Bank Ownership, Monetary Policy and Exports: 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 an expansionary monetary policy shock undertaken by the Central Bank of India during the crisis of 2008-09 on exports of Indian manufacturing firms. I find: (a) firms connected to private and/or foreign banks experience a drop of around 8.2–39% in their export earnings due to drop in credit supply during the crisis with no effect for firms' having banking relationships with public-sector banks; (b) the drop in exports is higher for firms' client to the big domestic-private banks and/or banks of the US origin; (c) firms also laid-off workers (both managers and non-managers), employed less capital and imported less raw materials; and (d) finally, not affected are 3-8% less productive than firms suffered, 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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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 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), etc. On the other hand, another set of literature also 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; Acharya et al. 2013; Ivashina 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 study how the effect of an expansionary monetary policy shock (undertaken to partially offset the liquidity crunch) during the 2008-09 financial crisis on firm level exports varies by the ownership of the banks to which the firms are connected. I show export flows of firms' having banking relationships with public-sector banks is not affected through the financial channel vis-à-vis firms which are borrowing from other sources – the private and/or foreign banks. Firms connected to private (major) or foreign banks experience a drop of around 8.2–39% in their export earnings as a result of the drop in credit supply during the crisis. And, the effect is concentrated only on the intensive margin of trade. To the best of my knowledge, this is one of the very few studies which directly looks at the effect of a post-crisis (2008-09) policy change on firm performance while using banks' ownership pattern as the identification strategy.[2]

A key question arises immediately: how does being a client to the public-sector bank can help a firm

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[1] Recently, there are couple of papers which are similar to the current study: (1) Coleman and Feler (2015) utilizing data from Brazilian banks show that bank ownership pattern significantly matters for regional level economic performance, such as GDP, employment, wages; and (2) Ongena et al. (2015) using a firm-bank matched dataset from 14 East European countries and exploiting the origin of funding of the banks point out that funding pattern of banks is a significant determinant for firm level financial performance. The current article combines these two studies in terms of utilizing a matched firm-bank data and bank ownership pattern, but additionally exploiting a uniqueness in the Indian Banking Act to causally identify the effect.

[2] On the other hand, there is now 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).

to mitigate the partial effects of the crisis? or why should the effect of a monetary policy shock vary by banks' ownership? Existing set of research highlights two possible reason: (1) first, public-sector banks are differentially affected (by the crisis) as compared to other banks as depicted by **Figure 1**. A few recent studies document the differential effect of crisis on different types of banks – 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, 2012). **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 banks cut their credit less is that they may have better access to deposit financing. This brings me to the second reason.

(2) differential performance of the public-sector and other banks (private and foreign) could also be due to the differences in investor confidence. **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.[3] On the other hand, private banks' deposit growth decreased from 22.3% to a meagre 9.1% for the same period. Acharya and Kulkarni (2012) shows that the credit default swap (CDS)[4] spreads for India's largest public-sector bank (State Bank of India (SBI)) and largest private bank (ICICI) were within the same range in 2007-08, but the difference between the CDS spreads started to increase in SBI's favour in the beginning of 2008-09 indicating that the market possibly views a public-sector bank to be more resilient to the crisis than a private bank. Eichengreen and Gupta (2012) by analyzing the change in bank deposits in India during the crisis of 2008-09 also show that it is the expectation for the implicit guarantee for the public-sector banks that resulted in a significant growth in deposits during the crisis.

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[3] The Govt. of India also issued a directive to public-sector enterprises (firms and 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).

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

Third, and the most important, which amplifies the intensity of the above two effects and is particularly relevant in case of India is the presence of the *Indian Bank Nationalization Act 1969*. It 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. A working paper by the current Deputy-Governor of the Central Bank of India, Prof. Viral Acharya and his coauthor shows that it is the explicit and implicit government guarantees for the public-sector banks that helped them to tackle the financial crisis better than other banks.[5] Viswanathan (2010) argues that the primary purpose of the expansionary monetary policy was to increase the credit supply to the public-sector (government- or state-owned bank) banks.[6] **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 Central Bank is similar before the crisis, but significantly different afterwards. The flow of money from the Central Bank increases almost exclusively for the public-sector banks.[7] Similar picture is revealed when I use total lending by banks. **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.

Another question which may be relevant in this case is: why exports? 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).[8] 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

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[5] Acharya and Kulkarni (2012) also highlights 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] He argues that the expansionary monetary policy was also undertaken (a) to meet the trade financing requirement of the traders and (b) to serve the debt service payments by those businesses that had existing foreign debt.

[7] Acharya and Kulkarni (2012, 2016) analyzing how the 2008-09 crisis has impacted the publicly-owned and other banks (private and foreign banks) in India also points such differential inpact. Mihaljek (2010) also provides similar evidence by looking across a range of emerging economies.

[8] 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).

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 interaction between the expansionary monetary policy (undertaken by the Central Bank of India due to the financial crisis of 2008-09) and bank ownership to investigate the differential effect of the bank ownership on Indian manufacturing firms' export activities. I presume that the *Bank Nationalization Act* first creates a differential effect (as the public-sector and other banks (private and foreign) are treated differently) of the monetary policy on the borrowing pattern of the commercial banks from the Central Bank of India 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 borrowing by a bank from the Central Bank of India to estimate the causal effect of the banks' ownership on firms' performance. However, using information on banks' borrowing or lending is useful in establishing a causal effect of the bank ownership on firm performance, but it still does not solve the problem of selection issue (between the firms and banks). For example, a firm may switch to a public-sector bank from its current banker (which is a private and/or foreign bank) during the crisis to avoid the anticipated drop in credit supply or a firm may have multiple banking relationships and it just stops borrowing from the private and/or foreign bank and borrow only from the public-sector bank. Also, the lending pattern of banks may vary according to ownership. For example, foreign-owned banks may lend to completely different set of firms. These issues can significantly bias the 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[9]; (b) use banks' borrowing indicators for years which are significantly before the crisis period; and (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.[10]

(ii) at firm level. To show whether the demand side of the story matches the supply side, I use direct

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[9]I also restrict the period to certain years and the results remain the same.

[10]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 addition, a large proportion (⟩ 90%) of the firms of this sample have relationship with only public-sector banks. Nonetheless, use of pairwise firm-bank fixed effects along with clustering at the same-level will help me purge out the right coefficients.

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.

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 Central Bank of India, 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 changes in credit flows from different kinds of sources may influence firm performance.

I have three different sets of results. First, I utilize balance sheet of the banks (particularly, borrowing from Central Bank of India) to show that firms client to the state-owned or public-sector banks do not experience any decline in their domestic and international sales due to the disruption in credit supply in the post-2008 period. On other hand, firms client to either private banks (especially, the big banks) and/or foreign banks (especially, the banks of the US origin) experience the opposite; they register a significant drop in their export flows. Interestingly, my estimates on the percentage drop in export flows of these firms is close to what the macro figures of India's decline in export flows is during the 2008-09 crisis, 16-17%. And, it is the small and medium-sized firms exporting intermediate and capital goods which suffered the most. Additionally, I use firm level credit information to show that firms borrowing from the public-sector banks indeed have significantly higher earnings from export flows when compared to firms borrowing from other sources. Second, firms also laid-off workers (both production and non-production; with the effect for production workers about 20% higher), reduced capital employed and import of intermediate inputs due to drop in credit supply by virtue of not connected to the public-sector banks.

Lastly, I investigate the type of firms which were not affected due to their relationships with public-sector banks? To understand this, I compare the productivity distribution of firms connected solely to public-sector banks versus other type of banks. I find that firms which are connected to the public-sector banks are on average about 3.2–8% less productive than other firms. This implies that the discretionary nature of the monetary policy due to the *Bank Nationalization Act* created some sort of capital misallocation and this could probably reinforce further inequality (in terms of efficiency) in the economy.

The findings contribute to four different kinds of literature. My primary 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 findings are similar to that of Coleman and Feler (2015) on Brazil and Ongena et al. (2015) on East European countries. I extend the literature to show the interaction between expansionary monetary policy and bank ownership help us to understand the composition of (i) effect on the real economy and (ii) firms connected to different types of banks. 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 foreign banks transmit international financial shocks to an economy.

