−0.044	−0.099*
	(0.074)	(0.013)	(0.066)	(0.102)	(0.128)	(0.129)	(0.123)	(0.060)	(0.057)
$D_{crisis} \times B^{CB}_{b,<2008} \times DB_{fb,<2008}$	0.139	0.029							
	(0.137)	(0.026)							
$D_{crisis} \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$			0.019	0.036	−0.007	−0.142	0.078	0.015	0.067
			(0.123)	(0.169)	(0.166)	(0.131)	(0.172)	(0.093)	(0.098)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.92	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.92
N	43,984	43,984	32,270	29,344	29,099	27,082	27,149	42,647	29,662
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE*Year Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE(4-digit)*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) and (3) – (9) use natural logarithm of exports of a firm as the dependent variable. Column (2) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $\rangle$ 0. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$DB_{fb,<2008}$' is a dummy variable representing a domestic bank. It takes a value 1 if a firm is a client to a domestic bank before the crisis. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to a public-sector bank before the crisis. '$B^{CB}_{b,<2008}$' is the average borrowing by a bank from the Central Bank of India. It is the average for the years 1999-00 and 2000-01. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Robust standard errors corrected for clustering at the bank level are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 11: Bank Ownership, Monetary Policy, and Firm-level Exports: Demand Side - Firm Borrowing

	Ln(Exports)		Exporter = 1	
		High Fin Dependence		High Fin Dependence
	(1)	(2)	(3)	(4)
$D_{crisis} \times Borr_{i,PSB,00-01}$	1.038^{***} (0.190)	1.105^{***} (0.206)	-0.211 (0.200)	-0.200 (0.195)
Firm Controls$_{t-1}$	Yes	Yes	Yes	Yes
R-Square	0.89	0.89	0.76	0.76
N	28,409	18,433	28,409	18,433
Firm FE	Yes	Yes	Yes	Yes
Industry FE(4-digit)*Year FE	Yes	Yes	Yes	Yes

Notes: Columns (1) - (2) use natural logarithm of exports of a firm as the dependent variable. Columns (3) - (4) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $\rangle$ 0.'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$Borr_{i,PSB,00-01}$' is an indicator variable. It takes a value 1 if a firm borrows from domestic public-sector banks. For example, $Borr_{i,PSB,00-01}$ takes a value 1 when the average borrowing of a firm (for the years 2000 and 2001) from public-sector banks is positive and 0 otherwise. I consider only borrowing from public-sector banks and foreign banks in my analysis. Firm controls include age of a firm and its squared term, 'TechAdop/GVA', and firm size (assets of a firm). 'TechAdop' (Technology Adoption) = R&D expenditure + Royalty payments for technical knowhow. 'GVA' is the gross value-added of a firm. Both technology adoption and assets are used at $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Numbers in the parenthesis are robust clustered standard errors at the firm level. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 12: Bank Ownership, Monetary Policy, and Firm-level Exports: Other Effects

	Factors of Production					Imports			
	Labour Compensation			Capital Employed	Raw Mat Expenditure	Capital Goods	Raw Materials	Stores & Spares	Finished Goods
	Total	Man Comp	Non-Man Comp						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$D_{crisis} \times B^{CB}_{b,<2008}$	−0.078*	−0.055*	−0.077*	−0.155**	−0.076	−0.027	−0.159**	−0.046	0.050
	(0.047)	(0.028)	(0.038)	(0.069)	(0.070)	(0.053)	(0.066)	(0.046)	(0.059)
$D_{crisis} \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$	0.020	−0.011	0.004	0.028	−0.022	0.051	0.069	−0.024	0.004
	(0.087)	(0.053)	(0.089)	(0.140)	(0.136)	(0.096)	(0.127)	(0.079)	(0.036)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.20	0.16	0.21	0.13	0.16	0.19	0.22	0.20	0.17
N	51,260	51,260	50,956	50,482	51,256	51,260	51,260	51,260	51,260
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE*Year Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE(4-digit)*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1), (2), and (3) use total compensation, managerial compensation, and non-managerial compensation of a firm as the dependent variable. Columns (4) and (5) use amount of capital employed and raw material expenditure of a firm as the dependent variable. Columns (6) – (9) use import of capital goods, import of raw materials, import of stores and spares, and import of finished goods, respectively. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to a public-sector bank before the crisis. '$B^{CB}_{b,<2008}$' is the average borrowing by a bank from the Central Bank of India. It is the average for the years 1999-00 and 2000-01. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Robust standard errors corrected for clustering at the bank level are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 13: Bank Ownership, Monetary Policy, and Firm-level Exports: Firm Characteristics