My second contribution is to the general literature on financial crisis. There is now a sizeable amount of qualitative evidence showing how financial crisis in general and particularly 2008-09 induced several governments and central banks to undertake monetary expansion as a policy response, especially in the emerging economies (Moreno, 2010; Crowley and Luo, 2011; Blinder et al, 2017). But, to the best of my knowledge there is no study to investigate how these policy responses affected the real economy. I use the expansionary monetary policy, in case of India, which was undertaken as a response to the 2008-09 to show significant effect on firm level export earnings (intensive margin).

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. The paper exploits a policy response which led to differences in the availability of credit across different types of banks, to measure its effect on firms' export performance. The results are closely related to the work that analyzes the effects of credit disruptions on trade during the Great Trade Collapse of 2008-09 (Bricongne et al., 2012; Bolton et al., 2011; Chor and Manova, 2012; Levchenko et al., 2010; and Paravisini et al., 2014) 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). The 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; Iyer et al., 2014; Carvalho et al., 2015; Muûls, 2015; Amiti and Weinstein, 2018). The literature compares firm level outcomes such as financial performance, employment or investment across firms affected differently by a credit shock. I show how a monetary policy differentially affects the exporting activities of firms due to ownership patterns of the banks that they are connected to.

The rest of the paper is organized as follows. Section 2 describes the background of the policy response undertaken the Central Bank of India as a result of the 2008-09 crisis and how did it impacts the Indian banking sector. The dataset is outlined in Section 3. Section 4 describes the empirical strategies and the corresponding results. Section 5 concludes.

2 Monetary Policy and Bank Lending 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 that there was 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.

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 the 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

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[11] Prof. 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.

(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, 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.

As the gravity of the financial crisis became apparent, the Central Bank of India intervened heavily and took several policy measures to improve the flow of credit to productive sectors, at viable costs, so as to sustain the growth momentum and to restore the economy back to its pre-2008 growth schedule (Sengupta, 2009; Acharya and Kulkarni, 2012, 2016).[14] And, monetary policy was the principle tool to counter the after effects of the financial meltdown (Sengupta, 2009).

The policy announced several measures, principle of them is the lowering of the interest rate structure by significantly reducing both its key policy rates – the repo rate[15], (so that banks can swap their holdings of government securities for cash) and the reverse-repo rate[16] (so that the cost of borrowing by the central bank decreases). Both these rates was reduced by 425 and 275 basis points, respectively. In addition, the Cash Reserve Ratio (CRR) was also slashed by 400 points between October 2008 and January 2009. **Figure 4** plots yearly repo, reverse-repo rates and CRR (as reported by the RBI)[17] from 2006 to 2010; all the three policy rates register a significant decline for the year 2008-09. All these were done in order to increase the

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[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.

[14] The Central Bank also sold dollars to support Indian Rupee leading to some depletion of the stock of reserves.

[15] Repo rate is the rate at which the central bank of a country lends money to commercial banks in the event of any shortfall of funds.

[16] It is the rate at which the central bank of a country borrows money from commercial banks within the country (it is also a monetary policy instrument which can be used to control the money supply in the country).

[17] It is an average of the monthly rates as announced by the RBI.

money supply to the productive sectors through commercial banks.[18] Mohan (2009) highlights that the estimated amount of liquidity that has been injected into the system is about 9% of GDP.[19]

Pandit and Vashisht (2011) show that such was the case for other emerging economies like Chile, South Africa, Mexico, Brazil, South Korea, etc. Blinder et al. (2017) in a survey paper[20] argues that the global financial crisis had significant impact on the practice of monetary policy across a range of countries. Moreno (2010) and Crowley and Luo (2011) also notes that the crisis influenced the policy makers, especially the central bankers, to respond by increasing foreign and domestic currency liquidity.[21]

Other measures undertaken by the Central Bank include (a) reduction in Statutory Liquidity Rates (SLR) (from 25% to 24%); (b) opening of new refinance windows; (c) lowering of prudential norms in regard to provisioning and risk weights; and (d) refinance to Small Industries Development Bank of India (SIDBI) (Subbarao, 2009b).[22] In addition, foreign exchange liquidity was also eased by loosening restrictions on ECBs and short-term trade credits, while interest rate ceilings on non-resident deposits were raised in order to attract more foreign funds into the country (Islam and Rajan, 2011). The RBI which allowed the rupee to depreciate until September 2008, intervened to manage the rupee decline by leaning-against-the-wind, hence releasing further foreign exchange into the market.[23]

As a result of these monetary measures, banks, especially the public-sector ones, found themselves saddled with surplus liquidity. The Central Bank of India 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) points out that it is because of the expansionary monetary policy that the state-owned banks witnessed a sharp rise in their lending activities, in contrast

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[18] See official statement of the Governor of the RBI: https://www.reuters.com/article/idINIndia-37674620090127

[19] According to the estimates of the Deputy Governor of the RBI (during the crisis period), the various monetary and liquidity measures, taken together, released actual/potential liquidity amounted to be over INR 5,620,000 Million.

[20] The paper surveys 95 central banks with a questionnaire consisting of 13 questions. In all, 55 questionnaires were returned, with a gratifying (these days) response rate of 58%. The authors concentrate on four sub-questions: have there been important and lasting changes in central bank mandates, monetary policy instruments, central bank communications, and the place of the central bank within the government?

[21] **Figure A.2 (Appendix A)** shows the total amount of credit given by the government-owned banks as opposed to other banks in Brazil. The graph points out that although the total credit given out by the types of banks are somewhat similar before the crisis, it was significantly different after. Localities in Brazil with a high share of government-owned banks experienced a relative increase in lending following the onset of the financial crisis.

[22] Also see the RBI website for details Measures for Liquidity Management and Improving Credit Flow (http://www.rbi.org.in /Scripts/BS_PressReleaseDisplay.aspx?prid=19468).

[23] The infusion of such a significant amount of liquidity by the RBI and other quasi-open market operations helped the credit to grow at a stable and robust rate. **Figure A.3 (Appendix A)** shows that this is partially due to the decline in reserve money and consequent increase in the broad money during the second quarter of 2008-09. The graph also points out that RBI's credit supply to public-sector banks and commercial sector also increased during the crisis. This led to an increase in the money multiplier (**Figure A.4, Appendix A**), which is in sharp contrast to the US (RBI, 2009; Islam and Rajan, 2011).

to the private-sector banks. The domestic private-sector and foreign banks, on the other hand was rather reluctant to respond and eventually reduced their long-term lending and shifted to short-term exposures. **Table 2** calculates the year-by-year percentage changes in credit flows for all public-sector, private-sector and foreign banks. For public-sector banks, the percentage of credit flow increased to 28.6% in Janurary 2009 as opposed to 22.5% in March 2008; for private and foreign banks, it declined from 19.9% to 11.8% and 28.5% to 16.9% during the same time period, respectively.

Acharya and Kulkarni (2012) investigates the impact of ownership structure on bank vulnerability in India during the crisis of 2008-09 and show that private banks performed worse than public-sector banks. 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 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 differential impact on the public-sector, private and foreign banks due to the *Bank Nationalization Act 1969* to investigate the role of bank ownership on a firms' export performance.

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 1999–00 to 2009–10, 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 reclassify 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. **Table 14** (**Appendix C**) provides the descriptive 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.

The dataset provides information on 52 public-sector banks (including state-sponsored financial institutions), 88 private banks (including cooperatives), and 53 foreign banks.[24] This is according to the list of major banks (excluding the state-sponsored financial institutions, cooperatives)[25] provided by the Central Bank of India. 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 the banks from the Central Bank of India. This is a direct indicator of how different banks are being treated due to the *Bank Nationalization Act* as a result of the expansionary monetary policy undertaken in the post-crisis scenario. Public-sector banks were able to borrow more money as compared to other banks (as revealed by **Figure 2**) leading to a differential treatment of the monetary policy. This gives me the unique advantage of utilizing this information for a bank, 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, there are these 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 monetary policy does not affect firms' performance through health of banks. Since, the primary purpose of the monetary policy was to increase the lending to the firms (through the banks, especially the ones connected to the public-sector ones) in the short-run and not *per se* to improve the health of a bank. **Table 3** lists summary statistics for these variables at the aggregate and by the ownership

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

[25]I have included the state-sponsored financial institutions and co-operatives from the PROWESS dataset. Excluding them also produces the same result.

of the banks. A public-sector bank on average borrows more from the Central Bank of India and lends out more than a private and/or a foreign bank. On other hand, health indicators like operating profit to working funds or return to assets of a foreign bank is significantly better than that of a public-sector and/or private bank.

However, there are a couple of potential limitations of the dataset (in terms of the banking information) that I should highlight here: (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. However, I believe this is not of such a great concern in this case, as I would be utilizing banks' borrowing from the Central Bank of India (and total loans and advances by a bank) in order to understand the effect of expansionary monetary policy.

(ii) details about a firm's sources of credit 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.[26] 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 4** 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.

Figure 5 plots the average borrowing done by a Indian manufacturing firm (for all firms and further

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[26] 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 yeild same result.

dividing it onto exporters and non-exporters) from four different sources - public-sector banks, domestic private banks, foreign banks, and foreign NBFCs.[27] **Panel A** of **Figure 5** 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 5**. On the other hand, **Panel C** of **Figure 5** which documents the borrowing pattern of an average non-exporting firm do not show any such pattern like that of an exporter.

Lastly, another concern here that could be important is: 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.

Figure 6 compares average exports (deflated by the Wholesale Price Index number), divided into four different size quartiles., across all manufacturing sectors for the same time period as before. 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.[28]

In addition to this, the dataset rolls out information on a vast array of firm level characteristics regarding

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[27] 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.

[28] **Figure A.5** 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.

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 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 15** (**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, Monetary Policy and Exports

4.1   Monetary Policy, Bank Lending and Export: Bank-Firm level Regressions

This section investigates the direct role of bank ownership on a firm's performance. In particular, how does a monetary policy have differential effect on firms depending on their banking relationships? To understand this, I utilize the change in the borrowing rates of the commercial banks (as an indicator of expansionary monetary policy) due to the crisis of 2008-09 interacted with bank ownership as the identification strategy to evaluate its effect on firms' export flows.

4.1.1 Utilizing Banking Relationships

Before going into the details of the balance sheet of the banks, I start by exploiting the firm-bank relations. I follow Coleman and Feler (2015) and use a simple interaction between monetary policy (RR_t) 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:

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

x_{ijt} is either the intensive or extensive margin of trade for an Indian manufacturing firm i belonging to industry j at time t. RR_t is an indicator of the expansionary monetary policy. It takes value 1 for the years 2008 and 2009 as when the repo rate was reduced by the Central Bank of India in order to increase the liquidity in the economy to maintain the growth momentum. So, the lower is the repo rate, the higher is the amount of money borrowed by a bank. Now, given the *Bank Nationalization Act 1969,* lending from the Central Bank will be disproportionately higher for the public-sector banks. And, firms connected to those banks may be differentially affected than others.

$PSB_{fb,<2008}$ takes a value 1 if a firm is a client to a public-sector bank. 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.[29] Therefore, the interaction term, $RR_t \times PSB_{fb,<2008}$, measures the impact of the monetary policy (undertaken due to the crisis) given the fact that a firm is client to a public-sector bank (before the crisis). In other words, the relative difference between firms' export performance when it is connected to a public-sector bank vs. a private and/or foreign bank. 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_2 would say the opposite.

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[29]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.

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 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 as any fiscal policy considerations, drop in demand for products due to the crisis, etc. as well industry exposure of banks. 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.

Estimates are reported in **Table 5**. Columns $(1) - (4)$ regress the interaction term $RR_t \times PSB_{fb,<2008}$ on firm level export flows or the intensive margin of trade controlling for firm fixed effects, interaction between bank fixed effects and a year trend 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 in export sales as compared to a firm connected to private and/or foreign bank. Column (5) focuses only on sectors which are highly dependent on external finance. I use total borrowing by a bank 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 high financially dependent sectors. However, I do not find any significantly different effect for firms belonging to high-financially dependent sectors.

One important issue which needs to be controlled immediately and this can plague the estimates is the fact that the borrowing pattern of the different types of banks might be different in the pre-crisis period. In other words, there might be pre-trends which may possibly influence the results. In order to control for this issue, I interact the year fixed effects with public-sector bank dummy, $PSB_{fb,<2008}$ in column (6). My estimate remains significant and stable. 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 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 (7) and (8), respectively. The coefficient of interest continues to remain positive and significant.

Next, I use extensive margin of trade as the outcome of interest in columns (9) and (10). I do not find any effect of the interaction between bank ownership and monetary policy 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.

4.1.2   Utilizing Balance Sheets of Banks

Utilizing banking relationships is important to establish a causal effect of the bank ownership on firm level export flows, but it may not clearly establish the channel through which the interaction between

the expansionary monetary policy and bank ownership affects the real economy. In other words, is it the differential borrowing (due to the monetary policy) by the banks (from the Central Bank) as a result of their ownership or is it the financial health of the banks that led to this difference in effect 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 Central Bank of India and health indicators for a bank.[30]

Commercial banks, as a result of the crisis, will resort to the Central Bank as it announces the expansionary monetary policy. However, due to the *Bank Nationalization Act 1969,* some banks, especially the public-sector ones will be able to borrow more than the others. Therefore, differential borrowing by the banks from the Central Bank can have a differential effect on the firms attached to those banks. I use the information on borrowing from the Central Bank (by the commercial banks) as a possible indicator for monetary policy. To clearly understand whether differential borrowing affected the firm performance differentially, I use the following fixed effects type of OLS estimation to establish a cleaner causal effect of the interaction between bank ownership and monetary policy:

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

$B^{CB}_{b,<2008}$ 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 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, 2012). 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 the interaction of bank ownership and monetary policy on firm level exports. In order to potentially subvert this problem, I use average of the borrowings by a bank from the Central Bank

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[30] As indicated previously, the dataset also provides information on the total amount of loans and advances done by a bank. I have also uused this for robustness check and results remain the same. More on this later.

of India during the years 1999-00 and 2000-01 as a proxy for the borrowing of the years 2008-09 and 2009-10.

My main variable of interest is the double-interaction term, $RR_t \times B^{CB}_{b,<2008}$. It estimates the effect of the interaction between the monetary policy and borrowing from the Central Bank when a 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. On the other hand, the double interaction term will also estimate the effect of the crisis on firms' exports as the effectiveness of monetary policy is minimal or close to zero when a firm is not connected to a public-sector bank(s) in India. Therefore, I expect $\gamma_1 < 0$.

My other variable of interest is the triple interaction term $RR_t \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$. It estimates the effect of differential borrowing (due to the monetary policy undertaken by the Central Bank) during the crisis of 2008-09 on a firm's export flows when a firm has a banking relationship with a public-sector bank. Therefore, my other coefficient of interest is γ_2 and I expect γ_2 to be not negative and 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 are reported in **Table 6**. Column (1) estimates the effect of the interaction between bank ownership and monetary policy 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 $RR_t \times B^{CB}_{b,<2008}$ 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 and thereby increase in the credit supply to the firms which are connected to those. 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 the policy change; 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.[31]

Next, in **Table 7** 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. $RR_t \times B^{CB}_{b,<2008}$ 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. 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 the bank ownership and monetary policy on the extensive margin of trade.[32]

Lastly, I use the profitability ratio of the banks as a placebo to show that the effect on the export flows is mainly due to the increase in short-term lending by the Central Bank, which was the primary purpose of the monetary policy and not due to the financial health of the banks. I use operating profits to working funds ratio as the indicator for health of banks. Results are reported in **Table 8**. I find no effect of the financial

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[31]I also use total loans and advances by the banks ($LA_{b,<2008}$) in place of borrowings from the Central Bank in **Table 16** (**Appendix C**) as a robustness check. Using total loans and advances can help establish whether the lending channel of the monetary policy also played a role or not. 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.