	Ln(Exports)										
	Size				End-Use					Ownership	
	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	Con Durable	Inter-mediate	Basic	Capital	Con N-Durable	Domestic	Foreign
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
$D_{crisis} \times B^{CB}_{b,<2008}$	−0.102	−0.289**	−0.072	−0.047	−0.015	−0.299**	0.163	−0.390**	−0.109	−0.123**	−0.215*
	(0.131)	(0.149)	(0.102)	(0.098)	(0.140)	(0.144)	(0.211)	(0.196)	(0.110)	(0.062)	(0.127)
$D_{crisis} \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$	−0.130	0.305	0.031	−0.042	−0.068	0.419	−0.376	0.445	0.413	0.059	0.003
	(0.212)	(0.277)	(0.285)	(0.288)	(0.242)	(0.303)	(0.397)	(0.295)	(0.412)	(0.138)	(0.627)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.87	0.87	0.87	0.89	0.91	0.94	0.92	0.89	0.90	0.92	0.91
N	9,653	10,838	11,457	11,884	11,167	11,055	4,771	6,794	5,679	40,236	3,748
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE*Year Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE(4-digit)*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (11) use natural logarithm of exports of a firm as the dependent variable. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to a public-sector bank before the crisis. '$B^{CB}_{b,<2008}$' is the average borrowing by a bank from the Central Bank of India. It is the average for the years 1999-00 and 2000-01. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Robust standard errors corrected for clustering at the bank level are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.

Table 14: Bank Ownership, Monetary Policy, and Firm-level Exports: Capital Misallocation

	Total Borrowing		Domestic Borrowing		Other Borrowing	
	(1)	(2)	(3)	(4)	(5)	(6)
$D_{crisis} \times HighAPK_{i,00-07}$	-0.377^{***}	-0.382^{***}	-0.517^{***}	-0.508^{***}	-0.188	-0.139
	(0.109)	(0.101)	(0.156)	(0.145)	(0.280)	(0.257)
Firm Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.88	0.88	0.83	0.83	0.85	0.85
N	9,111	9,111	6,722	6,722	2,389	2,389
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No	Yes	No
Industry FE(5-digit)*Year Trend	Yes	No	Yes	No	Yes	No
Industry FE(2-digit)*Year FE	No	Yes	No	Yes	No	Yes

Notes: Columns (1) - (2) use total borrowing, columns (3) - (4) use total domestic borrowing, and columns (5) - (6) use other borrowing (domestic private and foreign) by a firm as the dependent variable. 'D_{crisis}' is an indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008. '$HighAPK_{i,00-07}$' is an indicator variable for firms with high average product of capital. It takes a value 1 if a firm's average product of capital is greater than the median of the corresponding industry before the crisis, 1.e., 2008. Firm controls include age of a firm and its squared term, 'TechAdop/GVA', and firm size (assets of a firm). 'TechAdop' (Technology Adoption) = R&D expenditure + Royalty payments for technical knowhow. 'GVA' is the gross value-added of a firm. Both technology adoption and assets are used at $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Numbers in the parenthesis are robust clustered standard errors at the firm level. Intercepts included but not reported. *** denotes 1% level of significance, respectively.

Appendix

A Data

I use an annual-based panel of Indian manufacturing firms that covers around 5,500+ firms with consolidated data on banking relationships. This is across 108 4-digit industries for the years 1999–00 to 2009–10. Data is based on the PROWESS database of the Centre for Monitoring Indian Economy (CMIE). All monetary-based variables measured in Millions of Indian Rupees (INR), deflated by 2005 industry-specific Wholesale Price Index (WPI). We use 2004 National Industrial Classification (NIC).