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

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 foreign funding interacted with the discretionary accommodative monetary policy 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) 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 (due to the drop in credit supply) according to the 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)?

4.1.3 Heterogeneity Across Banks

Foreign Banks   I start by looking at firms which are connected solely to foreign banks. Results are reported in **Table 9**. 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 $RR_t \times B_{b,<2008}^{CB} \times DB_{fb,<2008}$. $DB_{fb,<2008}$ 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. That is, the double interaction term $RR_t \times B^{CB}_{b,<2008}$ now estimates the effect of the monetary policy only when a firm is connected to private bank(s). Results from these estimations are reported in **Table 10**.

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 (2012) 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 $RR_t \times B^{CB}_{b,<2008}$ 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.

4.2 Firm Borrowing and Exports: Firm level regressions

As credit is an equilibrium outcome, outcomes from the supply side should match that of demand side. In order 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 borrowings, borrowings from Non-banking Financial Institutions, borrowings from foreign sources, etc. For my purpose, I only use data on borrowings from domestic banks and foreign sources and use the following reduced form using OLS fixed effects type of estimation:

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

x_{ijt} is either extensive or intensive margin of export activity for firm i belonging to industry j at time t. RR_t continues to be the indicator for monetary policy; takes a value 1 for the years 2008 and 2009 as when the Central Bank of India reduces the repo rate as the result of the significant withdrawal of capital from the Indian equity market (as a result of the crisis).

One of the crucial determinants of export performance of a manufacturing firm is the amount of credit received by that firm (Amiti and Weinstein, 2011; 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 interaction effect of the expansionary monetary policy and 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 monetary policy and/or shortage of finance for foreign banks during the financial crisis, a firm would inadvertently go to a domestic 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 1999-00 and 2000-01 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.[33] 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, $RR_t \times Borr_{i,PSB,00-01}$. 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.[34] Therefore, β_1 establishes the effect of the expansionary monetary policy on exports when a firm is borrowing from domestic sources or public-sector banks. I expect that for an average Indian manufacturing firm, the effect of the monetary policy on exports would be significantly higher for a firm borrowing from public-sector banks than foreign sources, therefore $\beta_1 > 0$. This is because the transmission mechanism of the monetary policy to the real economy only works when a firm is to a public-sector bank(s). I note that β_1 could have been more precisely estimated if I have 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-

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

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

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. 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. The interaction terms will also control for any another special stimulus awarded for industry-level bodies/associations to help them during the crisis. The interacted fixed effects will also control for 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.

4.3 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), 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. Drop in credit supply reduces the amount of capital employed by firms by 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 reduces exports through drop in labour, capital, imported inputs.

4.4   Which type of firms?

This section explores two important additional questions: (a) which type of firms were affected? and (b) which type of firms aren't affected? **Table 13** utilizes different firm characteristics to understand first 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.

Exports of firms connected to private and/or foreign banks and producing intermediate and capital goods dropped 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.

Next, what type of firms did not suffer the drop in export flows as a result of the banking relationships with public-sector bank(s)? This is important, because if the firms 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 understand whether such is the case, I plot the productivity distributions of firms: (a) having banking relationships with public-sector banks and (b) no relationships with public-sector banks in **Figure 7**. I estimate productivity using Levinshon and Petrin (2003) methodology.

A representative firm having relationship with public-sector bank(s) is on average 3.2-8% 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 (1) a long right tail, (2) higher spread than the other type of firms. Combining these, it can possibly be said that the discretionary nature of the monetary policy during the 2008-09 crisis 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 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

I show that the type of banking relationships matter, especially during the crisis. In particular, the effect of monetary policy on manufacturing firms' vary according to their ownership of the banks that they are connected. In other words, the paper links the effect of monetary policy on a firm's lenders to its trade and other important outcomes. To do so, I exploit a matched firm-bank dataset, utilizing bank level information for each firm before and after the crisis to show that the ownership of banks significantly matters 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.

The results are as follows. First, a firm not connected to a public-sector bank during the crisis suffers about 8.2-39% drop in their export flows. 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 crisis on firms' exports comes from the 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, the firms that got benefitted due to the selective nature of the monetary policy are significantly less productive than other firms and this may have led to more 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 as a success of the monetary

policy 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.

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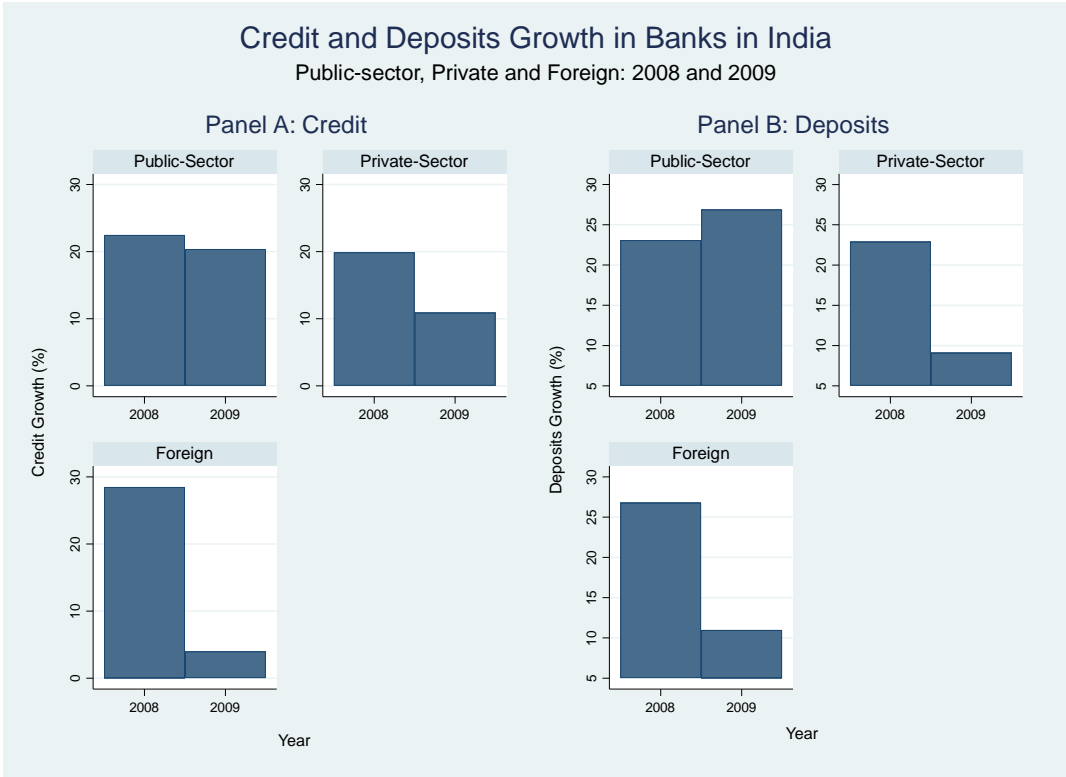
Figure 1: Credit and Deposits Growth in different types of banks in India, 2008 and 2009

Notes: Figure presents the yearly growth rates in different types of banks in India, 2008-2009
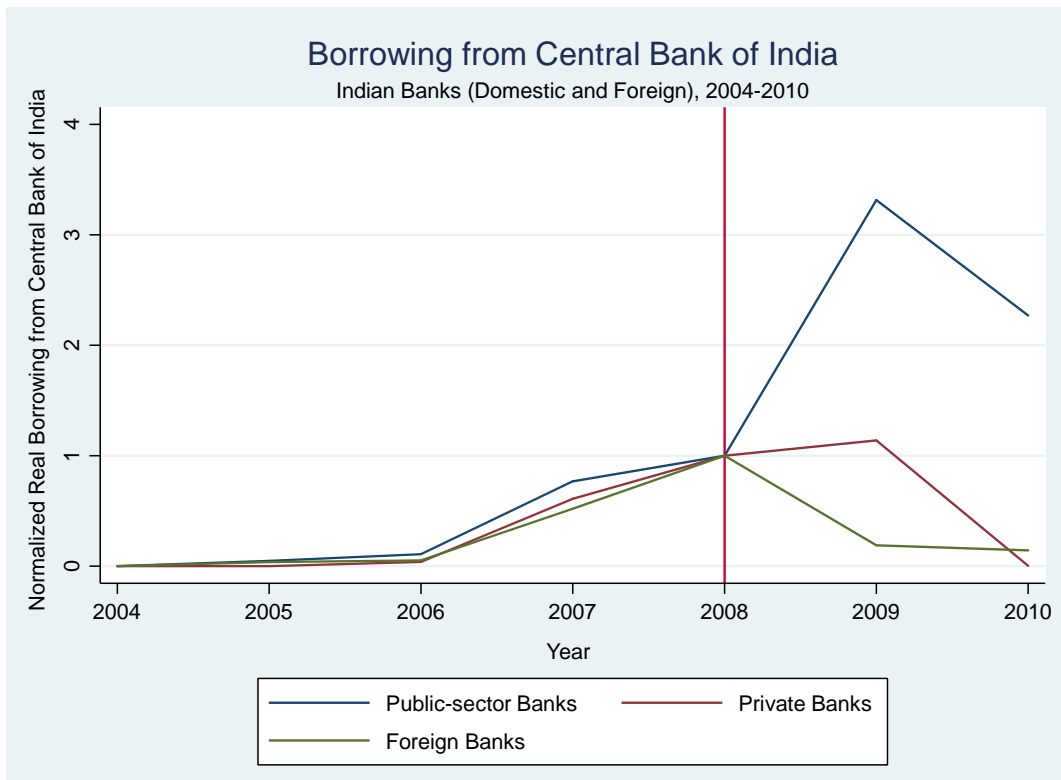
Figure 2: Banks' Borrowing from Central Bank of India, 2004-2010

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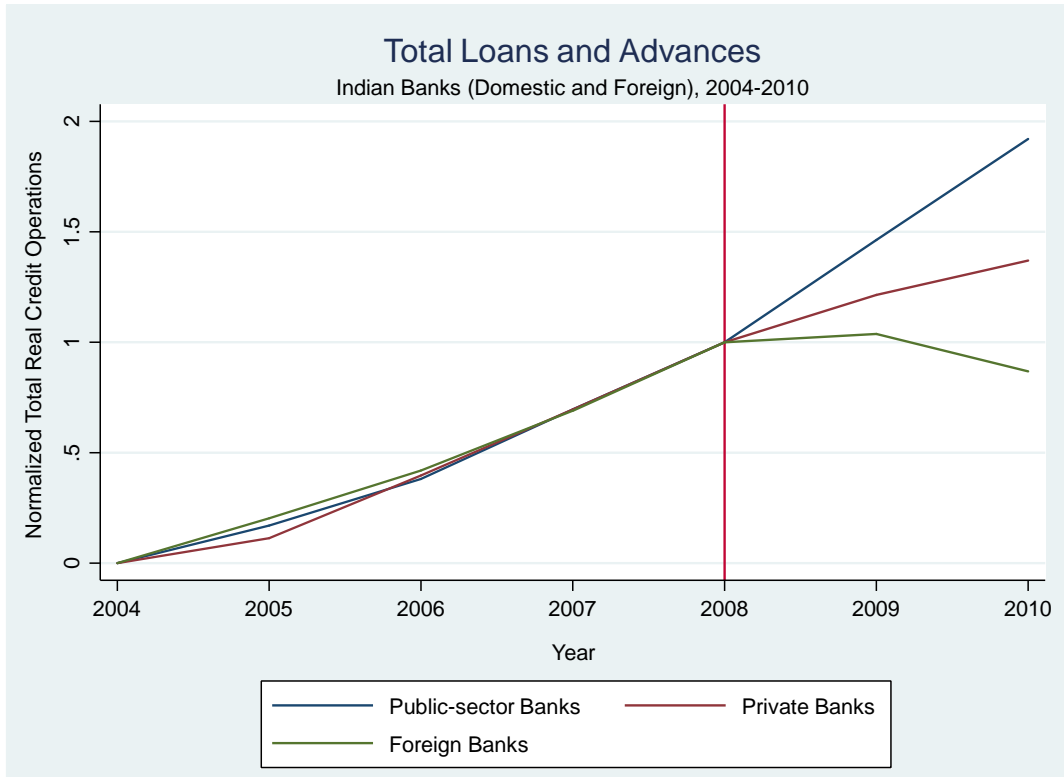
Figure 3: Total Loans and Advances by Different Types of Banks, 2004-2010

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.
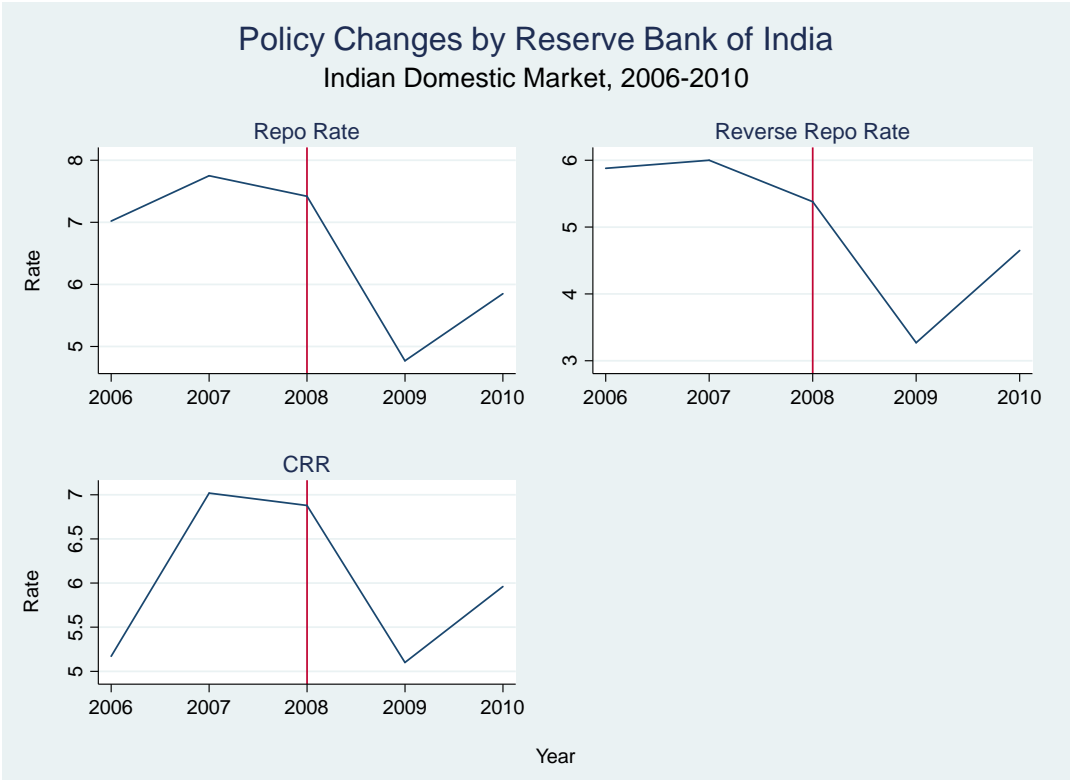
Figure 4: Repo Rate, Reverse-Repo Rate and Cash-to-Credt Ratio