Variable definitions

Borrowings from Central Bank of India (Bank level): Banks borrow money from other banks as well as from the Central Bank of India, popularly known as the Reserve Bank of India (or RBI). This is the amount of borrowings done by a bank from the RBI. The RBI acts as a 'lender of last resort' to Indian banks. Therefore, banks cann borrow from the RBI on the basis of eligible securities or any other arrangement. Also, in times of crisis, they can approach the RBI for financial help.

Total Loans and Advances (Bank level): It is the sum total of all kinds of loans and advances made by banks and financial companies. It captures the outstanding value of total loans and advances of all types of financial companies.

Operating Profit/Working Funds (Bank level): It indicates the ratio of a bank's operating profits to its average working funds, expressed in percentage terms. Working funds refers to the total resources of a bank as on a particular date. It can be construed as being either total liabilities or total assets. Total resources would essentially include capital, reserves & surplus, deposits accepted from customers, borrowings, other liabilities and provisions. It could also be looked at as total assets excluding accumulated losses, if any. It, therefore, denotes a bank's ability to put its resources to profitable use, at the operating level.

Return on Assets (Bank level): Return on assets mean the ratio of a bank's net profits to its average total assets (average of the outstand value as at the beginning of the year and as at the end of the year). It reflects the net earnings generated by a bank from its total resource. It captures the ratio of profits after taxes to the total average assets of a bank, expressed in percentage terms.

Assets: Total assets of a firm and/or a bank.

Age: Age of a banks and/or a firm.

D_{crisis}: Indicator of the 2008-09 crisis. It takes a value 1 for the years $\geq$ 2008.

$Borr_{i,PSB}$: Total borrowings by a firm i from a public-sector bank (PSB).

Exports (Firm level): Total exports of a firm.

Domestic Sales (Firm level): Total Sales - Exports of a firm.

Sales (Firm level): Total sales (exports + domestic sales) of a firm.

Imports (Firm level): Total imports = import of (raw materials + finished goods + stores & spares + capital goods).

Labour Compensation (Firm level): Total labour compensation of a firm. It is the sum of manageial compensation and non-managerial compensation.

Capital Employed (Firm level): It is total amount of capital employed by a firm sourced from different sources.

Raw Material Expenditure (Firm level): Total amount of expenditure incurred by firm on raw materials, stores and spares.

Ownership: It indicates whether a firm or a bank is domestic- or foreign-owned.