Notes: Figure presents the average rates for a year as announced by RBI, 2006-2010
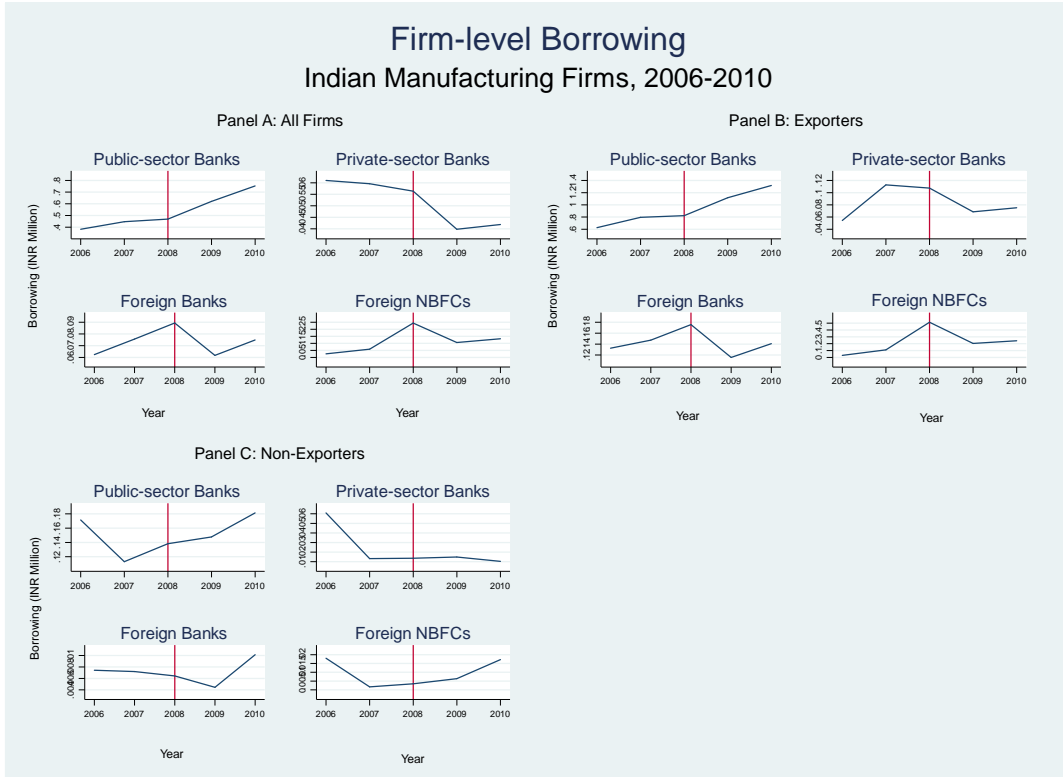
Figure 5: Firm level Borrowing, Indian Manufacturing Firms, 2006-2010

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 6: 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.
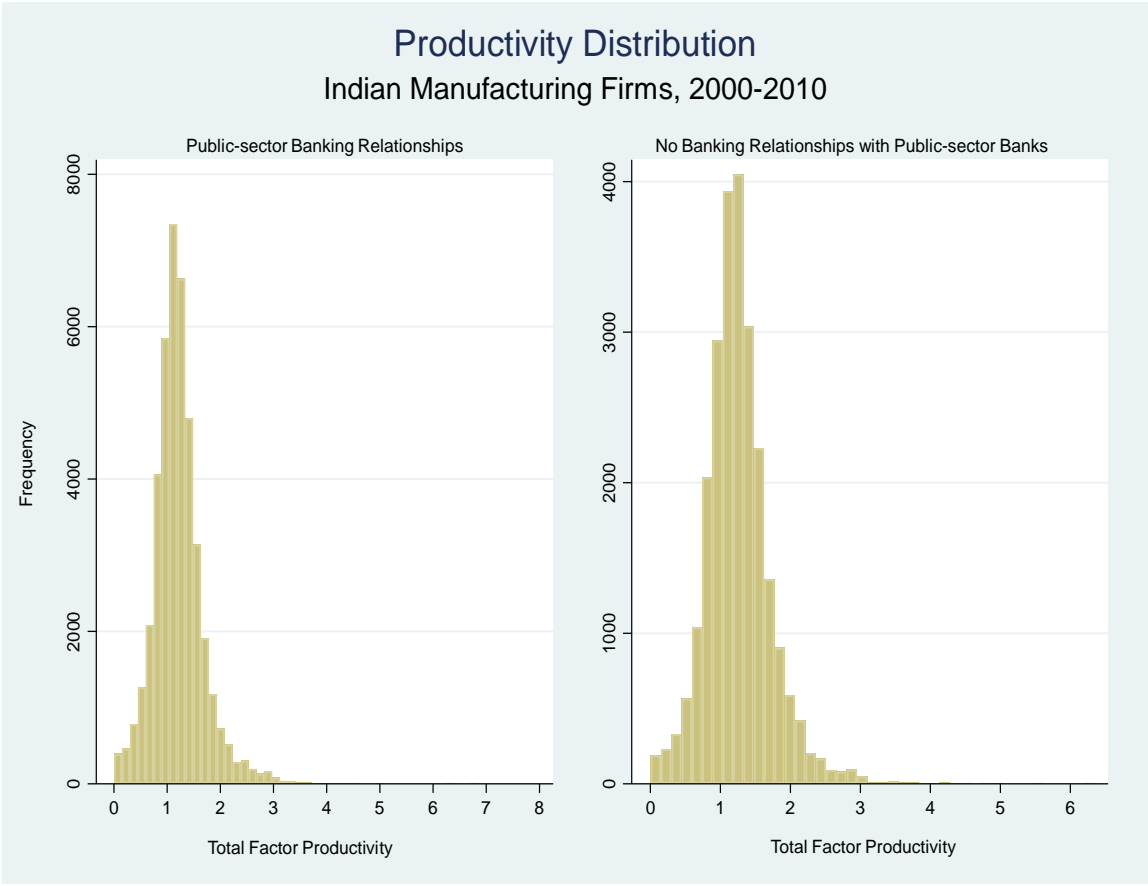
Figure 7: Productivity Distributions

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: Credit Flows from Different Banks, 2008-2009

	4 January 2008	28 March 2008	4 January 2009	28 March 2009
Public-Sector Banks	19.8	22.5	28.6	20.4
Private Banks	24.2	19.9	11.8	10.9
Foreign Banks	30.7	28.5	16.9	4.0

Notes: Values are expressed in %, year-on-year changes. Source: Macroeconomic and Monetary Development, Various Issues, Reserve Bank of India.

Table 3: 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 4: 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 5: Bank Ownership, Monetary Policy, and Firm-level Exports: Utilizing the Banking Relationships

	Ln(Exports)								Exporter = 1	
					High Fin Dependence	Year FE× PSB	Firm Charac× PSB	Firm FE× PSB		High Fin Dependence
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$RR_t \times PSB_{fb,<2008}$	0.077*	0.078*	0.077*	0.078**	0.080*	0.078**	0.094**	0.078*	0.004	0.007
	(0.041)	(0.040)	(0.040)	(0.039)	(0.049)	(0.039)	(0.037)	(0.040)	(0.007)	(0.009)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.91	0.91	0.91	0.92	0.92	0.92	0.93	0.92	0.82	0.81
N	51,224	51,224	51,210	51,195	31,968	51,195	49,215	51,195	51,195	31,968
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	No	No	No	No	No	No	No
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) – (8) use natural logarithm of exports of a firm as the dependent variable. Columns (9) – (10) use a dummy as the dependent variable which takes a value 1 if a firm's export flows $>$ 0. 'RR_t' 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. 'Bank Controls' includes age, age squared and size of a bank. I use total assets of a bank as the size of a bank. I use 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.

47

Table 6: 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)
$RR_t \times B^{CB}_{b,<2008}$	−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)
$RR_t \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$	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 > 0. Columns (9) − (10) use natural logarithm of domestic sales as the dependent variable. 'RR_t' 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 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 7: 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)
$RR_t \times B_{b,<2008}^{CB}$	−0.087** (0.039)	−0.068* (0.039)	−0.076* (0.041)	−0.081** (0.041)	−0.079** (0.040)	−0.075* (0.040)	−0.007 (0.007)	−0.006 (0.008)	−0.006 (0.008)
$RR_t \times B_{b,<2008}^{CB} \times PSB_{fb,<2008}$	0.049 (0.080)	0.031 (0.079)	0.024 (0.082)	0.046 (0.080)	0.020 (0.082)	0.021 (0.082)	−0.010 (0.016)	−0.013 (0.017)	−0.011 (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 > 0. 'RR_t' 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 a public-sector bank before the crisis. '$B_{b,<2008}^{CB}$' 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.

49

Table 8: 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)
$RR_t \times OPWF_{b,<2008}$	−0.061 (0.090)	−0.061 (0.093)	0.011 (0.018)	0.012 (0.019)	−0.014 (0.032)	−0.036 (0.124)
$RR_t \times OPWF_{b,<2008} \times PSB_{fb,<2008}$	−0.227 (0.313)	−0.323 (0.320)	0.038 (0.069)	0.002 (0.070)	−0.050 (0.134)	0.111 (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 which takes a value 1 if a firm's export flows > 0. Columns $(3) - (4)$ use a dummy as the dependent variable. Columns $(5) - (6)$ use natural logarithm of domestic sales of a firm as the dependent variable. 'RR_t' 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. '$OPWF_{b,<2008}$' 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 9: Bank Ownership, Monetary Policy, and Firm-level Exports: Foreign Banks

	Ln(Exports)	Exporter = 1	Ln(Exports)				
			All Foreign Banks	US Banks	EU Banks	Japan Banks	Other Banks
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$RR_t \times B_{b,<2008}^{CB}$	−0.157**	−0.001	−0.118*	−0.172*	−0.116	0.012	−0.208*
	(0.074)	(0.013)	(0.066)	(0.102)	(0.128)	(0.129)	(0.123)
$RR_t \times B_{b,<2008}^{CB} \times DB_{fb,<2008}$	0.139	0.029					
	(0.137)	(0.026)					
$RR_t \times B_{b,<2008}^{CB} \times PSB_{fb,<2008}$			0.019	0.036	−0.007	−0.142	0.078
			(0.123)	(0.169)	(0.166)	(0.131)	(0.172)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.92	0.82	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
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE*Year Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE(4-digit)*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) and (3) − (7) 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 $>$ 0. 'RR_t' 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. '$DB_{fb,<2008}$' 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. '$B_{b,<2008}^{CB}$' 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 10: Bank Ownership, Monetary Policy, and Firm-level Exports: Private Banks

	Ln(Exports)		Exporter = 1	
	All Private Banks	Major Private Banks	All Private Banks	Major Private Banks
	(1)	(2)	(3)	(4)
$RR_t \times B_{b,<2008}^{CB}$	−0.044 (0.060)	−0.099* (0.057)	−0.007 (0.005)	−0.051 (0.042)
$RR_t \times B_{b,<2008}^{CB} \times PSB_{fb,<2008}$	0.015 (0.093)	0.067 (0.098)	−0.010 (0.019)	−0.023 (0.027)
Bank Controls$_{t-1}$	Yes	Yes	Yes	Yes
R-Square	0.92	0.92	0.81	0.82
N	42,647	29,662	42,647	29,662
Firm FE	Yes	Yes	Yes	Yes
Bank FE*Year Trend	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 $>$ 0. 'RR_t' 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. '$B_{b,<2008}^{CB}$' 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 | |
	(1)	High Fin Dependence (2)	(3)	High Fin Dependence (4)
$RR_t \times Borr_{i,PSB,00-01}$	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. 'RR_t' 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. '$Borr_{i,PSB,00-01}$' 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)
$RR_t \times B_{b,<2008}^{CB}$	−0.078* (0.047)	−0.055* (0.028)	−0.077* (0.038)	−0.155** (0.069)	−0.076 (0.070)	−0.027 (0.053)	−0.159** (0.066)	−0.046 (0.046)	0.050 (0.059)
$RR_t \times B_{b,<2008}^{CB} \times PSB_{fb,<2008}$	0.020 (0.087)	−0.011 (0.053)	0.004 (0.089)	0.028 (0.140)	−0.022 (0.136)	0.051 (0.096)	0.069 (0.127)	−0.024 (0.079)	0.004 (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. 'RR_t' 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 a public-sector bank before the crisis. '$B_{b,<2008}^{CB}$' 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.

54

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)
$RR_t \times B^{CB}_{b,<2008}$	−0.102 (0.131)	−0.289** (0.149)	−0.072 (0.102)	−0.047 (0.098)	−0.015 (0.140)	−0.299** (0.144)	0.163 (0.211)	−0.390** (0.196)	−0.109 (0.110)	−0.123** (0.062)	−0.215* (0.127)
$RR_t \times B^{CB}_{b,<2008} \times PSB_{fb,<2008}$	−0.130 (0.212)	0.305 (0.277)	0.031 (0.285)	−0.042 (0.288)	−0.068 (0.242)	0.419 (0.303)	−0.376 (0.397)	0.445 (0.295)	0.413 (0.412)	0.059 (0.138)	0.003 (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. 'RR_t' 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 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.

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.

Repo rate (RR_t): Repo rate is the rate at which the Central Bank of a country (Reserve Bank of India, in case of India) lends money to commercial banks in the event of any shortfall of funds.

$Borr_{i,PSB}$: 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.
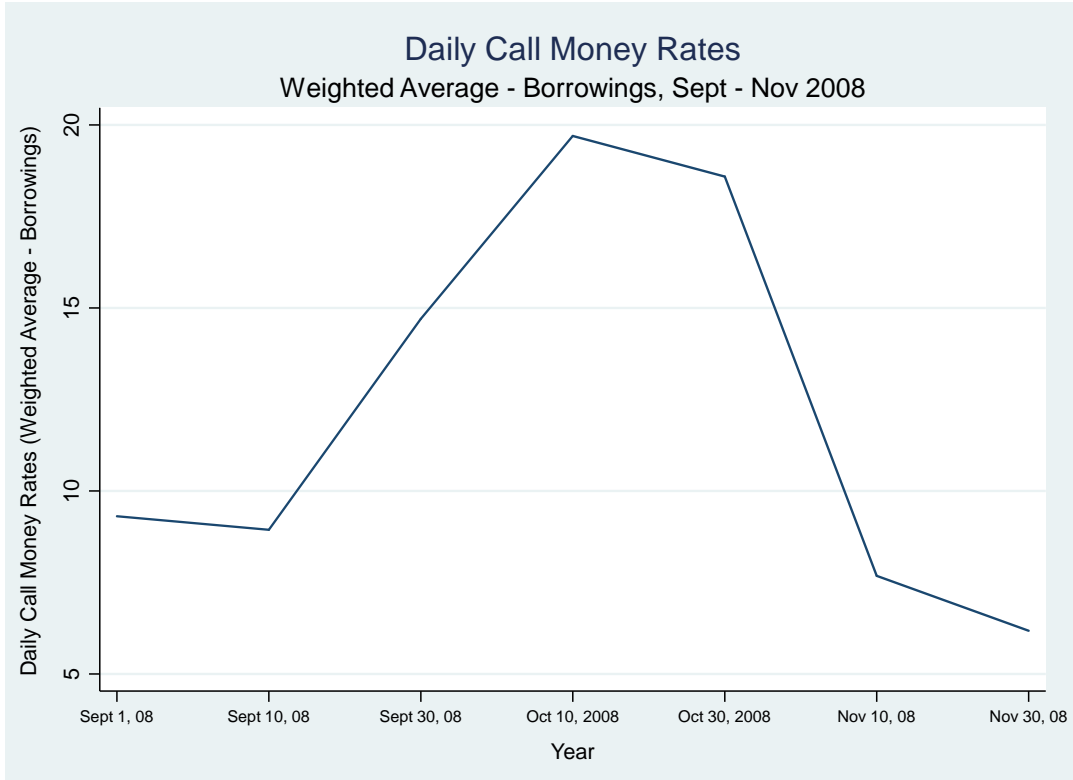
B Figures