B Figures

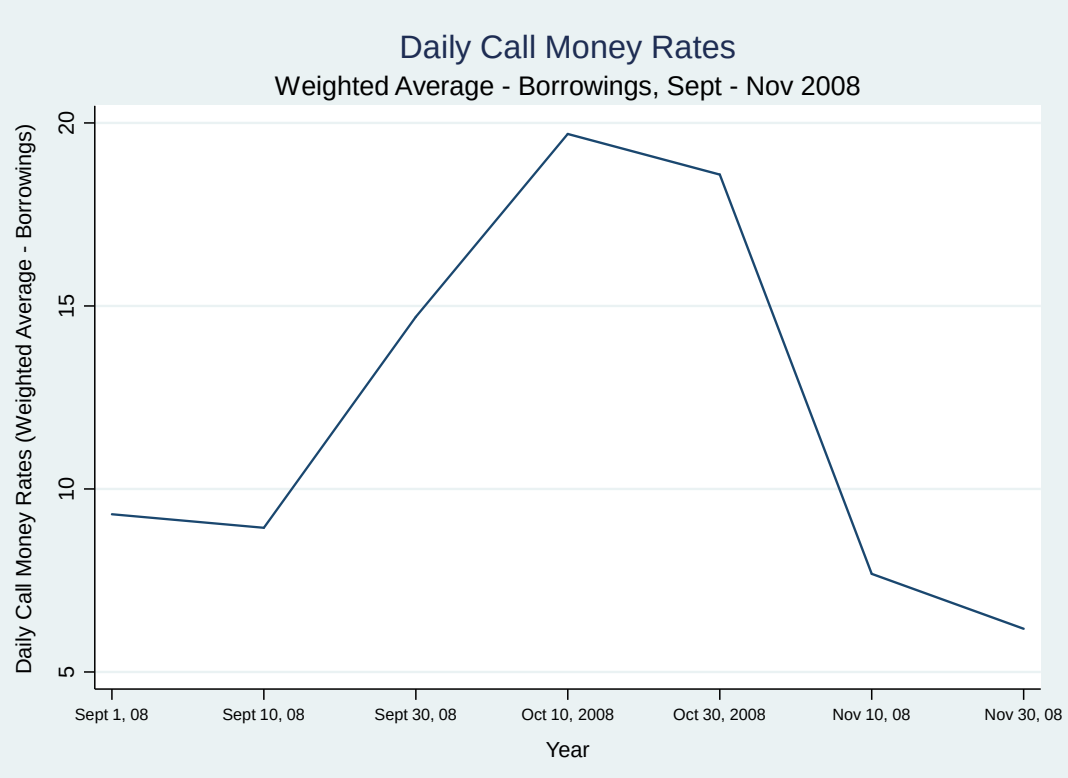

Figure A.1: Daily Call Money Rates, Sept. 2008 to Nov 2008

Source: RBI Various Publications.

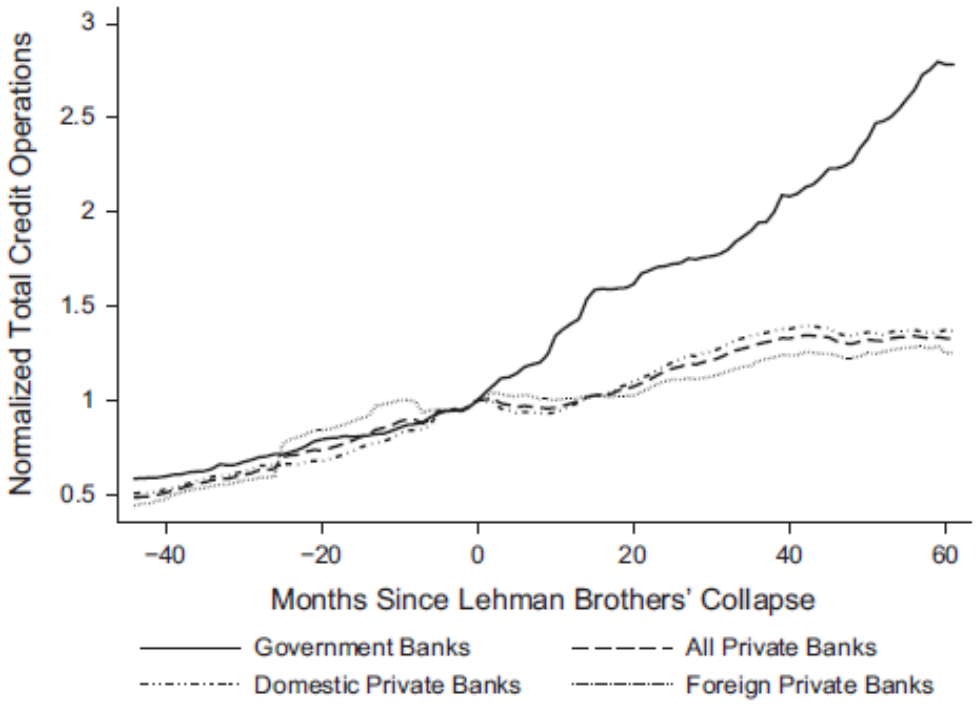

Figure A.2: Total Credit Disbursement by Different Types of Banks in Brazil

Notes: Figure represents total credit by government-owned and private banks in Brazil. Source: Coleman and Feler (2015)

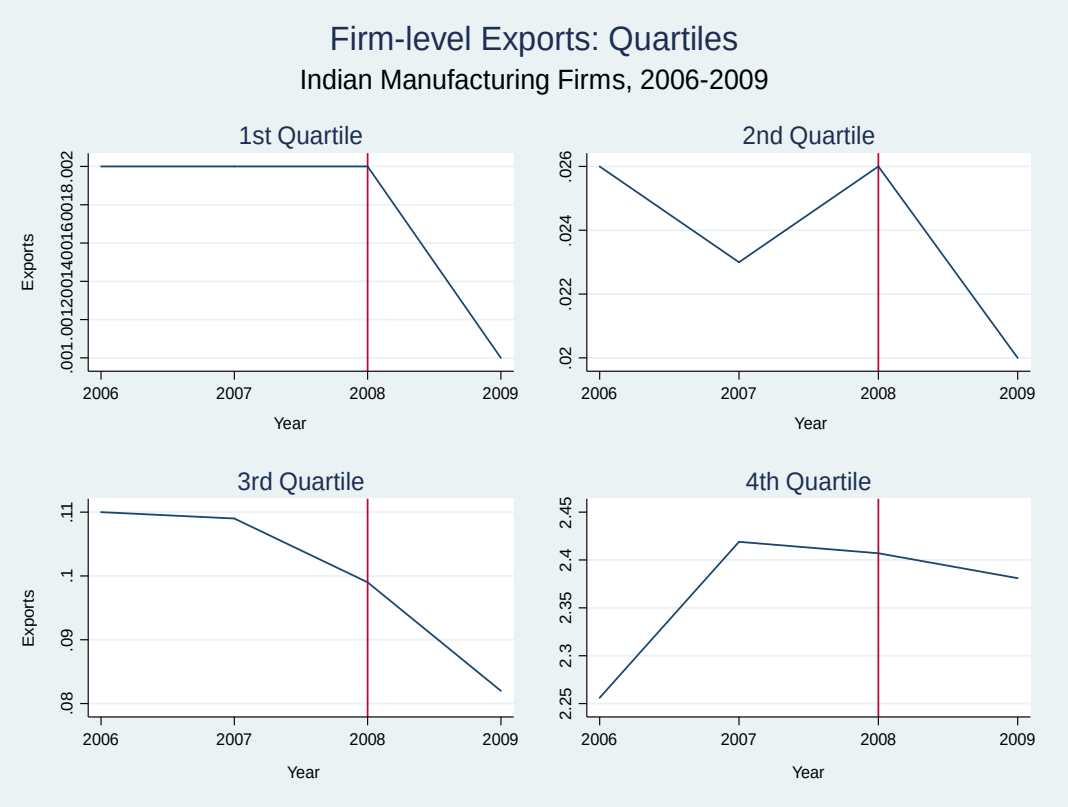

Figure A.3: Firm level Exports (Manufacturing): Quartiles, 2006-2009

Notes: Figures represent average real exports (deflated by the wholesale price index) over all exporters operating in the manufacturing sector in a particular year. Quartiles are defined according to the total assets of a firm. If a firm's total asset falls below the 25th percentile of the total assets of the corresponding industry to which the firm belongs, then the firm belongs to the 1st quartile. Similarly, if a firm's asset is within 25th-50th, 50th-75th and over 75th percentile then it would fall into 2nd, 3rd and 4th quartile respectively.

Figure A.4: Total Manufacturing Exports of India: Major Destinations, 2006-2009

Notes: EU is European Union. US is the United States of America. These are major trade destinations of India. Values are expressed in US $ Million. These are total merchandise exports from India. Compiled from UN-COMTRADE Database.

C Tables

Table 15: Summary Statistics: Banking Relationships of Firms

	Banking Relationships				
	Mean	Median	Std. Dev.	Min	Max
Panel A					
Aggregate	5.21	4	4.45	1	38
Panel B: Dividing by Ownership					
Public-sector	7.87	6	6.32	1	38
Domestic Private	5.08	4	4.39	1	36
Foreign	5.03	5	2.64	1	16
Panel C: Dividing by Size					
1st Quartile	2.27	2	1.49	1	12
2nd Quartile	3.51	3	2.27	1	19
3rd Quartile	5.45	5	2.68	1	18
4th Quartile	9.75	9	5.73	1	38
Panel C: Dividing by Export Orientation					
Non-Exporters	3.42	3	2.74	1	20
Exporters	6.07	5	4.83	1	38

Notes: 'Public-sector' are the govt-owned firms. 'Domestic Private' are the privately owned firms. 'Foreign' are the firms of foreign origin. Quartiles ($Qr_{i=1,2,3,4}$) are defined according to the total assets of a firm. A firm belongs to 1st Quartile if the total assets of that firm is $\langle$ 25th percentile of the total assets of the corresponding industry and so on.