Figure A.1: Daily Call Money Rates, Sept. 2008 to Nov 2008
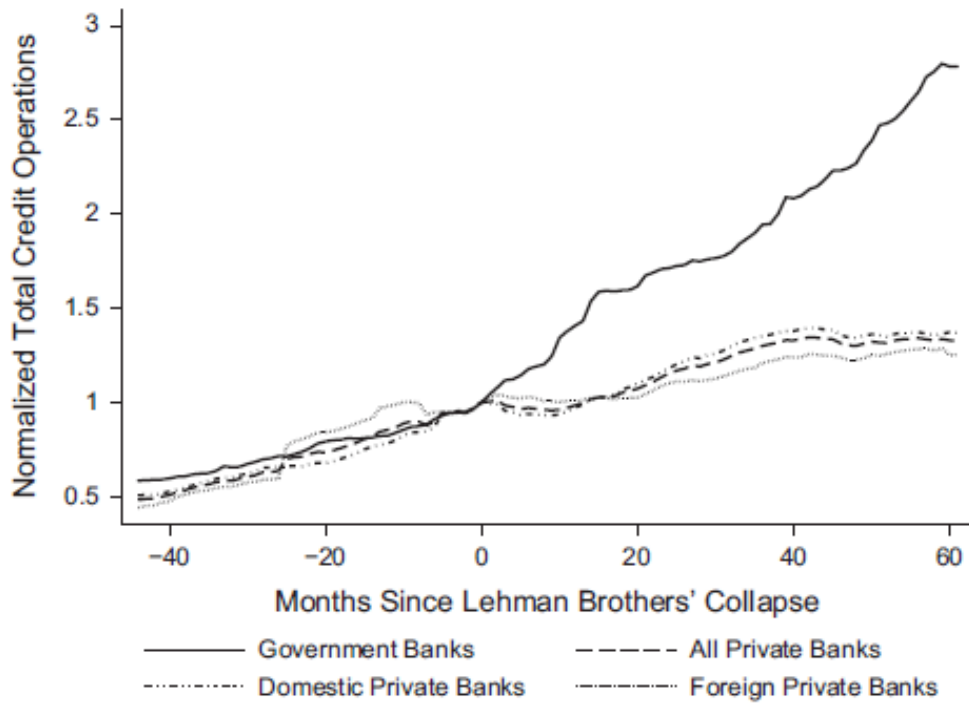Source: RBI Various Publications.

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)
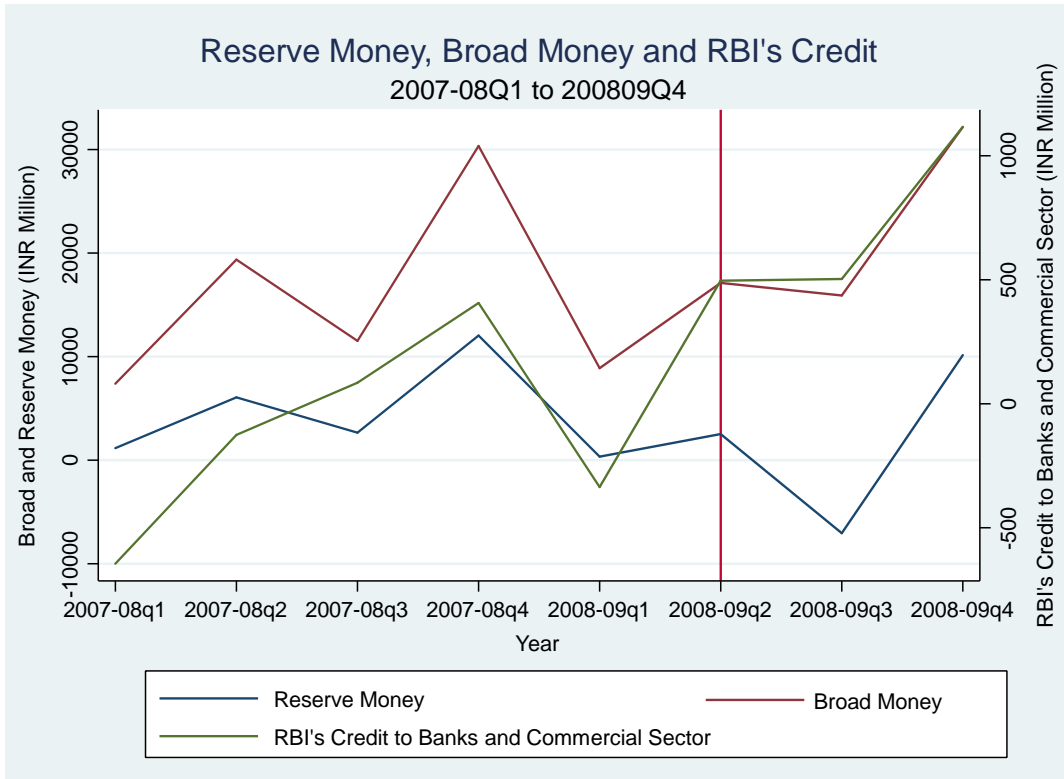
Figure A.3: Reserve Money, Broad Money and RBI's Credit to Banks and Commercial Sector, 2007-08Q1 to 2008-09 Q4

Notes: Figures are in INR Million. Source: RBI Various Publications.

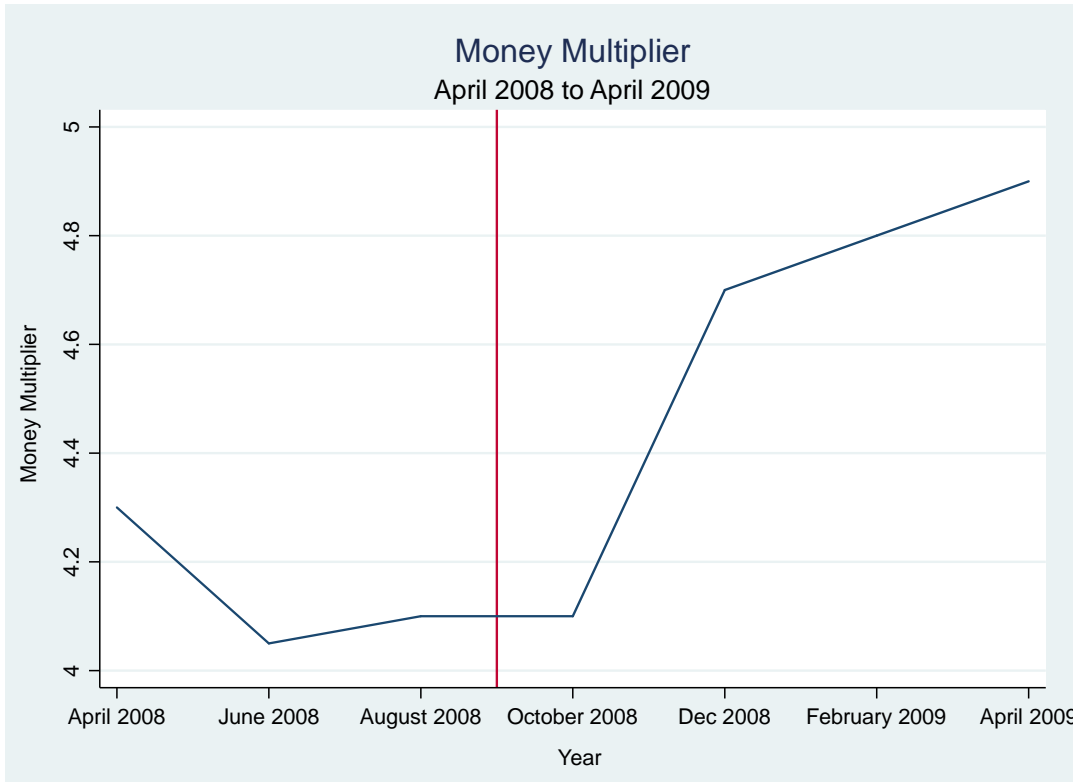Figure A.4: Money Multiplier, April 2008 to April 2009
Source: RBI Various Publications.

Figure A.5: 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 14: 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 15: 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 16: 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)
$RR_t \times LA_{b,<2008}$	−0.153** (0.063)	−0.140** (0.062)	−0.148** (0.062)	−0.159*** (0.055)	−0.146** (0.066)	−0.016 (0.013)	−0.017 (0.014)	−0.047** (0.024)	0.042 (0.128)
$RR_t \times LA_{b,<2008} \times PSB_{fb,<2008}$	0.198** (0.099)	0.195** (0.097)	0.165* (0.096)	0.166* (0.09)	0.209** (0.100)	0.010 (0.020)	0.008 (0.021)	−0.033 (0.043)	0.082 (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 $>$ 0. Columns (8) − (9) use natural logarithm of domestic sales as the dependent variable. 'RR_t' 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. *, **, *** denotes 10%, 5% and 1% level of significance, respectively.

Intercepts included but not reported.