Table 16: Summary Statistics: Firm Characteristics

	Mean	Median	Std. Dev.	Min	Max
Panel A: Aggregate					
Exports	3931.02	241.1	38263.82	0	1026556
Domestic Sales	12489.22	1282.6	74403.75	0.2	3152178
Sales	20352.01	2608.4	110815.9	0.2	3300034
Assets	15454.79	1741.4	91934.69	0.1	2512494
Panel B: Firms Connected to Public-Sector Banks					
Exports	3814.799	208.5	38039.25	0	1026556
Domestic Sales	11749.04	1061.4	74347.71	0.2	3152178
Sales	19723.55	2209.7	111818	0.2	3300034
Assets	14628.6	1436.7	90167.8	0.1	2512494
Panel C: Firms Connected to Private Banks					
Exports	2995.874	220.4	29988.25	0	1026556
Domestic Sales	10381.23	1150.2	66858.56	0.2	3152178
Sales	16795.94	2450.8	96202.32	0.2	3300034
Assets	13291.51	1645.25	77228.12	0.1	2512494
Panel C: Firms Connected to Foreign Banks					
Exports	5653.42	442.6	47947.04	0	1026556
Domestic Sales	19406.68	3327.4	85285.06	0.2	1391784
Sales	27612.48	4952.4	124527.6	0.4	2003998
Assets	22968.41	4031.6	118579.5	0.1	2512494

Notes: 'Exports' is the total exports of a firm. 'Domestic Sales' is the domestic sales of a firm. 'Sales' is the total sales (exports plus domestic sales) of a firm. 'Assets' is the total assets of a firm. Values are expressed in INR Million.

Table 17: Bank Ownership, Monetary Policy, and Firm-level Exports: Benchmark Results - Utilizing the Loans and Advances by the Banks

	Ln(Exports)					Exporter = 1		Ln(Domestic Sales)	
					High Fin Dependence		High Fin Dependence	Exporters	Non-Exporters
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$D_{crisis} \times LA_{b,<2008}$	-0.153^{**}	-0.140^{**}	-0.148^{**}	-0.159^{***}	-0.146^{**}	-0.016	-0.017	-0.047^{**}	0.042
	(0.063)	(0.062)	(0.062)	(0.055)	(0.066)	(0.013)	(0.014)	(0.024)	(0.128)
$D_{crisis} \times LA_{b,<2008} \times PSB_{fb,<2008}$	0.198^{**}	0.195^{**}	0.165^{*}	0.166^{*}	0.209^{**}	0.010	0.008	-0.033	0.082
	(0.099)	(0.097)	(0.096)	(0.09)	(0.100)	(0.020)	(0.021)	(0.043)	(0.199)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.91	0.92	0.92	0.92	0.92	0.82	0.82	0.87	0.93
N	53,936	53,936	53,936	53,936	50,564	53,936	50,564	38,799	15,060
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	No	No	No	No	No	No
Bank FE*Year Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE(5-digit)*Year Trend	Yes	No	No	No	No	No	No	No	No
Industry FE(2-digit)*Year FE	No	Yes	No	No	No	No	No	No	No
Industry FE(3-digit)*Year FE	No	No	Yes	No	No	No	No	No	No
Industry FE(4-digit)*Year FE	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (5) use natural logarithm of exports of a firm as the dependent variable. Columns (6) – (7) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $\rangle$ 0. Columns (8) – (9) use natural logarithm of domestic sales as the dependent variable. 'D_{crisis}' is an indicator of the expansionary monetary policy. It takes a value 1 for the years 2008 and 2009 when the repo rate was reduced as a measure to increase liquidity into the economy. '$PSB_{fb,<2008}$' is a dummy variable representing a public-sector bank (PSB). It takes a value 1 if a firm is a client to public-sector bank before the crisis. '$LA_{b,<2008}$' is the average loans and advances by a bank for the years 1999-00 and 2000-01. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size indicator in $(t-1)$ period and in real terms. All the regressions contain the respective double interactions and individual terms. Robust standard errors corrected for clustering at the bank level are in the parenthesis. Intercepts included but not reported. *,**,*** denotes 10%, 5% and 1% level of significance, respectively.